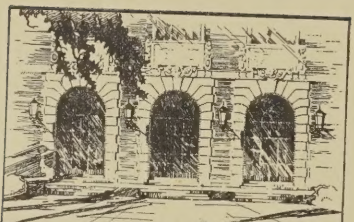

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COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

Volume 4, No. 1
Issued Every Saturday
Hill Publishing Company

NEW YORK, JULY 5, 1913

Ten Cents per Copy
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Advertising Index, Last Page

Coal Age
Vol 4
July to Dec 1913
No. 23 missing

Vol 5
Jan - June 1914

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Power Coal Augers
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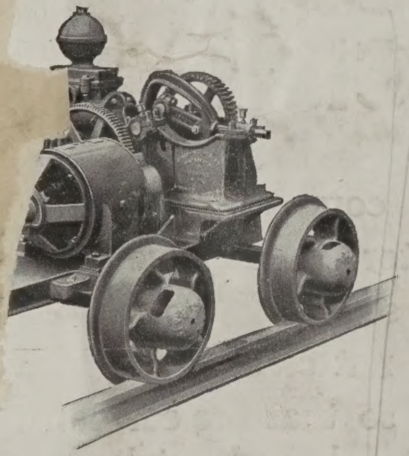
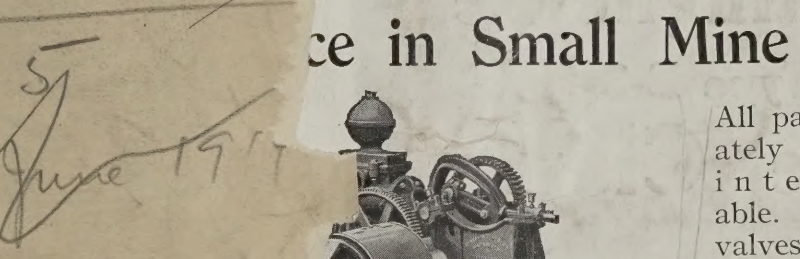


All parts are accurately machined and interchangeable. Cylinder, valves and seat cast from acid resisting bronze. When mounted on a truck, as illustrated, may be taken anywhere in the mine with same ease as mine cars.

It's Ultimate Mine Tie Cost That Counts

The following will give you an idea of what one user thinks of Fairmont Steel Mine Ties. "In my judgment, the steel tie will take the place of the wood tie in a few years, and will be **cheaper** to the small vein operators, where it is necessary to shoot roof rock for height." This is part of just one of many letters we've received along a similar vein.



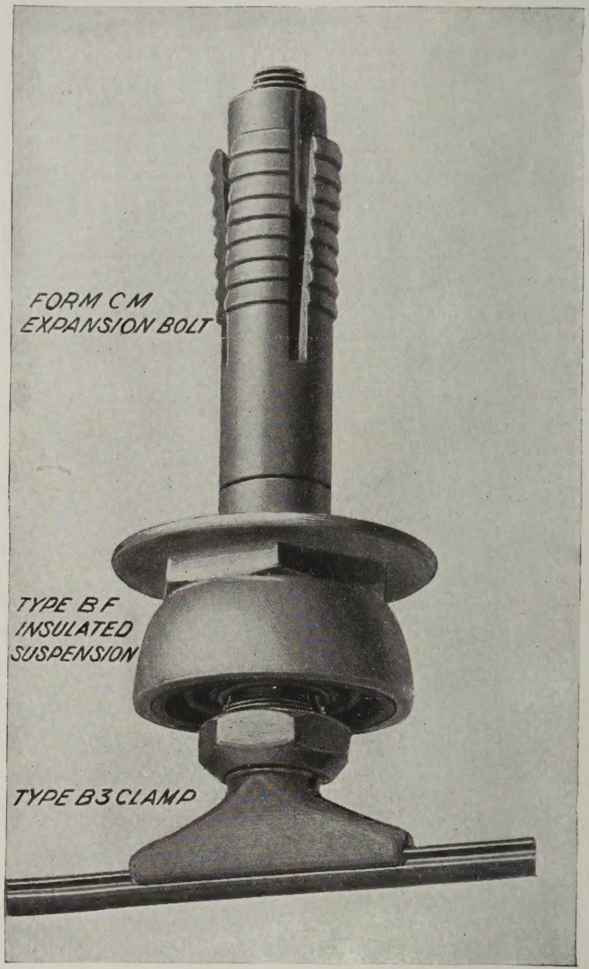
FAIRMONT STYLE "C" STEEL MINE TIE

Look at the mine tie situation seriously. The wooden tie when used once or twice is done for—while **steel ties** last **indefinitely**. Can't you see that it isn't a **low first cost** that counts, rather a low **ultimate** cost, that ought to influence your decision?

Write for the Bulletin now.

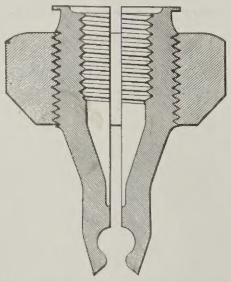
Fairmont Mining Ma
Fairmont

Here is a mine clamp that has only three parts, and that can be installed quickly because it is so simple.



Westinghouse
Type B-3
Mine Clamp

THE clamp complete, with nut loosened, is screwed on the insulator stud.—The wire is inserted in the lips of the clamp and slips freely into place.—Screwing down the nut clamps the wire and also clamps the stud, so that the ear can be placed in any direction and yet be tight on the stud.—Loosening the nut permits the wire being drawn through, without dropping out, for taking up slack.


Cross-section of B-3 Clamp for Fig. 8 Wire

Type B-3 clamp gives absolutely perfect clearance for the trolley wheel, and is as foolproof as a clamp can be. It is suitable for round, grooved or figure 8 wires.

Folder 4224 gives more particulars.

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Cities East Pittsburgh, Pa.

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COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada.

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*A HYDRO-ELECTRIC PLANT TO SUPPLY COAL MINES: *Pages* 2-7

A plant in Virginia which purposes to find a large market for hydro-electric power in West Virginia coal fields, though these are situated nowhere less than 45 miles from the central station, and though some mines which are to be supplied are located 65 miles away. COAL AGE, Vol. 4.

WEST VIRGINIA COAL MINING INSTITUTE: *Page* 8

Following a two-day program, which included the reading of several interesting technical papers, automobile trips to nearby industrial plants and a banquet, the members made an all-day inspection tour of mining and coking plants in the famous Connellsville region. COAL AGE, Vol. 4.

*THE USE OF STEEL TIES IN MINING: *Pages* 8-10

The steel mine tie has not only greater durability than its wood rival, but has the advantage of taking up less room, so that in low places either less brushing is required, or else the cars can be more fully loaded. The many advantages of steel mine ties in beds of coal of all kinds are here summarized. J. Clark Evans. COAL AGE, Vol. 4.

*A COAL CUTTER WITH SAW AND AUGER MOVEMENT: *Pages* 11-13

In this new mining machine the bits are arranged spirally on a cone-shaped cutter. As they revolve, they grip the coal after the manner of an auger. A quick reciprocation serves to break the coal which they have gripped and prepare the surface for further cutting action. It belongs to the type of shortwall machines. Raleigh C. Taylor. COAL AGE, Vol. 4.

A REVIEW OF THE WEST VIRGINIA INQUIRY: *Pages* 14-15

In the investigation of the West Virginia mine strike the statements of the operators were delivered last, when the public was no longer interested. The following is a presentation of the results of the inquiry from the operators' point of view. COAL AGE, Vol. 4.

*ROCKY MOUNTAIN COAL-MINING INSTITUTE: *Pages* 16-18

An account of the second semi-annual meeting of the Rocky Mountain Coal-Mining Institute, which was held at Salt Lake City, Utah, June 11, 12 and 13, 1913. COAL AGE, Vol. 4.

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CIRCULATION OF THIS ISSUE 12,150

None sent free regularly, no returns from news companies, no back numbers

The New Advertising

By George W. Coleman

Ex-President Associated Advertising Clubs of America.

The Weekly Ad-Talk Page

A quiet revolution is going on in the advertising world. This is in accordance with the general trend of things everywhere. Marked changes are manifesting themselves today in every form of organized activity. The advertising men themselves are too close to their work to realize in full the significance of the rapid changes which have been taking place.

In the first place, a new spirit is permeating the whole business. The old motto, *Caveat emptor*, "Let the buyer beware," is fast becoming a relic of the past, and the new philosophy that the Golden Rule pays is being widely accepted. This new spirit is working itself out in countless ways, the effect of which is to put an entirely new face on advertising.

The trade-mark of modern advertising.

But in addition to the new spirit there is a new method also. It has been found that the rule-of-thumb measure of advertising values is an exceedingly wasteful and inefficient standard. Advertising is at last being subjected to the scientific method of study which has wrought such marvelous changes not only in the natural sciences but in many other realms of thought. Advertising is being submitted to laboratory tests—typographical, statistical, psychological and pragmatic. The result is a steady elimination of some of the extravagances and waste which heretofore have characterized altogether too much advertising matter.

It is a rather remarkable coincidence that with this new spirit and new method in advertising there should have come into existence at about the same time a new instrument for the accomplishment of the new ideals which lends itself most naturally to the new order of things. It is the Advertising Club movement that has taught advertising men the tremendous value that lies in co-operative endeavor, and through the perfection of the Advertising Club organization facilities are being afforded for the study and practice of advertising such as were entirely impossible in the days that are gone by.

This is the significance of this great convention at Baltimore at this time. It represents that new instrument for the advancement of American Civilization through industry and commerce—the Advertising Club—which in turn embodies within itself this new spirit and new method that is revolutionizing the advertising business.

This renaissance in the advertising world was first made apparent to the public mind through the widely heralded success of the great Boston convention of the Associated Advertising Clubs, two years ago, although the roots of the matter run back to the formation of the national association, nine years ago, and still further beyond that to the organization of isolated advertising clubs in different parts of the country, the first of which was formed in Chicago eighteen years ago and still flourishes—the well known Agate Club, composed largely of men interested in magazine advertising. This Baltimore convention marks the beginning of a new chapter in this remarkable movement. Our organization has been more highly perfected, our resources have been amplified, our ideals have been clarified, and we have been given a vision such as we have never had before of the possibilities that lie before us.

COAL AGE

Vol. 4 NEW YORK, JULY 5, 1913 No. 1

The Secret

By Berton Braley

Written expressly for Coal Age

The way to reach the man who toils
Amid the dingy workings,
Is not by stratagems and spoils
Or oily smiles and smirkings,
You give him model homes and such,
Or clubs in which to revel,
You still will find yourself "in Dutch,"
Unless you're on the level.

It isn't coddling that he likes,
Or lordly condescension,
Such methods will not stop his strikes
Or banish all contention.
You must be fair and square and just,
A man among your brothers,
Before old doubtings turn to trust
Or ancient hatred smothers.

Whatever motive yours may be,
In time he's sure to find it,
He looks through every deed to see
The spirit that's behind it,
And though he may misunderstand,
Repel, at first, and doubt you,
He'll warmly grasp the proffered hand
When he is sure about you.

The boys within the breaker shed,
The miners, deep below them,
Are slow of faith and hard of head,
You've simply got to show them,
And prove your varied aims and ends
Are *not* those of the devil—
For man and master can be friends—
If *both* are on the level.

A Hydro-Electric Plant to Supply Coal Mines

SYNOPSIS—A plant in Virginia which purposes to find a large market for hydro-electric power in West Virginia coal fields, though these are situated nowhere less than 45 miles from the central station and though some mines which are to be supplied are located 65 miles away.

⁂

The question of the ability of hydro-electric plants to transmit power several miles so as to compete with steam plants using waste fuel at the coal mines is being tried in southern West Virginia. The company expects to use a steam-power plant at times of low water or excessive load. Another power house on which reliance is placed, is that of the Roanoke Railway and Light Co., which is situated 116 miles from the coal fields by railroad. As this plant is operated by steam, it will be placed at a great disadvantage in competing with a plant at a mine receiving its coal direct from the mine tipple. Yet, as it is a standby plant, it will probably be but little used.

The Norfolk and Western R.R., which is about to electrify its lines through this same coal field is reported to be about to erect a steam-power house for its own use, at Bluestone, though the lines of this hydro-electric company will approximately parallel the railroad. The length of line to be so electrified is 30 miles but the actual trackage is in the neighborhood of 85 miles. Apparently, the railroad officials believe they can produce their own power more cheaply than they can buy it.*

Among recent hydro-electric developments which are worthy of special notice, is that of the Appalachian Power Co. This corporation was organized in May, 1911, to develop the water power of the New River, in Virginia, and to distribute it by electric transmission through southwestern Virginia and southern West Virginia.

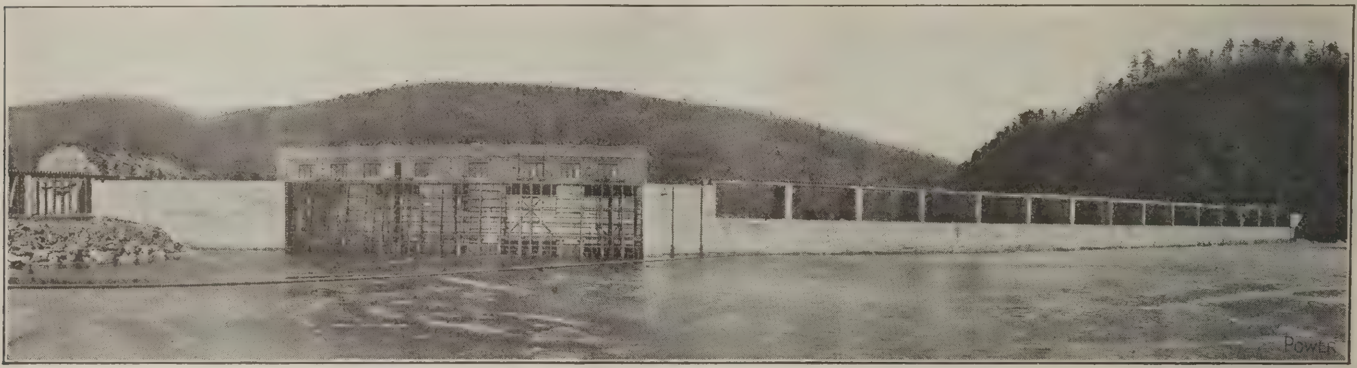

Fig. 1. View of No. 2 Plant and Spillway Dam from Above

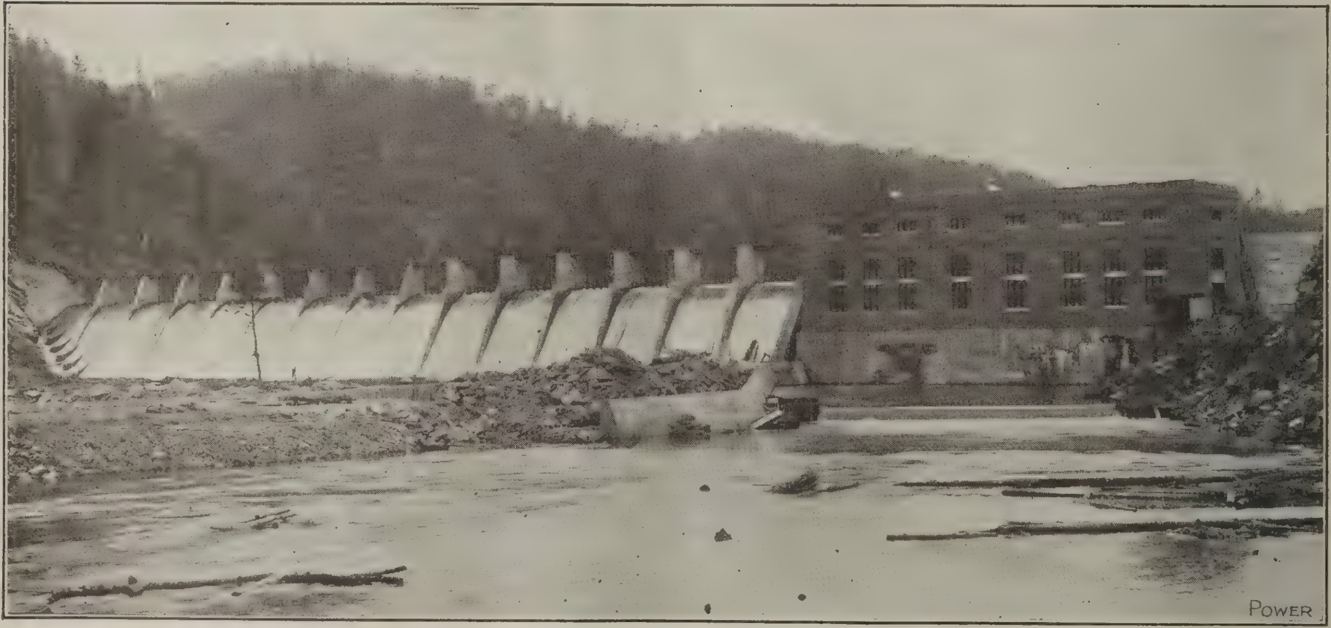

Fig. 2. No. 2 Power Plant and Spillway from Below

When completed, this development will consist of five dams and power houses to be known as Nos. 1, 2, 3, 4 and 5. They will all be built on the New River in Carroll and Pulaski Counties, Va. The aggregate water head will be 225 ft. and the total capacity of these plants will be 75,000 hp. Already plants Nos. 2 and 4, with a combined output of 29,000 hp., have been completed.

Plant No. 2 consists of a dam, the main spillway of which is 504 ft. and the low spillway 198 ft. long. The power house is built in one end of the dam, the overflow of the latter being approximately 50 ft. in height. The dam is built directly across the river. An auxiliary spillway above the power house has been constructed by cutting through a ridge. This discharges into a natural sluiceway back of the ridge; thus saving approximately 200 ft. of dam work. The dam is of concrete and the power house of brick and steel. There are five hand-operated and one motor-operated 6x30-ft. Tainter gates in the main spillway dam, and nine spans of flashboards. The low spillway has six spans of flashboards, which can be applied to a height of 8 ft. The total length of the spillway is 702 ft. There is also a sluice duct for passing drift wood at the end of the power house. The tailrace is 400 ft. long, 90 ft. wide and has an average depth of 12 ft. Approximately 11,000 cu.yd. of material were excavated.

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*Note—The concluding remarks are quoted from an article by Warren O. Rogers on the "Appalachian Hydro-Electric Development," which appeared in "Power," Mar. 25, 1913.

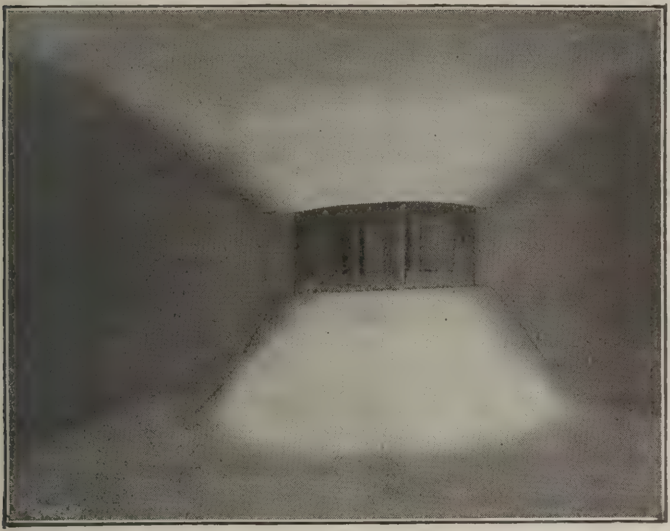

Fig. 3. Concrete Wheel Pit

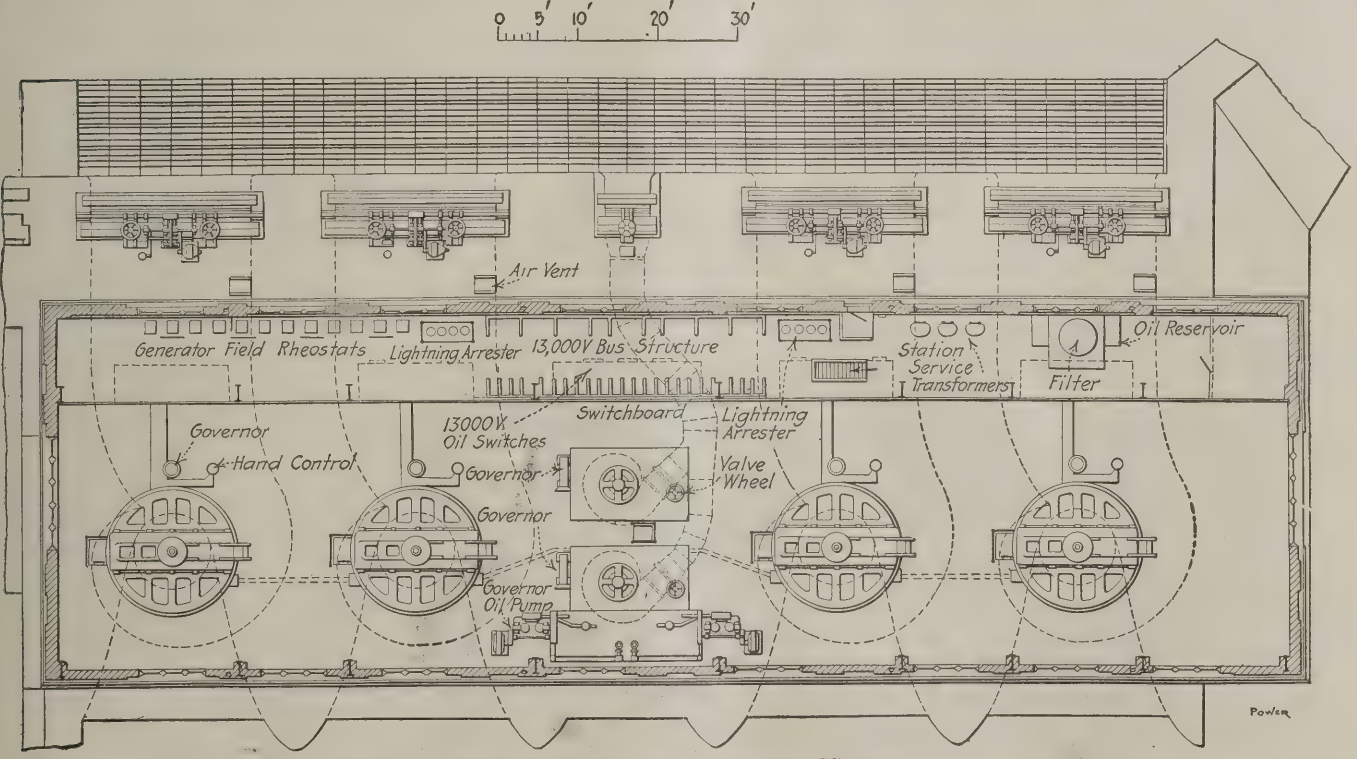

Fig. 5. Plan of No. 2 Power House

Power House No. 2

In this power house there are four vertical-shaft units generating 5000 electrical horsepower. The waterwheels are of the single-runner Francis type. The wheel rests on a circular concrete foundation, and water enters the wheel casing through a spiral-shaped passage formed in the concrete of the foundation. This construction is shown in Fig. 3, which is a view in the wheel pit.

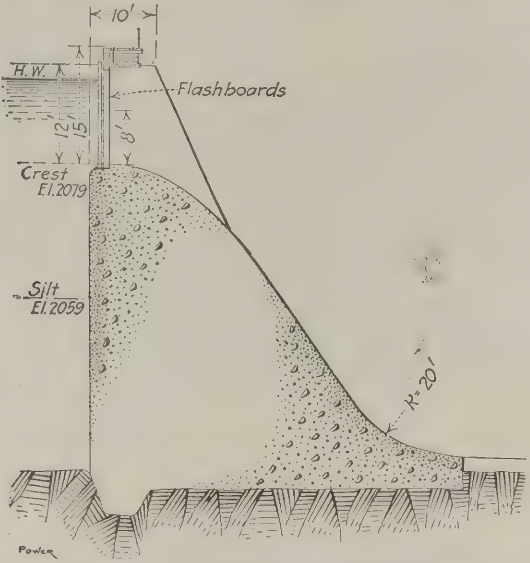

Fig. 4. Section of Spillway Plant No. 4

These four waterwheels are coupled by vertical shafts to four 4000-kw., 13,200-volt, three-phase, 60-cycle generators of the internal revolving-field type. The speed is 116 r.p.m. The water from the wheels discharges through concrete draft tubes into the tailrace in the river bed. Water is admitted to the waterwheels through eight 14x25-ft. motor-operated, screw-actuated sluice gates. With the flashboards in place the average head of water

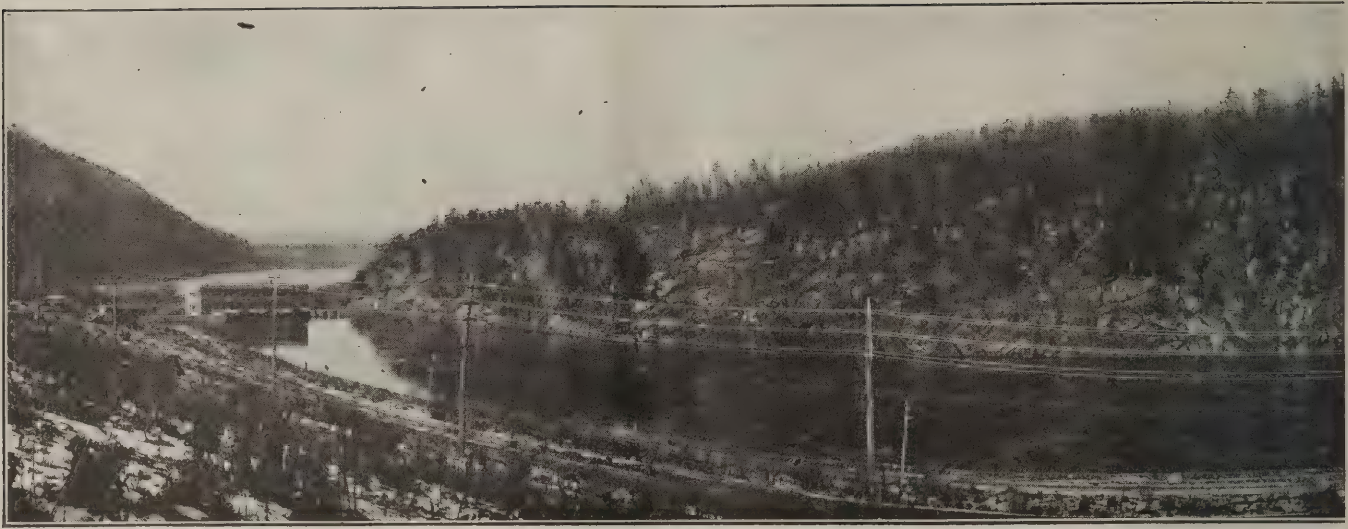

Fig. 6. Panoramic View, Showing No. 4 Power Plant, Headrace and Spillway

to the wheels is 53 ft. The Tainter gates and flashboards are for storing the water and regulating the head. By this arrangement, ample water can be stored above the dam for operating the plant at any daily load factor.

Exciter Units

Between Nos. 2 and 3 generators are two water-turbine-driven exciter units. The wheels are of the inward discharge, single-runner type and are rated at 430 hp. each. They are set vertical and are shaft-connected to two 600-amp., direct-current, 250-volt generators, running at 330 r.p.m. The speed of the units is controlled by a special type of oil-actuated hydraulic governor. The same type of equipment is installed in No. 4 power plant, the only difference being that in the latter plant the two exciter units are located at one end of the generator room, and are of slightly smaller capacity.

Machines for Oil System of Governing

Both power houses contain two triple-plunger, motor-driven oil pumps for operating the governors. The motors are of the induction type and of 25 hp. capacity. They operate with three-phase, 60-cycle current, of 220 volts, at a speed of 845 r.p.m. The motors are gear-connected to the pump crankshaft.

A 7¼x3¾x6-in. motor-driven air compressor is at one side and at one end of each plant. The 10-hp. motor is of the induction type. It operates with three-phase, 60-cycle, 220-volt current, at a speed of 1145 r.p.m., and is gear-connected. The air is used to maintain a uniform pressure of 200 lb. in the tanks of the oil system supplying the turbine governors.

Power House No. 2 is of brick with concrete foundations. It is 162½ ft. long and 89½ ft. wide from the rack to the end of the draft tube. As the electrical equipment is practically the same in both plants the description of plant No. 2 will apply equally well to No. 4.

A cross-section of No. 2 spillway dam is shown in Fig. 4, and a plan view of No. 2 power house in Fig. 5.

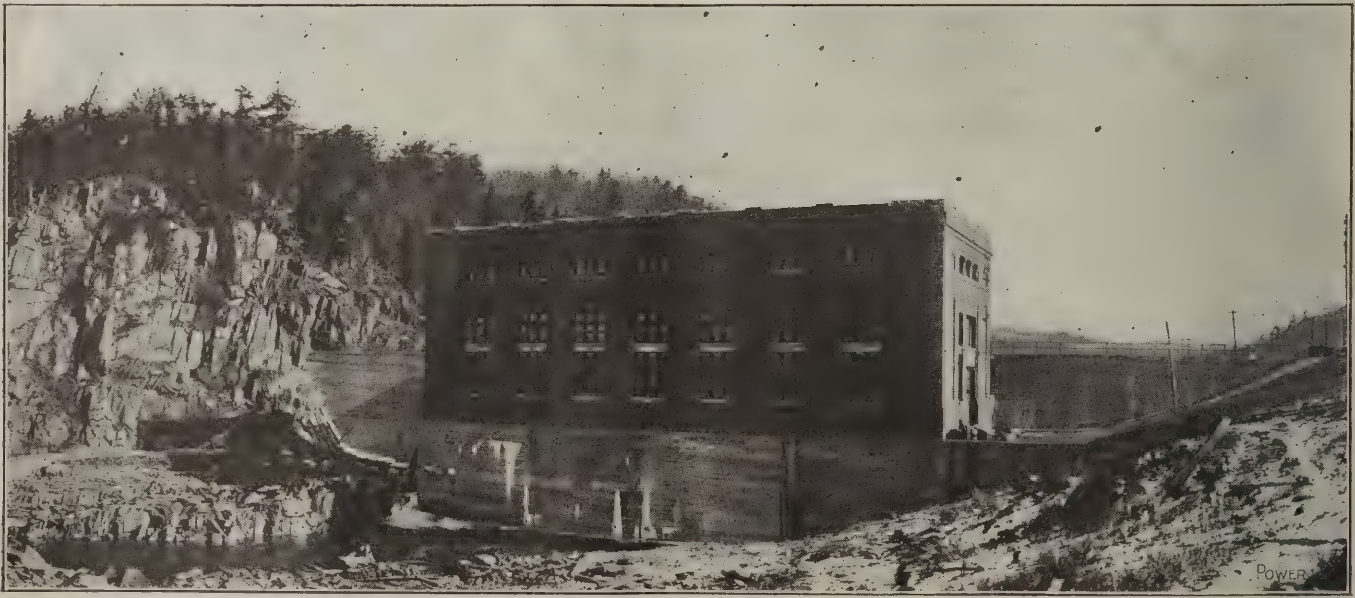

Fig. 7. No. 4 Power Plant from Below the Dam

Plant No. 4

Although plant No. 4 is the smaller of the two, it is of no less interest. It is between Mountain Island in the New River and the river bank. The spillway dam is

Dam on the New River in Virginia; Mountain Island in the Foreground

at the upper end of the island, extending from the south shore of the island to the south shore of the river; the power house is at the other end of the island and it and its dam extends from the north end of the island to the north bank of the river.

The spillway dam, which is built across the main channel of the river, is 1005 ft. long. It has six spans of Tainter gates and 24 spans of flashboards designed for 6½ ft. height. This dam diverts the water to the power house which, with the retaining dam, is at the lower end of this natural headrace.

Below the power house is a tailrace 1900 ft. long, 60 ft. wide and 12 ft. deep. This necessitated the removal of 66,000 cu.yd. of rock. This tailrace provides for an additional head of 15 ft., giving a total average head of 38 ft. Fig. 5 is a general plan of plant No. 4, Fig. 6 a panoramic view of the headrace, spillway dam and power plant, and Fig. 7 is the view from below No. 4 power house. The building is a brick and steel superstructure, 126 ft. long and 34 ft. 4 in. wide, with a solid concrete foundation. The equipment comprises three 3000-hp. units, with vertical-shaft, single-runner waterwheels.

Mounted on the upper ends of the shafts of these wheels are three 2300-kw., 13,200-volt, three-phase, 60-cycle, internal-wound, revolving-field generators; the speed of each is 97 r.p.m. Fig. 8 is a cross-section of No. 4 power house. Fig. 14 is a view of the generating units in plants No. 2.

The special type of double floating-lever governor used is operated from the generator shaft, by bevel gears and shafting. It is oil-controlled, and operates a piston and a lever connected to a rocking ring above the outer casing of the waterwheel. The rocker ring operates the arms attached to the stems of the 20 gate vanes set in the inlets of the waterwheel casing. As the speed of the wheel increases the governor closes the gate vanes enough to shut off the flow of water to the wheel and to maintain a constant speed. If the wheel tends to slow down the vanes are opened.

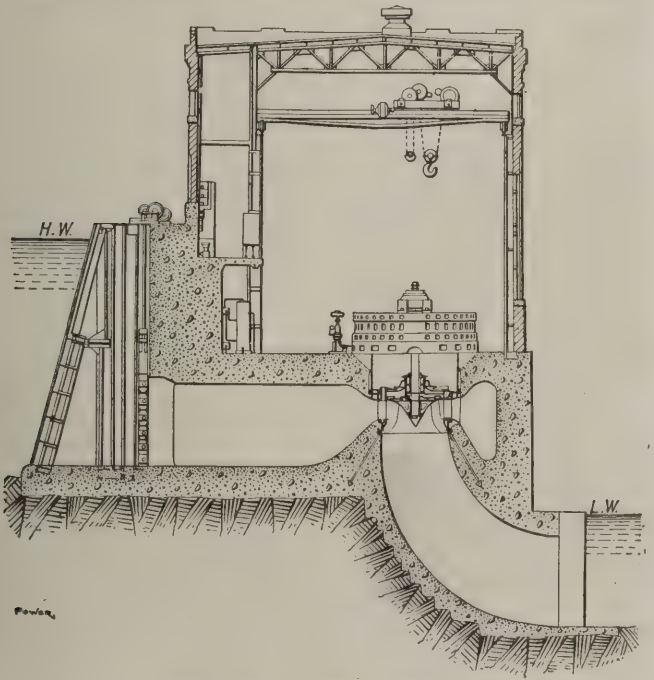

Fig. 8. Cross-Section of Power House No. 4, Showing Turbine and Generator

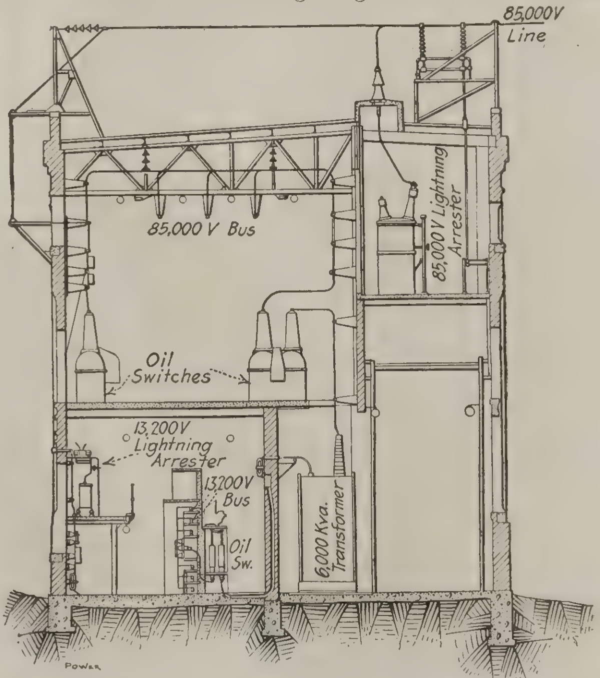

Fig. 9. Cross-Section through Step-Up Transformer House

The exciter waterwheels have 14 gate vanes, similarly

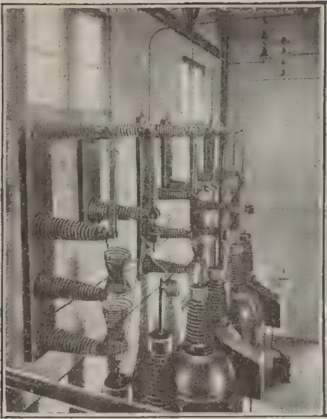

Fig. 10. Choke Coils in Transformer House

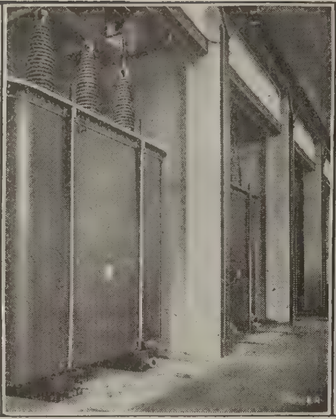

Fig. 11. 6000-Kv.-A. Transformers

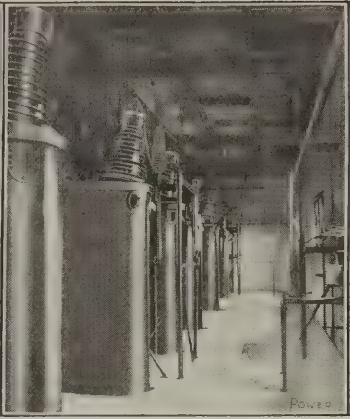

Fig. 12. Single-Phase Transformers

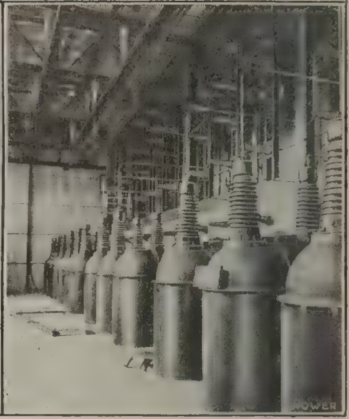

Fig. 13. Oil Switches for Transformers

controlled. The generating and exciter units in both plants are governed in the same way. The shaft of each unit is hung on roller bearings at the top with two steadying bearings below the generator. These bearings are lubricated by a gravity-flow oil system, oil from the bearing flowing to a well and being pumped to the bearings again by a small rotary pump, belt-driven from the generator shaft.

MECHANICAL EQUIPMENT OF PLANTS NOS. 2 AND 4 OF THE APPALACHIAN POWER CO.

No.	Equipment	Make	Purpose	Kw.	Volts	Amp.	Phase	Cycles	R.p.m.	Hp.	Size	Manufacturers
4	Water wheels	Francis	Main units	....	....	....	....	....	116	3500	....	I. P. Morris Co.
3				....	....	....	....	....	97	3000	....	
2			Exciter units	....	....	....	....	....	360	430	....	
2				....	....	....	....	....	330	250	....	
4	Generators	Alt. current	Main units	4000	13,200	....	3	60	116	....	....	General Electric Co.
3				2300	13,200	....	3	60	97	....	....	
2		Direct current	Exciter units	250	250	1000	....	....	360	....	....	
2				250	250	600	....	....	330	....	....	
7	Governors	Hydraulic	Main units	....	....	....	....	....	....	....	....	Lombard Governor Co.
4			Exciter units	....	....	....	....	....	....	....	....	
4	Pumps	Plunger	Oil	....	....	....	....	....	....	....	....	Deane Steam Pump Co.
4	Motors	Induction	Oil Pumps	....	220	70	6	60	845	25	....	Westinghouse Electric and Mfg. Co.
2	Compressors	Motor driven	Compressed air	....	....	....	....	....	....	....	$7\frac{1}{4}$x$\frac{3}{4}$x6″	Ingersoll-Rand Co.
2	Motors	Induction	Air compressors	....	220	26	6	60	1145	10	....	General Electric Co.

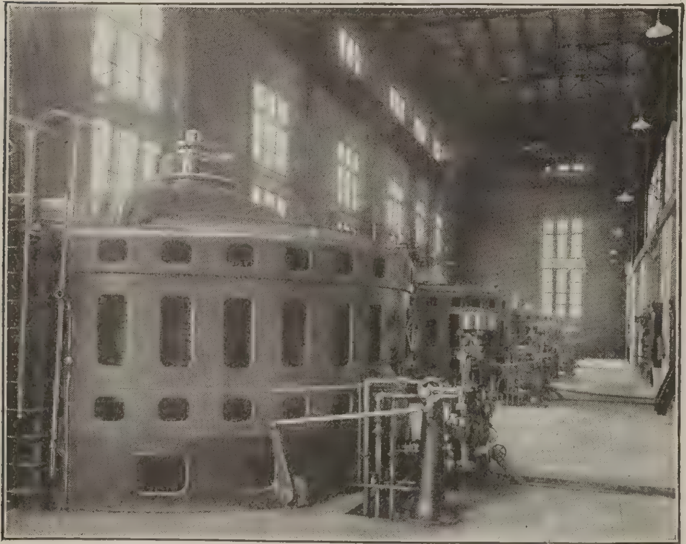

Fig. 14. 4000-Kw., 13,200-Volt Generating Units in Plant No. 2

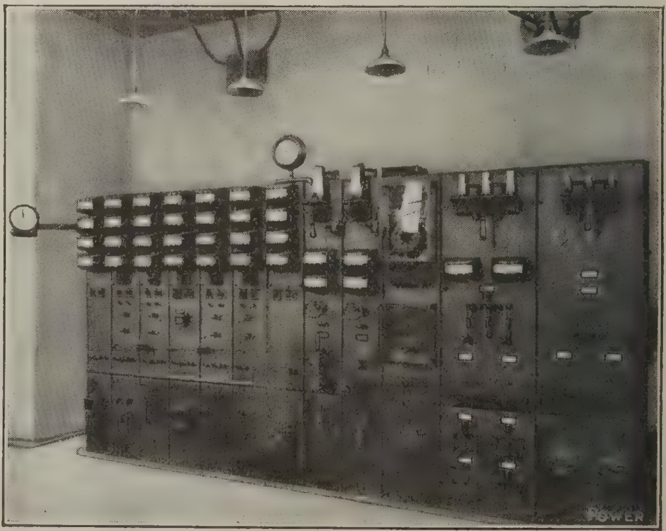

Fig. 15. Switchboard at Main Transformer Station

The waterwheels operate with a head of 38 ft. Water is admitted from the headrace to each wheel pit through two 14x25-ft. motor-operated, double-screw lift gates. The wheels are set on a concrete base, the walls of which are 4 ft. thick, with a draft tube in the center.

Each generator is equipped with an indicator to show the gate opening, and they also have a speed tachometer. In case of an accident to the governor and when starting up the machines, the flow of water to the waterwheels can be controlled by hand.

Electrical Control Apparatus

In both plants the switchboard apparatus only controls the generators. The switchboards are at one side of the building. Back of them are the busbars, in concrete isolated compartments. All oil switches are remote-controlled and are of 13,200-volt capacity. They are on the concrete balcony above the switchboards. The field rheostats are on the balcony, also the lightning arrester with the helical choke coils on the two No. 000, 13,200-volt lines which extend to the transformer house near No. 2 plant.

EXCITER UNITS

Both exciter units are at the end of the generator room. Each is of 250 kw. capacity and generates 250-volt current. The waterwheels are of the inverted, single-runner Francis type, each of 250 hp. capacity. The oil pumps and air compressor are of the same design and size as those of the plant No. 2.

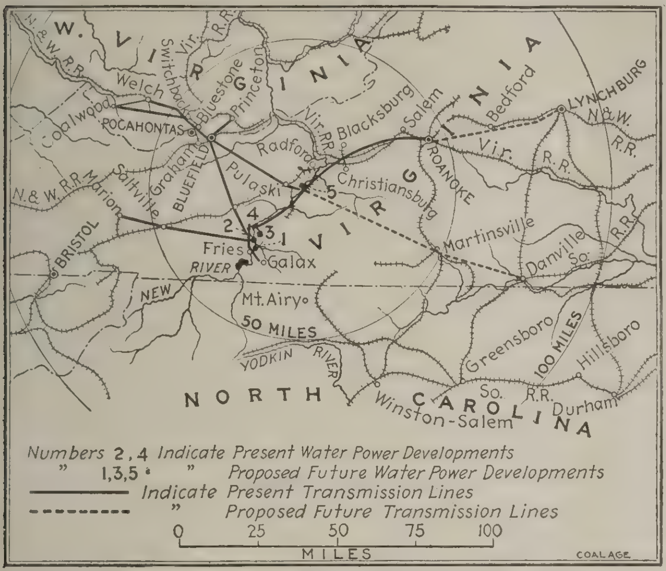

FIG. 16. MAP OF APPALACHIAN POWER CO.'S OPERATIONS

TRANSFORMER HOUSE

Electrical energy from both power plants is carried by overhead lines supported by wooden poles to the step-up transformer house adjacent to No. 2 development. A cross-section is shown in Fig. 9. Here the electrical energy is transformed from 13,200 to 88,000 volts and distributed over the high-tension transmission system. This transformer house is designed for ultimate extension, so that all of the power from the plants Nos. 1, 2, 3 and 4 will concentrate at this house and be regulated and distributed from it. Fig. 10 illustrates the arrangement of the choke coils.

At present there are four 6000-kw., water-cooled, three-phase transformers (Fig. 11) with 13,200-volt primaries and 88,000-volt secondaries, together with the various regulating and controlling devices, consisting of 21 oil switches, all remote-control, and 12 lightning arresters on a balcony over the transformers. The busbars are in concrete isolated compartments; the transformers are on trucks and can be rolled out of their bays if necessary.

The low-tension, 13,200-volt inlet lines enter the house 15 ft. above the main floor; the high-tension 88,000-volt outlet lines are 59½ ft. above the floor. The transformers are delta connected on both sides. Figs. 12, 13 and 15 show single-phase transformers, oil switches, and the switchboard of the transformer station. The latter is on the ground floor.

FIELD DISTRIBUTION

From the transformer house there are three outgoing 88,000-volt lines. One extends to Switchback via Bluefield. The second goes direct to Roanoke, but there is a branch from this line near Pulaski going through Pulaski and on to Bluefield and Switchback. This provides a double circuit into the latter station. The third high-tension line runs direct to Saltville. There is also a high-tension line connecting the Switchback and the Coalwood substations.

In addition there are three 13,200-volt transmission lines outgoing from the transformer house, one direct to Galax, one to Wytheville, on the same poles with the first of the higher tension lines, and one to Hiwassee, mounted on the same poles as the second of the higher tension lines.

The company has a large distribution system in the Pocahontas coal fields radiating from the Switchback and the Coalwood substations. There, a number of contracts have been made with collieries to provide power for their coal-mining operations. This is probably the first instance where a water-power development has supplied power to coal mines.

The company also operates the utilities in the towns of Marion, Wytheville, Pulaski, Bluefield, Pocahontas, Welch and Keystone. It also sells power to the Roanoke Railway & Light Co.

STANDBY COAL PLANTS

In addition to the hydro-electric plants there is a 7500-hp. steam plant at Switchback, W. Va., which has been leased by the company, and will be used as a reserve station and to supplement the power from the hydraulic plants. This steam reserve will be in addition to that available from the various steam plants of the utilities purchased by the power company, and also to the steam power available from the steam plant of the Roanoke Ry. & Light Co. The map, Fig. 16, shows the water power, transmission line and district served by these hydro-electric developments.

Viele, Blackwell & Buck, of New York City, are the consulting engineers. This firm built the hydraulic developments and the high-tension transmission lines and substations. H. M. Byllesby & Co., of Chicago, are the engineers and managers of the company. This company built all the low-tension distribution system in the coal field and in the different towns which are now being supplied by the company.

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Portland Cement Production in 1912

According to figures of the United States Geological Survey, the production of portland cement in the United States in 1912 was 82,438,096 bbl. This production was reported from 24 states. The first ten, namely, Pennsylvania, Indiana, California, New York, Missouri, Illinois, New Jersey, Michigan, Iowa and Kansas, given in the order of their importance, reported 69,682,321 bbl., or about 85 per cent. of the total.

These states ranged in production from 26,441,338 bbl. in Pennsylvania, to 325,040 bbl. in Kansas. The first three reported over one-half of the total production.

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Rocky Mountain Coal Mining Institute

The paper by John McNeil on "Prevention of Accidents and a Higher Standard of Sanitary Conditions in Coal Mines," which was read at the Salt Lake meeting, will be published in our next issue. We also expect to print the paper of D. J. Griffiths, on "Falls of Roof and Sides," in COAL AGE next week.

West Virginia Coal Mining Institute

SYNOPSIS—Following a two-day program, which included the reading of several interesting technical papers, automobile trips to nearby industrial plants and a banquet, the members made an all-day inspection tour of mining and coking plants in the famous Connellsville region.

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The summer meeting of the West Virginia Coal Mining Institute convened in Morgantown, Tuesday morning, June 24. Following addresses of welcome by Mayor Stewart and Prof. C. R. Jones, of the State University, came the presidential address of Neil Robinson. After President Robinson had finished his interesting and instructive talk, a paper on "Gasoline Motor Haulage in Mines," was read by R. O. Hodges, mechanical engineer of the George D. Whitcomb Co., Rochelle, Ill. This lengthy discussion on gasoline locomotives will be published in COAL AGE, probably next week.

In the afternoon of the opening day of the convention, the members and friends of the Institute boarded special cars and were taken to Sabraton, where they inspected the works of the American Sheet & Tin Plate Co., and the Pressed Prism Plate Glass Co. Returning to Morgantown at 4 o'clock in the afternoon, the Institute members were taken in automobiles for an extensive ride to the plant of the Hydro-Electric Co. of West Virginia, on Cheat River, and from there to Mt. Chateau, where a luncheon was served.

On Wednesday morning, President Robinson having been called away, George T. Watson, vice-president of the Institute, presided. The following papers were read: "Welfare Work in Mining Communities," by Ira D. Shaw, secretary Central Y. M. C. A., Pittsburgh, Penn.; "The Hess Dustless Mining Machine," by Raleigh C. Taylor, secretary Hess Dustless Mining Machine Co., Ansted, W. Va.; both of these papers are printed elsewhere in this issue.

On Wednesday afternoon, J. Clark Evans, secretary of the Fairmont Mining Machine Co., Fairmont, W. Va., read an interesting paper on "The Uses of Steel Ties in Mining." Following Mr. Evans' address came a talk on "The Power Development on the Cheat River, at Cheat Haven," by George F. Rowell, engineer-in-charge, Cheat Haven, Penn.

The members of the Institute attended a banquet at the Madeira Hotel, Wednesday evening. Short after-dinner talks were given by H. M. Wilson, engineer-in-charge, Bureau of Mines, Pittsburgh, Penn.; Dr. T. E. Hodges, president West Virginia University; Floyd W. Parsons, editor COAL AGE; J. B. Hanford, general superintendent Elkins Coal & Coke Co.; E. B. Wilson, editor *Colliery Engineer;* J. B. Johnston, editor *Coal and Coke Operator;* and E. N. Zern, professor of mining, West Virginia University. Dr. I. C. White, of Morgantown, acted as toastmaster.

On Thursday morning, at 7 o'clock, the Institute members left Morgantown via the B. & O. R.R., for an all-day trip to various modern mining and coking plants in the Connellsville region. Mines of the W. J. Rainey Co., the H. C. Frick Coke Co., and the Oliver & Snyder Steel Co., were inspected. The meeting as a whole was interesting and instructive, although the attendance was not as large as it has been at other recent meetings of the West Virginia Institute.

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The Use of Steel Ties in Mining

By J. Clark Evans*

SYNOPSIS—The steel mine tie has not only greater durability than its wood rival, but has the advantage of taking up less room so that in low places either less brushing is required or else the cars can be more fully loaded. The many advantages of steel mine ties in beds of coal of all kinds are here summarized.

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The scarcity of timber, among other reasons, has caused the introduction of the steel tie into mining, but that has not been the sole reason for its development. Many operators have realized that the wood tie has several disadvantages, such as excessive cost of handling, short life, and height of track above room floor. At first every operator who used steel ties had a special design of his own, and none were manufactured or used extensively.

It has been only within the past four years that steel mine ties have been put on the market and pushed by manufacturers in this country and the strides this product has made are remarkable. Mines that a few years ago were using a hundred at a time are now ordering them by the car load. I have collected a few statements from mining men relative to the availability of steel ties for use in mining, and I feel that I can do no better than to quote some of these.

Relative First Costs

C. H. Meade, the general manager of the Peytona Block Coal Co., Peytona, W. Va., states: For laying one pair of rails we use four steel mine ties which cost us 32c. each, or $1.28 per pair of rails. When laying the same length of track with wood ties, we place them at three-foot centers and so have to use 11 cross ties at a cost of 5c. each, or $0.55 per pair of rails. We also use spikes costing about 10c., making the cost for material 65c. as against $1.28 for material where steel ties are used.

To offset this greater cost for material, however, we find that there is a large difference in the labor required to lay the pairs of rails, using the two different methods of keeping them in gage. At most mines, the miners do not object to laying the tracks in their working places themselves if steel ties are used as they can lay them without any tools, but they demand that wood ties shall be placed for them by a track layer. Moreover they can lay the rails and be loading coal in the time they would be waiting for a tracklayer to reach their places. The difference of cost in laying (63c.) is practically absorbed by the time demanded to gather up the necessary wood ties and haul them to the working place, and to pay a track layer to go to the room and lay the rail.

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*Secretary Fairmont Mining Machinery Co., Fairmont, W. Va.

Note—Paper read before the West Virginia Coal Mining Institute, June 25, 1913, at Morgantown, W. Va.

First Cost of Both Ties Really Equal

Therefore, I regard the original cost of one pair of rails laid with steel ties and one pair laid with wood ties as practically the same. My experience has been that wood ties are very seldom used more than twice. I have not been using steel ties long enough to make an estimate as to how many times they may be used, but it would certainly take a long time to wear them out.

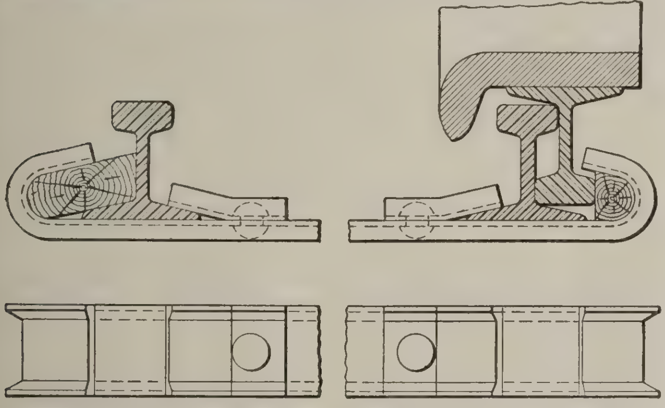
We find that we recover a much greater number of ties made of steel than we do when they are made of wood. If the top gets bad in a working place it only takes a few minutes' labor to tear up and remove the track if laid with steel ties, and the miner can do this work when to spend the longer time required to remove a track laid with wood ties would be dangerous.

Moreover, if a mine foreman, tracklayer, or any other dayman sees a steel tie or two in a part of the mine which is not in use the natural thing for him to do is to pick this tie up and bring it out as the work is trifling, whereas had it been a wood tie, he would probably intend to come back and get it or send back for it some other time, which time would probably never come.

Track Extension

One of the chief values of the steel tie lies in the fact that its use has made possible the most satisfactory method of advancing the jumper rail that has ever been developed. I find that by turning the "jumper" upside down, right over the track rail which has already been laid, but on the outside of it, thus leaving the base of the jumper up instead of the ball, that the jumper will lie right over the track rail and extend past it, thus allowing the miner to keep his mine car right up to his coal all the time.

A regular wooden wedge will hold this jumper in place just as it will the rails in the track. The miner then to extend his jumper has only to loosen this wooden wedge and pull the jumper rail forward the required length. When the full length of the jumper is used in this way the miner simply turns it over and wedges it up, making it a part of his road track. We do not make special wood wedges for this work but use cap pieces and no tools at all are necessary as these wedges can be driven in with a piece of slate if no tools are at hand.



Steel Tie with Exterior Reversed Jumper Rail

When taking up bottom slate for the roadway where we use wood ties which are 5 ft. long, we have to remove material about 6 ft. in width, but when using steel ties that width can be reduced to four feet. This difference is strongly in favor of the steel ties; moreover, that type of tie takes up not more than ½ in. of height, while the wood ties take up 4 in. We have just 3½ in. less slate to handle to get the same height over our mine car.

The Economy Ratio Three to One

Fred Norman, chief engineer of the Allegheny River Mining Co., Kittanning, Penn., makes the following statement relative to steel mine ties: The length of time during which the steel tie has been in use in our mines is not sufficient to permit me to certify to its durability, but it appears that a steel tie would last as long as six wooden ties and half as many of these more expensive ties are required to lay the same length of track as is necessary when wooden ties are used. The ratio of utility is, therefore, as 1 to 12.

We pay 32c. plus freight for our steel ties and the wooden tie costs us 8c. delivered. Overlooking the freight charge, which is not considerable, the ratio of costs is as one to four in favor of the wood tie. Hence it is easy to see that it is three times as profitable to use a steel tie as one made of wood. This estimate does not take into consideration the fact that there is a saving in spikes and a saving in tie waste because the miner takes more care to save steel ties than he will to recover wooden ones. Moreover, steel ties are not suitable as substitutes for props and the wooden ties are very often used for this purpose replacing material which might be purchased much more cheaply.

Convenience in Laying Tracks

There is also much saving in the laying of tracks. As it is easy to relay a road in an abandoned room or along a coal pillar with the use of these steel ties, the miner often does the work himself rather than wait for the tracklayer to do it for him. Under the old system in which wood ties were used he would sit down and wait patiently, or impatiently as the case might be, and have the tracklayer lay his track.

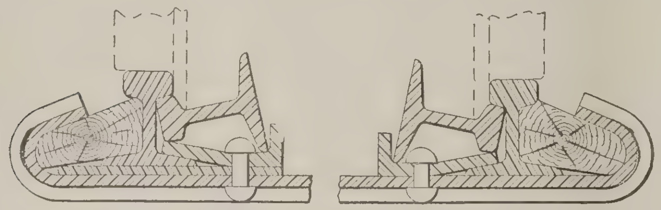
There is also a considerable saving in brushing rooms in low coal where a few inches would have to be removed either in the top or bottom in order to permit the passage of the car, and we can lay the track with the top of the rail four inches lower than on wooden ties unless the wood ties are sunk down into the floor which has to be paid for when done. Steel ties sink readily into the clay so that the base of the rail rests on top of the floor.

In other cases where it is not necessary to lower the rail for the passage of the car it is an advantage to have a thin tie because we can get a topping of four inches of coal on each car in excess of what could be loaded if a wooden tie were used. This amounts to about 10 per cent. more coal per car.

Miners are more careful to remove steel ties where drawing pillars than they would be were wooden ties provided. Miners prefer the steel tie as it is less work to lay the track with them; they are easier and lighter to handle, and spikes are not needed. It is sometimes hard to get these spikes from the trackman who is not desirous of giving the men any more than they absolutely need, because he fears that if he is too liberal he will not have enough for himself and large quantities will be wasted.

Better Room Tracks

As the ties sink into the bottom and leave the base of the rail resting firmly on the slate there is a more stable track for the car with less bending of the rails. The additional height permits better loading with less difficulties.



Steel Tie with Interior Jumper Rail Used as Channel Track

The stability of the track makes it easier for the miner to handle his cars where he has to push them in and out of his rooms. If a car leaves the track it is generally not so badly distorted when a steel tie is used and it is a great deal easier to get the car or cars retracked when there is a lift of only about two inches to replace the car as against six inches with wooden ties.

We find that track laid with steel ties in rooms gives excellent satisfaction with electric-gathering motor haulage and consider that we are saving many wrecks or derailments when gathering with locomotives because the track is laid solid on the floor.

This company has its own mills and is manufacturing timber and the wood ties are cut from odds and ends which will not make marketable lumber, but the steel tie has so many points in its favor that we find it more profitable to make them than to buy our own wood ties.

Four Steel Ties to a Pair of Rails

Lee Ott, general superintendent, Davis Coal & Coke Co., sends reports from two of his superintendents at mines where steel ties are being used. The first letter, from W. W. Brewer, superintendent of the Dartmore mine, reads: Steel mine ties have been used in the Dartmore mine for the past seven months. We use four steel ties under a 30-ft. rail, one at each end and two at equal distances apart in the middle. As the ties cost 32c. each, $1.28 is the total material cost of laying a track 30 ft. long. No spikes, bolts, splice bars nor the service of the trackman are required.

If wood ties were used for the same distance, placing them three feet apart, it would take 10 ties at 10c. per tie, making $1 plus 12c. for spikes. Thus the cost would be $1.12, making a difference of 16c. more for the steel ties. The cost would figure the same in proportion for a longer track, that is, about ½c. per foot more where steel ties are used.

If wood ties were adopted an additional expense would be added for we would be compelled to send a trackman to help many of the miners with their tracks. There are many miners who cannot lay a good track.

Use in Pillar Work

Miners would have to be supplied with track tools especially on pillar work to tear up the track; short rails would have to be supplied for each place and the miner would lose much time in tearing up and relaying the rails.

Steel ties are convenient in pillar work; the last rails at the face of a pillar are turned upside down and the top of the rail slipped from the outside groove of the tie in place of the wedge, and as the pillar is drawn back the rails are slid in the outside of the other rails until the full rail length is used up. It requires practically no time or effort on the part of the miner. With the wood tie the men would be running from place to place, hunting spikes and hammers and we would lose tonnage, especially on a day when men were scarce.

I believe the steel tie would work successfully on a heading if splice bars were used on the rails with the heavier ties. I feel sure they would hold the track under a heavy load. The rails cannot get out of gage or turn and after the track was run over for a time it would become stationary and not work sideways.

M. H. Harrison, superintendent of mines 14 and 20, writes: The steel mine tie saves shooting the rock to obtain height in the rooms of our mines and so saves a dollar per yard. Allowing one tie for every yard of rock, which we would be obliged under ordinary conditions of working to shoot, we have a saving of 63c. per yard on the initial cost and have the tie to use elsewhere for the same purpose as it is practically indestructible. In this way these ties are a great boon to the operators of mines in thin coal.

When the Moores Run Coal Co., which owned the Kirkwood mine, near Bridgeport, Ohio (now operated by the Hutchinson Coal Co.), equipped that mine with steel rails and ties they collected data showing the economy effected.

YEAR 1907—ALL WOOD TRACK

Month	Tons produced	Cost per ton
September	16043	$0.0480
October	26216	0.0402
November	22617	0.0370
Average cost per ton		0.0410

YEAR 1908—75% STEEL TRACK

Month	Tons produced	Cost per ton
September	12620	$0.0398
October	16696	0.0336
November	16281	0.0321
Average cost per ton		0.0348

YEAR 1909—ALL STEEL TRACK

Month	Tons produced	Cost per ton
September	21556	$0.0284
October	22540	0.0281
November	25191	0.0282
Average cost per ton		0.0282
Saving per ton in favor of ALL STEEL TRACK		$0.0128
Saving for three months of 1909		$886.85
Saving per room measuring 24 ft. x 200 ft. and producing 1000 tons; coal 5 ft. 4 in.		12.80

The following comparison of cost of removing the coal from a room 24 ft. wide, 200 ft. long, 5 ft. 4 in. thick, by the use of steel rails with wood ties, and steel rails with steel ties was also made at the same time.

Wood Ties		Steel Ties	
Ties 2½ ft. apart, 80 ties at 12c.	$9.60	35 Ties at 33 cts.	$11.55
320 spikes, 40 lb.	0.90	Labor removing track	1.50
Labor laying and removing track	7.50	(Track laid by miners)	
Depreciation of ties and spikes.	3.50	Depreciation	1.00
Total	$21.50	Total	$14.05
Value of material left	7.00	Value of Material left	10.55
Actual cost	$14.50	Actual cost	$3.50

Saving per 1,000 tons $11.00 or $0.011 per ton.

A Coal Cutter with Saw and Auger Movement

By Raleigh C. Taylor*

SYNOPSIS—In this new mining machine, the bits are arranged spirally on a cone-shaped cutter. As they revolve, they grip the coal after the manner of an auger. A quick reciprocation serves to break the coal which they have gripped and prepare the surface for further cutting action. It belongs to the type of shortwall machines.

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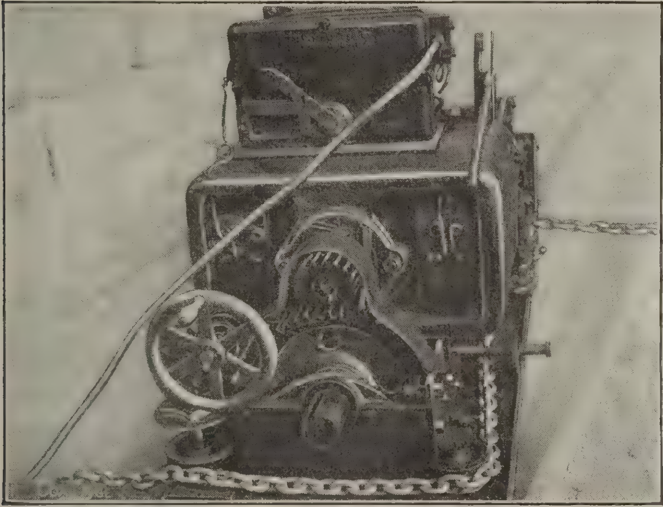
The Hess dustless mining machine is the invention of Louis F. Hess, who was born near Ansted, in Fayette County, W. Va., in the year 1862, and has remained there practically all his life, now living on the old homestead where he was born. His grandfather came to Nicholas County, W. Va., from Massachusetts, in 1816 or 1817, and perhaps it was from this Yankee ancestor that he inherited the ingenuity that enabled him to design his coal cutter.

The inventor has been at work in and around the coal mines of Fayette County, for about 33 years, and thinks he has mined with his own pick his full share of coal. From mining he was promoted to mine foreman, and then superintendent, so that he has filled almost every position connected with his line of work.

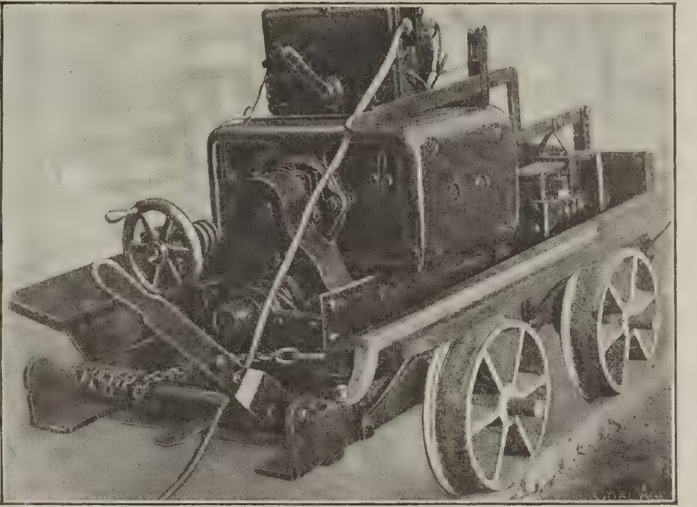
Evolution of the Machine

About 1896 he was in charge of two mines for W. P. Rend, the well-known coal operator of Ohio and West Virginia. Here, for the first time, he was in charge of mining machines, and they gave him so much trouble in various ways that he determined to build a cutter of better design. From that time to this he has been experimenting and working out his plans as spare time and means would allow. After several experiments, he finally worked out a satisfactory cutter bar and contrived the means for giving it a reciprocating as well as a revolving motion.

Shortly after this, in 1911, he built, partly at home and partly at the machine shop of the Gauley Mountain Coal Co., his first power-driven machine. To demonstrate his idea, he mounted the motor and shaft with cutter bar attached on a wooden frame, and with this contrivance proved to everyone who saw the resultant machine in operation that he was working on the correct principle. Then arrangements were made with the same company to build a machine of suitable materials and of substantial construction. At this point proper credit should be given to E. L. Morris, of Ansted, whose mechanical skill, good judgment and patience have been invaluable to Mr. Hess in working out all the necessary details.



Machine Rigged for Cutting across Face



Small Truck Conveys Cutter between Rooms

Finally, the first machine was completed and made the remarkable record of cutting a room the first time it was taken into the mine, and did it with little trouble; though, of course, many changes of detail and improvements suggested themselves.

Machine Bores and Saws Its Way through Coal

The Hess machine is of the revolving cutter-bar type and in operation combines the two methods that have long been regarded as the best for cutting coal, viz.: boring and sawing. The construction is strong and simple. On a substantial bed plate, shaft bearings are mounted at such an inclination from the horizontal as to hold the main shaft true with the center line of the cone-shaped cutter bar when that cutter is lying with its lower surface in the same plane with the bottom of the bed plate. The main shaft is surmounted by the motor, so that the armature pinion engages the gear on the rear end of the shaft, the ratio of their diameters being 3:1, giving a speed of 300 r.p.m. to the cutter bar.

The reciprocating motion is derived from a worm, affixed to and revolving with the main shaft; but the latter is free to slide backward and forward through it. On

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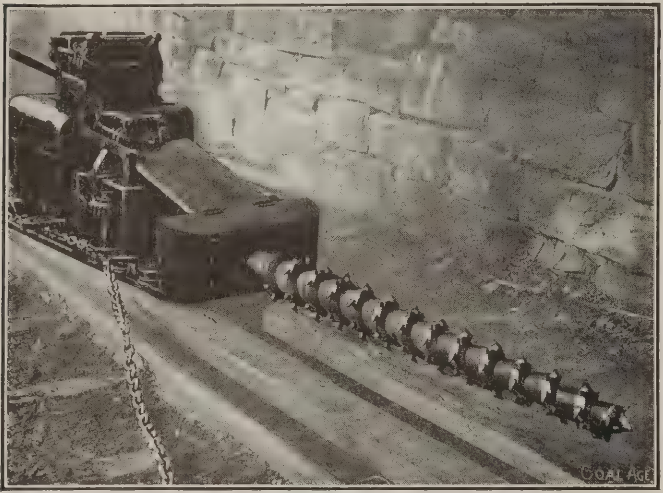
Note—Article entitled "The Hess Dustless Mining Machine" read at the West Virginia Coal Mining Institute, Morgantown, W. Va., June 25, 1913. This machine was described and illustrated in a somewhat briefer manner in our issue of Dec. 28, 1912, Vol. II, p. 914.

*Secretary, Hess Dustless Mining Machine Co., Ansted, W. Va.

a cross shaft immediately over the worm is mounted a worm wheel and two crank disks, which are also gear wheels. The worm wheel, of course, engages the worm on the main shaft with which its ratio is 1 to 15, giving the cross shaft a speed of 20 r.p.m. Rods connect the crank disks with a slide bearing on the forward end of the main shaft; in this bearing the main shaft is free to turn, but is held fast longitudinally by means of collars. The slide bearing being connected with rods to the crank disks on the cross shaft, is so moved backward and forward, and imparts the reciprocating motion to the main shaft and cutter bar. Engaging the teeth on the crank disks are two pinions mounted on a second cross shaft, which drives the feed mechanism.



A VIEW TAKEN IN OPEN AIR; MACHINE RIGGED TO COMMENCE CUT

THE SAW AUGER

The cutter bar is a spiraled, cone-shaped, steel casting, about 5 ft. long, 7 in. in diameter at the butt, and 3 in. at the tip. Along the spiral rib of this casting are set bits or picks of tool steel, so spaced as to give one bit to each inch of cross-section of the bar; and as the reciprocating motion of the bar covers a space of three inches, the space between the bits is well taken care of. A triangular center bit is set in the tip end of the bar. The bar is screwed to the end of the main shaft, so that they have a common center line, and this brings the bits into such a position as to make them revolve barely clear of the floor, and parallel with it when at the lowest point of a revolution.

The bed plate and casing, which contains all of the mechanism except the cutter bar, is 5 ft. long and 2 ft. wide; with the controller placed on top, the height is about 28 in., but this may be reduced to about 20 in. by placing the controller on the side of the motor.

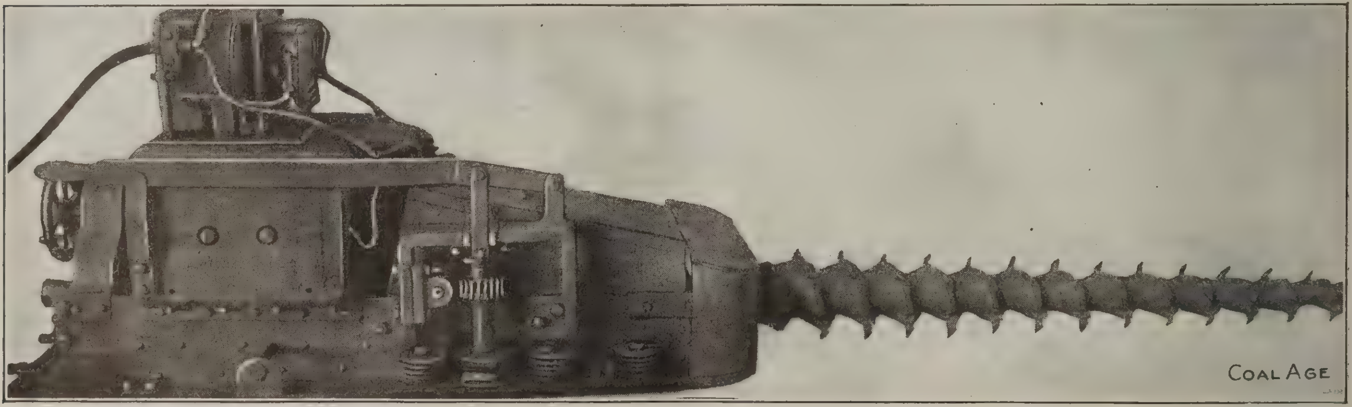
With the cutter bar attached, the machine weighs 2350 lb., the cutter bar itself weighing about 200 lb., as it is detached when moving from place to place, the greatest weight to be handled in one piece is 2150 lb.; the truck weighs 620 lb., and the box of fittings 560 lb., so that the total shipping weight is about 1.7 tons.

At present, a 23-hp. motor is being used, and it has given a surplus of power under all conditions so far encountered; if, however, it is necessary where the coal is of a harder nature, to use more power, or to strengthen the machine as a whole, this can readily be done without changing the general lines or plans materially.

METHOD OF CUTTING

In operation, the cutter bar is holed for its full depth in the left-hand corner of the room, in such a manner as to make practically a straight rib, the chain and jacks are then arranged so as to draw the machine across the face from left to right, sliding on the bottom, making a continuous undercut 5 ft. deep, 8 in. high at the front end and 3 in. high at the back, and flush with the floor, so that no scraping is necessary.

A double chain is used for holing in and for feeding across the face. For the latter operation the chain engages the drive sheave *B* on the machine and is then passed around a roller on the jack *A* in the right-hand corner of the room, after which the end is brought back to the machine and fastened to the forward right-hand corner *G* of the carriage. The rear end of the chain passes around the rear of the machine by pulleys *F* and *E*, then around a roller *H* on a jack set near the left rib, and is engaged in the chain sheave on the staff of the hand-steering gear *E*. By means of this hand-steering gear, the chain is kept tight and the rear of the machine may be retarded when necessary, in order that it may be held approximately at right angles to the face.



SIDE VIEW OF HESS DUSTLESS MINING MACHINE

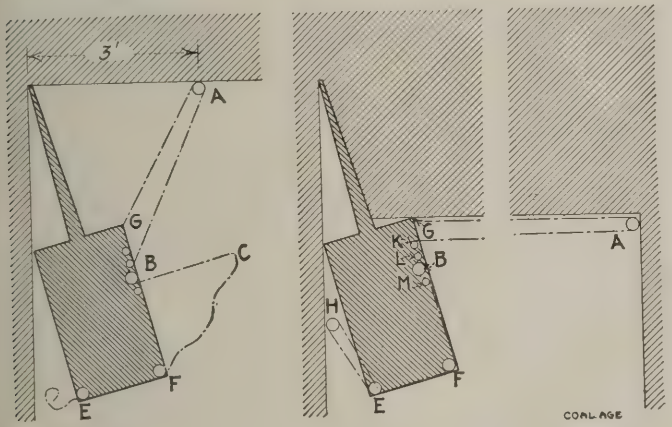
RATE OF OPERATION

The rate of feed is regulated to suit the coal in which the work is being done. The highest speed (across the face) that has been tried is 36 in. per minute and the lowest 13 in. This means a maximum of 15 and a minimum of 5 sq.ft. per minute undercut. The operation of unloading, loading, moving to any desired position, and propelling the truck, are performed quickly and easily by the machine under its own power, so that very little manual labor is necessary.

The amount of work that can be done in a given time will, of course, depend upon local conditions and the way in which the machine is handled, but records that have been made justify the claim that no other machine will do as much work in the same time under similar conditions, and with the same power.

Some of the advantages claimed are as follows:

1. Dustlessness. As the cuttings are not pulverized, and rather coarse, little or no dust is made.
2. Safety to machine men. There is very slight chance of injury to the workman.
3. Props may be set within six feet of the face without interference with undercutting.
4. The machine produces more coal per keg of powder than any other machine which uses electric power direct because it makes a tapered cut.
5. The cut removes the coal down to the floor, leaving a perfectly smooth bottom.



Holing in

Cutting across Face

6. A greater quantity of coal can be undercut with this than with any other machine in a given length of time and under similar conditions.
7. Owing to simplicity and strength of construction, repairs are reduced to a minimum.
8. Power consumption is comparatively small.
9. Owing to its lightness, and the fact that it is practically self-handling, manual labor is easier with this than with any other mining machine.
10. The machine is readily adjusted to irregularities in the floor both longitudinal and transverse.

The dustless feature of the cutter has been unanimously conceded by a number of expert mining men from all over the country, who have seen it in actual operation. The importance of this point cannot be overestimated in view of the stress that is being placed on the prevention of dust in coal mines and the great danger arising from this cause.

The suppression of dust, careful timbering and the prevention of solid or heavy shooting, are the three items receiving most attention and provoking most discussion at present. The Hess machine tends to eliminate the most fruitful cause of dust, allows timber to be set close to the face and makes a tapered cut, and in this way meets the safety requirements in coal mining.

The other points of advantage claimed are those of efficiency, economy and convenience. The tremendous saving of power, arising from the substitution of electricity for compressed air, will be readily admitted without taking into consideration the trouble, inconvenience and expense of maintaining pipe lines. The advantages of the tapered cut and the desirability of applying electric power direct to it are also clear, and an examination of the machine in detail will be convincing as to its simplicity and strength of construction and economy of maintenance.

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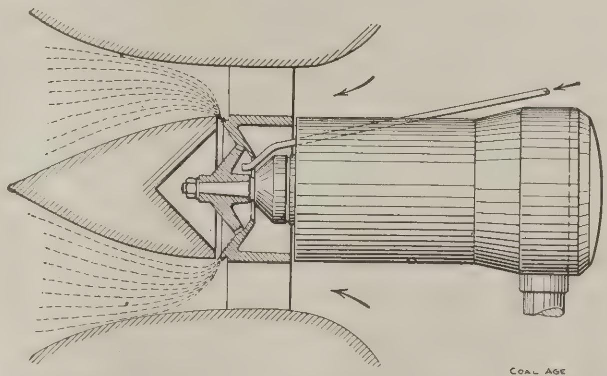
A New Atomizer

Several effective spraying devices have been invented and sold, but most of these consist solely of a suitable form of nozzle, by which the water is split up into finely divided particles, capable of washing down any suspended coal dust in the air. The difficulty, however, with regard to such sprayers is that in order to secure fine division of the water, the aperture of the nozzles is necessarily very small, with the result that they often become clogged by the dirt contained in the water. To meet this difficulty, either pure water must be obtained or dirty water made suitable by straining.



A Simple Atomizer for Precipitating Coal Dust

If the fineness of the spray could be obtained by the use of infinitesimal orifices, some impurity in the water used, would not be objectionable.

A type of sprayer has been introduced by Gustav Schlick, of Dresden, which does not depend on the use of nozzles, but on the action of a disk revolving at a high peripheral speed. It is, therefore, somewhat similar in construction to that devised by H. H. Clark, of the Bureau of Mines. The construction of this type of atomizer is shown in the illustration. The disk, by its rapid revolution, throws the water introduced to it, tangentially from its outer edge with a high velocity, and the water is in this way forced out in fine stream lines in the form of a spray. These stream lines are uniformly distributed throughout a wide area by means of suitably shaped expanding surfaces, leading to the outlet of the sprayer.

By this means, considerable volumes of water can be dealt with by a comparatively compact apparatus suitable for use in the most constricted workings. Impure and pit water can, if necessary, be used without any fear of clogging, the amount of water atomized can be varied by changing the speed of rotation and the supply of water to the sprayer. In order to procure a high-speed of rotation, the disk can be speeded to 12,000 r.p.m. It is rotated either by means of an electric motor, belt-connected to the apparatus, or directly by means of a steam or compressed air-driven turbine.

A Review of the West Virginia Inquiry

SYNOPSIS—The investigation of the West Virginia mine strike was conducted in such a manner that the statements of the operators were delivered last and in a series of hearings which exhausted the reporters. Thus the record of the newspapers favored the miners' cause. The following is a presentation of the results of the inquiry from the operators' point of view.

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The correspondents who covered the Senate subcommittee's investigation into mining conditions in this state, had to send their reports "running." Many sensational statements thus got on the wire which were shown on cross-examination to be untrue; but the original statements were not modified, for lack of time, rather than from any intent or desire to misrepresent, for the hearing was a continuous performance broken only by short intervals for food and sleep. All this being true, it may be worth while to review the hearing as a whole, in order to get all parts of the evidence into their proper relation to each other and in due perspective.

Briefly summarizing the results of the first installment of the hearing, these facts seem to have been clearly established by a preponderance of evidence:

1. The alleged fundamental grievance of the miners, namely, the employment of Baldwin-Felts guards was shown to be unfounded, because no guards were employed on the north side of the Kanawha and on Paint Creek, where the reign of violence began until after a number of crimes had been committed by striking miners. On Cabin Creek but four guards were employed. These were men of good character, who had lived on Cabin Creek for years and who were on friendly terms with the miners.

Attitude of Operators to Union

2. The real cause of the disturbance was the attempt by the United Mine Workers to force the operators to concede the "check off," which, if granted, would have resulted in the compulsory unionization of all the mines. The operators did not oppose the union any further than to insist on the open shop. Failing to obtain the check off, the miners struck for an advance of 2½c. a ton, as prescribed at the Cleveland conference of operators and union officials of Indiana, Illinois, Ohio and western Pennsylvania. The advance was granted on the north side of the Kanawha, but was refused by the Paint Creek Collieries Co., the entire output of which, for a series of years, had been sold at a price which did not admit of an advance in wages. The Paint Creek Collieries Co. was then, and still is, insolvent. After receiving what they had asked, the miners on the north side of the Kanawha, being incited by the person known as Mary Harris, alias "Mother" Jones, stenographic reports of whose profane, vulgar and incendiary speeches were offered in evidence, and others bought rifles and thus armed, went over to Paint Creek where they joined the strikers and in coöperation with them, committed many acts of violence. Not until all this had occurred were any mine guards employed on Paint Creek, and only then were the guards on Cabin Creek reinforced.

The Courts Were Unable To Repress Disorder

3. Many crimes were committed, for which no one has ever yet been indicted or punished; for the courts, while nominally open, were actually powerless to administer justice. Bodies of strikers, armed with rifles, openly paraded in Charleston and elsewhere or skulked in the woods around the mining camps, firing into houses and at men, women and children. Governor Glasscock thereupon declared martial law. The militia found "more than a thousand" armed strikers in the field confronted by 110 mine guards. The governor and the military authorities held that an insurrection actually existed. This view was shared by law-abiding citizens, and it has since been confirmed by the dictum of the State Supreme Court. Notwithstanding all this, the first act of the militia was to disarm the guards and send them out of the disturbed district. Then, finding that guards were absolutely necessary, even union officers conceded this, the governor, after confering with union officials and with their approval, put into effect a plan for selecting guards to be known as "watchmen" from the militia. "Watchmen" were as violently denounced as the guards had been and the disorders increased.

Wages Were Adequate, Commissary Prices Fair

4. The alleged secondary grievances of the miners were baseless. Numerous witnesses, even including many summoned on behalf of the miners, testified under oath that all who wanted to work could make good wages, but that many would not work. One witness swore his earnings ranged from $100 to $150 a month, and that three times he had earned as high as $190 a month. Others swore that they had earned good wages for years. Witnesses in behalf of the miners testified that the schools were as good as any in Kanawha County, but that many families neglected to send their children to school. The preponderance of evidence showed that in instances where company-store prices were higher than in independent stores, the goods were of superior quality. An interesting sidelight on the company store and its patrons was afforded in a statement submitted by President Connell, of the insolvent Paint Creek Collieries Co., showing that in the last year the company's stores had to write off $12,000 in bad accounts. Company houses, water supply and sanitary conditions were satisfactory.

The Train of Death

5. The "death train" story was related by a witness who admitted that he was a "free lance," ready for any job. He stated that he worked for a few days as a guard, was then discharged and has ever since been a union adherent without visible means of support. His story was published without qualification or reservation by newspapers throughout the land, and the operators were consequently represented as being worse than the Commanches of former days.

But note how different the story seems when all the facts are told: Three different men at Mucklow, which village had been shot up on several previous occasions, telephoned to Quinn Morton and Sheriff Hill in Charleston, Feb. 7, that the town had been attacked again. They appealed for rifles and for reinforcements. The Charleston & Ohio R.R. sent a special train for Sheriff Hill's posse of 11 men. This included the armored car which the company had equipped to protect its property. On the way, Sheriff Hill was warned that the miners at Holly Grove had planned to attack the train. As a measure of common prudence, the brakeman turned out the lights. Near Holly Grove, they saw a large number of women and children gathered in front of a cabin watching the train. Those on board concluded that the miners had sent their women and children to a safe place preparatory to an attack. As a matter of fact, this is exactly what had happened. Thus it seems that the train did not fire on a camp full of women and children as has been alleged, but only at an ambushed enemy. On reaching Holly Grove, the train was fired upon and replied. In the pitched battle that ensued, one man was killed and one woman who had refused to leave her husband was wounded. Every window in the train was shattered. The witness whose outrageous yarn had been sent broadcast has since been discredited.

6. "The present constitution of the United Mine Workers of America does not present the most inviting inducements to the operators to enter into contractual relations with it," declared the anthracite coal-strike commission appointed by President Roosevelt to settle the anthracite strike of 1902. W. L. Connell, president of the Paint Creek Colliery, who for nine years has been chairman of the Board of Conciliation, appointed pursuant to the recommendation of the Anthracite Strike Commission, and who is an anthracite operator, said in response to a question by counsel for the miners:

"If it was the purpose of the operators of West Virginia to destroy the union, my experience in the last year has almost persuaded me that their judgment was correct. I have received the most scant courtesy from the officers of District 17 of the United Mine Workers that I have received in all the 21 years I have been an employer of labor."

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An Instrument for Measuring the Flow of Air or Gas

The accompanying illustration shows an instrument for the accurate measurement of the flow of air or gas in a pipe. As may be clearly seen, it is a Pitot tube attached to a differential monometer.

The monometer, which is by no means a new invention, consists of a hollow brass cylinder or well around the outside of which is wound upon a uniform inclination, a transparent celluloid tube. The whole apparatus is arranged so that it may be rotated about its axis and the height of the liquid in the tube be thus easily ascertained.

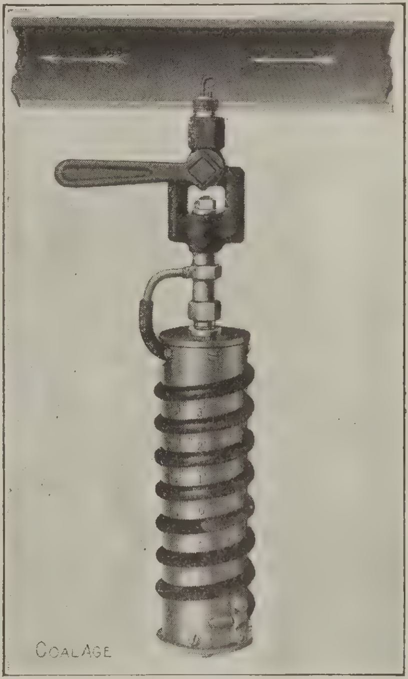
As may be seen, the part of the instrument within the pipe is a Pitot tube in the simplest form. To obtain the average velocity of the flow in the pipe the impact nozzle of the tube should be placed approximately $\frac{7}{10}$ of the distance from the center of the pipe to its inner circumference. The radial position of the static nozzle is immaterial.

The dynamic nozzle is connected with and transmits pressure to the liquid within the hollow cylinder, while the static nozzle performs a like service to that which is in the coiled celluloid pipe. This pipe, by the way, is connected to the cylinder near the bottom.

Suppose that the liquid in the coiled tube is brought to the zero marking upon the cylinder, when the cock in the yoke is closed, and consequently no pressure or rather an equal pressure is exerted upon the surface of the liquid in both the brass cylinder and coiled tube.

When the cock is opened the pressure of the moving gas due to its velocity is transmitted to the inside of the cylinder, while its static pressure is transmitted to the surface of the liquid in the coiled tube. As these two pressures are unequal, the liquid rises a certain amount in the coiled tube, this amount depending upon the velocity of the gas in the pipe.

When the instrument is set up as above described, the average velocity existing in the pipe may be determined from the formula: $v = \sqrt{2gh}$. Where v equals the velocity of the gas in feet per second, g equals the acceleration due to gravity and h equals the head in feet causing the flow.



Cross-Section of Pipe with Pitometer in Position

Since h in the above formula is a head of gas in feet but is measured by h_1, which is the head of liquid (usually either water, oil or mercury) it is necessary to know not only the density or weight per cubic foot of the gas flowing in the pipe, but also the specific gravity of the liquid by which this head h is measured.

Both these quantities are either known or may be readily calculated and letting V represent the velocity of flow in feet per minute and reducing our formula to its simplest form, it becomes $V = k\sqrt{h_1}$. Where k is a constant depending upon the density of the gas whose flow is being measured, and the specific gravity of the liquid employed.

As above described, this instrument is suitable only for measuring the flow of air or gas in a pipe. There is no good reason, however, why it could not be mounted in a fan house in such a manner as to show the velocity, capacity and horsepower being developed by the fan.

Rocky Mountain Coal Mining Institute

Editorial Correspondence

SYNOPSIS—An account of the second semiannual meeting of the Rocky Mountain Coal Mining Institute which was held at Salt Lake City, Utah, on June 11, 12 and 13, 1913.

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The second semiannual meeting of the Rocky Mountain Coal Mining Institute was held at Salt Lake City, Utah, on June 11, 12 and 13, 1913. Previously 146 members and friends had left Denver on Monday, June 9, on a special train over the Union Pacific R.R., making stops at Superior, Wyo., and also at Rock Springs and Reliance, in order to inspect the plants of the Union Pacific Coal Company.

At Superior the visitors saw the unusual arrangement where the hoist is carried upon the headframe, being located directly over the opening, and the hoisting engineer stationed in the room where the weighing and dumping is done. At Reliance an endless-rope car haul was the principal feature, while at Rock Springs a demonstration of first-aid work was given. The special train left Rock Springs at 11:30 p.m., on the 10th and arrived at Salt Lake City 7 a.m., the following morning.

Members of Rocky Mountain Coal Mining Institute at Salt Lake Meeting, June 11, 1913

The regular meeting of the institute was called to order on Wednesday morning, June 11, at 10 a.m., by the president, E. H. Weitzel, addresses of welcome being given by Governor Spry, Mayor Park and the Rev. P. A. Simpkins. An adjournment was taken just before noon in order to attend the organ recital at the Tabernacle.

The afternoon meeting was called to order at 2 p.m., and after the reading and approval of the minutes of the first regular meeting and of an executive board meeting, which was held at Denver, a letter from A. J. Reef, of Denver, was read. This contained proposed amendments to the constitution and bylaws and upon motion was referred to the executive board with instructions to report at the next regular meeting.

Amendments to Constitution and Bylaws

The proposed amendments are as follows:

Article 2 (regarding who may become members and how), to be amended to read as follows:

Membership in this institute shall be of three classes, corporate, individual and honorary. Any company, firm or individual operator, actually engaged in the mining of coal within the territory of this institute, may become a corporate member upon application, and by consent of a majority of the members present at any stated meeting. Any person who is directly engaged, or interested in some branch of coal mining, may become an individual member upon application and by consent of a majority of the members present at any stated meeting. Honorary members may be elected at the discretion of the institute.

Article 10. (Regarding dues.) To be amended to read as follows:

The membership dues of this institute shall be for individual members, two (2) dollars per year, payable in advance; the corporate members ten (10) dollars per year, when operating one mine, or individual operation, and five (5) dollars additional per year for each additional operation conducted by said member, but not in any case to exceed fifty (50) dollars per year, payable in advance.

The funds derived from corporate membership shall constitute a special fund applicable only to conducting investigations into problems of coal mining, and the publication of the results of such investigations, and may not be used for the ordinary expenses of the institute.

A new article to be added to the constitution to read as follows:

> Article 13. Any individual member in good standing, present at any stated meeting, shall have the privilege of the floor and be entitled to one vote. Any corporate member in good standing may designate one person as its representative, who, if present at any stated meeting, can have the privilege of the floor and be entitled to one vote.
>
> A new article to be added to the bylaws to read as follows:
>
> Article 2. In order to carry out the purpose of this organization, as expressed in Article 1, of the constitution, "to promote study and research into mining problems," the executive board shall have the power to appoint committees to investigate mining problems, as selected by the board, such investigations to comprise the gathering of information by correspondence, or otherwise, and the conducting of experiments if necessary, and every form of investigation that may seem wise to the executive board. The executive board shall have the power to appropriate and pay out under proper vouchers, the accruing dues of corporate members, with the expenses of such committees, and may, in special cases, pay compensation to committee members."

An invitation to the Institute to become a member of the American Mine Safety Association was read, and upon motion was accepted and the secretary-treasurer instructed to remit the dues. Upon motion it was then ordered that the chair should appoint three members to represent the institute at the next meeting of this association.

SEVERAL INSTITUTE MEMBERS ON AN OUTING AT SALTAIR

From left to right, standing: T. J. O'Brien, sales manager, Gunn-Quealy Co.; P. J. Quealy, gen. mgr., Kemmerer Coal Co.; Floyd W. Parsons, editor, "Coal Age"; W. D. Brennan, asst. gen. mgr., Union Pacific Coal Co.; H. C. Campbell, asst. mgr. mines, Central Coal & Coke Co. Sitting, left to right: Frank Manley, vice-pres. and gen. mgr., Union Pacific Coal Co.; E. H. Weitzel, mgr. of coal mines, Colo. Fuel & Iron Co.; W. J. Murray, vice-pres. and gen. mgr., Victor American Fuel Co.

At 3 o'clock the meeting adjourned, and a trip to Saltair was taken, where the remainder of the day was spent. The morning meeting of June 12 was called to order at 10 a.m., with the president in the chair. After a few selections by the orchestra, the applications of new members were voted upon, the total number of new members being 169.

A COMMITTEE ON EXPENSES

A discussion followed regarding the defraying of the expenses of the local chapters, and upon motion it was ordered that the chair appoint a committee to investigate the various methods which might be employed. The committee which was appointed is composed of the following: Frank Young, New Mexico; Louis Hufty, Huerfano Chapter, Colo., and Mark Danford, Trinidad Chapter, Colo.

John McNeil then read his paper on the subject: "The Prevention of Accidents and a Higher Standard of Sanitary Conditions in Our Coal Mines." After a short discussion the meeting adjourned in order that a photograph might be taken of the members of the institute.

The afternoon session was devoted to a trip to the copper properties at Bingham, the members of the institute leaving Salt Lake City at 1:30 and returning at 6:30 p.m.

The morning session of June 13 was called to order by the president. The first subject upon the program was a paper by D. J. Griffiths, of Colorado, the subject being: "What Shall We Do to Avoid Falls from Roofs and Sides?" Afterward, Dr. J. E. Talmage delivered an address upon coal, its geological history and the part it plays in the conservation of energy. At the close of Doctor Talmage's address, the Institute entered into a discussion at considerable length of Mr. Griffiths' paper. As a result, the following resolution was presented and unanimously carried:

> Resolved, that it is the sense of this meeting that any systematic method of timbering which contemplates the placing of the supports at regular intervals, is not applicable to the character of the roof overlying the coal measures in the Rocky Mountain regions, and that the only safe method is to require timbers to be set to securely support the roof in each individual working place. It is further resolved that this institute use all fair means to prevent, or repeal, any legislation which would attempt to establish systematic timbering in the several states in which the institute operates.

Doctor Talmage then extended an invitation to all the members to visit the Deseret Museum some time during the afternoon. The president then read a letter on the use of coal dust in concrete stoppings in coal mines, directed to F. N. Cameron, general manager, Black Hawk Coal Co., Salt Lake City, Utah, and signed by H. E. Lewis, superintendent, Black Hawk, Utah. The latter gave the method of placing forms and mixing the materials which make up the concrete mass.

VOTES OF THANKS

Motions were made and carried, votes of thanks being extended to Governor Spry, Mayor Park, Rev. Simpkins, Doctor Talmage, John McNeil, E. J. Griffiths and F. W. Whiteside, for the part each had taken toward making the meeting a success. Motions were also made and carried, a vote of thanks being extended to the committee of arrangements, Union Pacific Coal Co. and to J. E. Pettit, State Coal Mine Inspector of Utah, for their help in the entertainment.

The afternoon of June 13 was spent in visiting various places of interest about Salt Lake City. In the evening the entire institute was entertained with a banquet in the grill room of the Utah Hotel, the ladies of the party being provided a separate feast and entertainment in a separate dining doom. At the close of the banquet the institute adjourned, the visitors leaving Salt Lake City at 1:30 a.m. over the Denver & Rio Grande Railroad.

On the return trip, in a special train over the Denver & Rio Grande, the first stop was made at Castle Gate, Utah, where a modern double-steel tipple with all appliances was inspected, this being one of the few steel structures of this kind in the West. Leaving Castle Gate the party arrived in the evening at Glenwood Springs, where a stop was made in order to enable the members to indulge in bathing in the famous pool at this place. At 8 o'clock the following morning the special train arrived in Pueblo, where members from New Mexico and the southern portion of Colorado changed trains for their several destinations, the special continuing on its way to Denver, where it arrived at noon on June 15. The unanimous verdict of the delegates who attended the convention was, that it was one of unqualified success, the entertainment committee of Salt Lake City and Rock Springs having exhausted every resource in order to provide entertainment for the visitors. The total membership of the institute at the close was 445.

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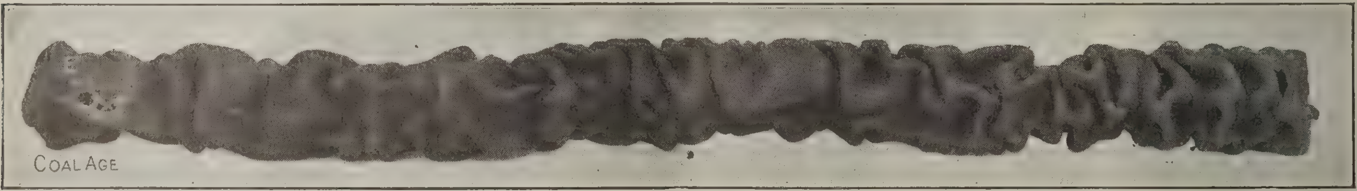
An Example of Good Manufacture

The malleability and ductility of some modern steel products are truly remarkable. The accompanying photograph shows a joint of steel well-casing manufactured by the National Tube Co., after its removal from a well which had been shot.

This pipe was in a well near Gore, Ohio, when a 150-qt. charge of nitrogylcerin, with a 20-qt. anchor-shot was exploded. After the blast this joint of inner casing which had been left in the well was found wedged about 1500 ft. from the surface, the well being 3000 ft. deep.



THE CASING AFTER REMOVAL FROM THE WELL SUBSEQUENT TO SHOOTING

The original length of this joint of casing was between 18 and 20 ft., while its diameter was $5\frac{3}{16}$ in. The force of the explosion crushed or compressed it endwise until its present length is only about 8 ft. As may be clearly seen in the illustration, it shows unmistakable evidence of hard usage, but a careful examination fails to reveal a single serious fracture or flaw.

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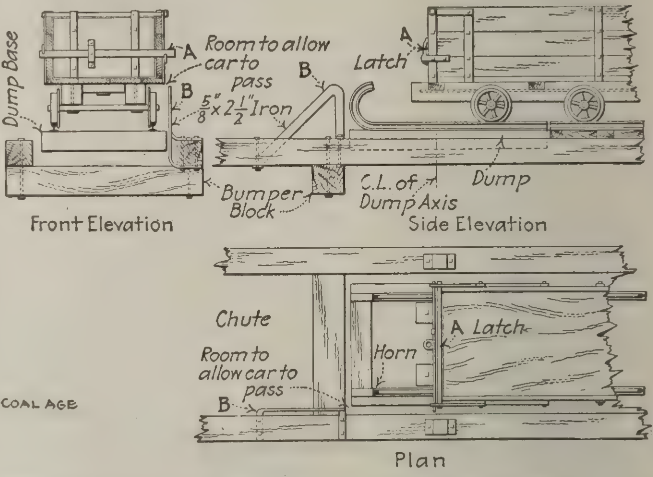
Device for Raising Mine-Car Gate Latches

By Simon H. Ash*

In most coal-mine districts of the state of Washington, the haulage arrangements and tipple equipments are such that all coal is conveyed from the workings to the tipple in mine cars. Of these there are several designs, which are usually discharged by hand from the end, over horned dumps.

The end gate is kept closed by some type of latch that must be raised before the car enters the horns; this latch is usually released by the dumper. In a great many instances, due to excessive speeds, failure to get in sprags, absence of car stops or a tight latch, a car will enter the horns with the latch closed, a continued repetition of which not only causes a considerable waste of time, but will eventually wreck the dump.



THE DUMP AND LATCH-LIFTING BAR ATTACHED TO THE TIMBERING

At the mines of the American Coal Co. the dumps are of the cradle type. The cars have a capacity of 45 cu.ft. The track gage is 3 ft., as is also the wheelbase. The car wheels are loose and 16 in. in diameter.

In the sketch is shown in plan and elevation an arrangement for automatically raising the latch of the mine cars at the dumps, the operation of which is as follows:

As the mine car reaches the dump, shown above, the end gate is closed and remains so until after the car enters the horns, whereupon it tips forward, causing the latch *A* to strike the 2½x⅝-in. strap iron *B* which moves the latch upward, thereby allowing the contents of the mine car to open the end gate.

As the car is tipping forward the latch *A* slides along the top of *B* until the car bumpers strike the bumper block. The iron *B* is long enough and sufficiently close to the car body to prevent the latch from getting caught or jammed by this iron, which would seriously hinder the dumper in returning the car.

By the use of such an arrangement no coal is scattered about before the car is dumped. The latches are always promptly opened, the tippleman has no occasion to be in front of the car while it is in motion, and the device can be adjusted to work on any type of end dump.

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*Mining engineer, American Coal Co., Spiketon, Wash.

EDITORIALS

An Unusual Coal Market

In the face of one of the most severe financial stringencies in six years, the coal market is showing an almost unprecedented buoyancy and strength. Summer ordinarily finds the coal business at the low point for the year; consumption is light, coal difficult to sell, and buyers pound prices down to an irreducible minimum. But such is not the case this year. And it is even more difficult to reconcile the situation, because the natural supposition would be that the unsettled conditions in financial circles would tend to further depress the market.

Viewing the situation from a statistical standpoint, it is clear that the market is not being maintained by any restriction in production, as shipments for the year are showing substantial gains over those for last year. Thus the thirteen leading coal roads of the country, which handle about one-third of the entire production, show a fairly substantial increase in shipments for the first four months of the current year, the respective figures being 52 million tons in 1912, and 54 millions in 1913. Of course, this is in a measure due to the suspension in mining which occurred last year, pending the arrangement of a new wage scale. Nevertheless it is a significant fact that even with a larger production, prices are, at the same time, ruling higher. In June of last year the New York prices on soft coal ranged from $2.35 for the low-grade West Virginia steam fuels up to $3.15 for the best Georges Creek; the ruling price for this month, on the same grades, is from $2.25 to $3.25.

The shipments of anthracite naturally show a large increase for the first five months of the current year, as compared with last year, since practically the entire hard-coal production was completely cut off by the suspension in 1912. The output during this period last year was about 20 million tons, as compared with 29 million for the current year. In spite of this condition, it is interesting to note that the stocks at tide are far below those on hand at any time during the last five years, with the exception of 1912, when, of course, all available supplies were in sharp demand because of the strike. At the close of May the stocks at tide were 5,200,626 tons, the previous low record at the end of any month from 1908 to 1911, inclusive, being 6,100,916 tons.

A comparison of the lake movement into the Northwest for the year to June 1 also presents some interesting points. Of course, the greatest discrepancy occurs in anthracite, the shipments for the current year being six million tons, as compared with only 18,000 for the same period last year. Bituminous, however, also shows a most decided increase, the respective figures being 2,890,789 tons for the current year, and 1,653,922 tons last year.

It is thus obvious, as previously stated, that the market is not being artificially sustained by any policy of restriction or other conditions, and the unusual strength must be due entirely to a strong healthy consumption all along the line. The market has reached a point where forced sales, even of the lowest grade, are practically unknown, and buyers have definitely abandoned hope of forcing the producers to recede from their demand for higher prices. The situation is in part due to the restricted labor supply, but this is obviously not very severe, since the production statistics show such substantial increases in the movement of coal.

As a matter of fact, should the production be seriously crippled from this cause, it would create a rather interesting situation, and would probably precipitate a runaway market. Even as it is, the outlook for the producers during the coming fall is highly favorable, and the most conservative companies are agreed that business will establish new high records providing there is no pronounced relapse in industrial activity.

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The Labor Supply

The coal industry seldom finds itself free from difficulties of one kind or another. When the demand for coal becomes urgent, and, as a consequence, prices are firm, it usually develops that the railroads are unable to cope with the heavy tonnage, or, as is now the case, the labor supply proves inadequate.

The coal market has seldom experienced such a buoyancy at this time of the year, except when abnormal conditions such as strikes, etc., have prevailed. It is difficult, however, to keep the miners at work during the pleasant summer months, for as is well known, there are few classes of people having such migratory habits as the average coal miner. The weather prevailing during the present spring has been particularly favorable to outside work and thus many of the miners have been attracted to this form of employment, with the result that complaints are general in all the mining districts that there is a pronounced inadequacy in the supply of labor.

It is thus natural that we should turn our eyes upon the inflow of immigrants into this country, as it is only in this direction that we can look for any relief so long as industrial activity continues general throughout the country. The official reports of immigration at present are highly favorable. There have already been several new high monthly records established this year, while the final figures for June promise to exceed the record for that month which was established in 1907. Another significant feature is the fact that the large steamship lines, sailing from continental ports, have found it necessary to put on extra ships during the last two months. Should there be a slowing down in industrial activity, which may be expected as an aftermath of the unsettled conditions in financial circles, it now seems probable that the country will be facing an oversupply rather than a paucity of labor.

In this connection it is interesting to review the new legislation pending, with regard to immigration. It seems now that the literacy test, by which it was proposed to restrict the influx of foreigners down to only the more desirable classes, has been definitely abandoned. But in its place there is now another bill being offered which proposes to restrict the number of aliens of any nationality to, not to exceed ten per cent. of those already residents in this country, according to the preceding census; it is provided, however, that not less than 5000 of any nationality may be admitted. Aliens returning from a temporary visit do not come under the provision of this act, nor do those coming to join near relatives; members of the professional and business classes will also be admitted without regard to these conditions.

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Hydro-Electric Plants

We devote a large space in this issue to hydro-electric plants. View them favorably or not, they are certainly about to become an important factor in the development of the coal industry.

We do not believe that they will be found as disadvantageous to the coal operators as has been feared. The producer sometimes cannot keep pace with the large demand for coal in the winter. The hydro-electric plant serves to lower this "peak load," if we may so express it, as there is no lack of water power during that season. In the summer, a hydro-electric plant which is well supplied with customers may not meet the demand for power as the water is low. Then the standby plants will buy coal and they will enter the market just when the business of coal producing is dull. Thus water-power plants will serve as a flywheel for the industry in all those states where water power competes with coal, as in Maine, New Hampshire, Massachusetts, Pennsylvania and West Virginia among other states.

The disadvantages in the last two commonwealths mentioned and in others where coal is produced and where water power is available is that the water-power plants cut deeply into the market, which is fed only by one or possibly two fields. This local market is not subject to the fierceness of competition experienced in attempting to do business in more distant centers.

It is a well known fact that coal operators often look to the local market for their profits and to the more distant and larger centers of industry for the continued operation of their mines. The local hydro-electric plant tends to cut the ground under the operator's feet, still leaving him, however, the remote markets undisturbed. If it were not for this fact, the water-power central plant would be, it seems to us, a welcome visitor, for nothing is worse for the industry than feverishness in the winter and stagnancy in the summer.

It remains to be seen whether it will pay to construct water-power plants in coal regions. Unless the power developable is almost unlimited, a standby plant must be maintained and consequently the first cost is almost doubled. If the water supply is unlimited, then the cost of damming is excessive and the interest charge becomes equally exorbitant. As coal production can be made more steady, the need for a standby plant is not felt, when a carbo-electric central plant is erected.

Perhaps the coal industry would be better controlled if water-power plants increased in number and would be rendered less stable if numerous carbo-electric plants, using waste fuels, slack, bone and the like, were erected. Such plants would demand the production of higher-class coal that the lower class might be obtained as a by-product. As a result, the mines generating electric power for general manufacturing purposes would glut the market whenever the demand for coal at distant centers became low. They would have to continue operations despite the market demand in order to take care of their local patrons.

In short, the hydro-electric plant would stabilize and the carbo-electric plant might disturb the industry. Certainly coal operators may view water power more favorably than the development of oil and gas fields. The output of fuel wells is not affected by the seasons, and mine operation is made impossible by the strenuous and continuous competition thus developed and moreover the wells add dangers and responsibilities without number to other trials of the coal operator.

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The Dead Level

We presume that if the question of socialism were broached in a conversation with almost any operator, he would deliver a short but effective address on the fact that the attempts of individuals to raise themselves above the mass have resulted in the betterment of humanity and that rewards should be permitted to those who earn them.

But that same operator is often a socialist when he builds his town. All his houses are the same, none are ever built any better or even any redder than the others. There are no finer houses for the man who deserves a better house and none for the man who will pay for a more desirable place of residence. The operators say to the working man: All men are equal who live here, there will be no award for merit. You may earn more money if you work more, but I will give you no better way in which to spend it.

The operator can readily see how such a method of reasoning holds back his business. The man who has no incentive to earn a larger wage has no desire to work for any more than a competency which will enable him to live and raise a family on the level of the mass of his fellows. There is no desire to keep a clean house in order to be given one of better construction with pleasanter environment.

Much as we may hate aristocratic sentiments, it has been the rise of these which has advanced civilization. The operator would do well to create such a degree of self-respect in his village as will make the better men endeavor to live more seemly lives. The democracy of the mine village is, in a way, to its credit and in a degree has been its undoing.

The foreman, the doctor and the miner often live in houses which can only be distinguished by most careful inspection, and all the residences in a mining town may be inferior in appearance at least to that which would be inhabited by a mechanic in a small town. The wage is sufficient to permit the miner to live in a good house and we have long wondered that he is almost always required to pay a rental of $6 or $8 a month when he is able to pay more and should demand better quarters.

We urge this in no revolutionary spirit, but advocate only a gradual raising of the mining communities by the building of a few houses of a better type, year by year. By renting these, on demand, to the more desirable tenants, a desire would be created throughout the mining camps for a higher standard of living.

SOCIOLOGICAL DEPARTMENT

Welfare Work Among Miners

By Ira D. Shaw*

SYNOPSIS—The miner argues that if welfare work pays the operator, the latter is trading on the pleasures, as well as on the labors, of his employees; if it does not, it is a charitable scheme and demands money, which should be expended in a wage increase. Welfare work is usually unpopular with the miner, unless he feels that he has originated it. That is why the author thinks it should not be fostered by an industrial corporation.

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"Ten years ago the employer of labor thought that, when he had given his employee a fair wage, passable living and working conditions, his full duty as an employer was done. Today every employer of labor feels that he has an obligation toward his employee that mere wages, favorable working conditions, etc., do not discharge. The question is now how to deliver the goods." Such in essence was the remark made a short time ago by the president of one of our largest corporations employing thousands of men in all grades of labor from the most highly skilled down to the least trained. There never was a period in our industrial history when so much welfare work was planned and performed as at present. Many experiments have been made, good, bad and indifferent, but all with the best of motives.

For the purpose of this paper I shall define welfare work as any operation or agency which has for its aim the betterment of any and all conditions so that there may accrue as a result, increased physical, mental and moral efficiency of the individual and eventually of the body politic as well.

Character as the Ultimate Product of Welfare Work

In the coal fields there has been but little done along welfare lines until within the past few years. As a rule the operator has been busy getting out his output at a price that would enable him to meet competition, with little thought of the main factor in production, the human element, for in the last analysis the quantity and quality of the output is going to be determined, not by the kind and number of machines used, but by efficiency and reliability of the human factor, or the real agent of production. This, in its last analysis, comes down to the question of the real character of the employee.

Some of the recent investigations for which our people are getting noted, if not notorious, have brought out that after all the most important factor in all human relationships is character. This fact is just as true in the industrial as in the financial world, and the sooner it is generally recognized and provision made for it the sooner we shall see diminution of strife in the industrial world.

Miner Desires to Spend His Wages Himself

As before stated, many attempts to meet this need for increased efficiency have been made; churches, relief and burial funds, death benefits, educational work, village improvement, gardens, savings banks and many other institutions, good in themselves have been established and their value tried. Some coal companies have invested thousands of dollars in clubhouses for employees, and in some cases confess that the whole scheme is a heart-breaking failure, because the miner has the feeling that every move on the part of the operator to give him something not absolutely needed for daily toil is bound to show up against him on the payroll in some way, though he may not know or understand just how.

This feeling of antagonism between miner and operator is a real condition, and not a theory. I believe it has no adequate foundation, but arises from a misapprehension of motives. However, the feeling exists, and it must be reckoned with in planning welfare work. So far as the writer knows practically all the attempts to better the conditions of the miners have been made either by the initiative of the operator, or at least without any attempt to bring the miner into any vital relationship with its inception, or by some outside agency, such as a church or other social organization or fraternity.

No one who knows the mining industry and the life of the miner denies that he has real needs which at the present time receive very little attention. The commendable agitation for a shorter day and better pay unfortunately does not carry with it a movement which will provide for the occupation of the increased leisure time, and for encouragement to the miner to save a part of his earnings.

The Greatest Danger to Society Is in Misdirected Leisure

No man is likely to become dangerous to society so long as he is working. It is misuse of leisure that in the final analysis works ruin to our laboring men. The man who labors at hard tasks, such as a miner performs, craves something of a stimulating nature when his daily toil is done. The dangerous character of his work adds to this feeling of need for stimulation, as he works under nerve as well as muscle strain, owing to the dangerous nature of his work. The average mining community has no provision for the miner who is in this condition, so one cannot wonder that he takes the most easily procured substitute, alcoholic stimulation, and this gives him temporary relief only, and is sure to bring on detrimental reaction.

In spite of all evidence to the contrary, there are still a few operators who maintain that the miner must have alcoholic stimulation to do his work; yet a study of mine accidents shows that the greater part of them occur just after a holiday, when those who indulge in liquor are coming through the reaction stage, and are not normal physically or mentally. In some communities it is impossible to run the mines on anything like normal output for several days after the men are paid, owing to the mine employees absenting themselves to drink or to recover from their intoxication.

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*Industrial Secretary of the International Committee of the Young Men's Christian Association.

Note—Paper read before the West Virginia Coal Mining Institute, June 25, 1913, at Morgantown, W. Va.

The Mining Camp Provides Only for Toil and Sleep

Study any of our coal fields: What opportunity is there for any man to use his leisure time for recreation? Many communities have absolutely no semblance of any public institution, even a church, no lodge or other social possibilities. In such a community as this what chance is there for a decent man? The forces of evil are always at work, and are reaching after their victims. Naturally, they are most successful where they have no opposition.

The sooner we recognize that man has a three-fold nature and none of these elements are to be ignored in providing for his welfare, the sooner we shall solve the problem of human efficiency. The mental and moral natures must be considered just as important as the physical, and provision must be made for their development as no mere prizefighter can be a real man, though he may look much like one. So no mere drudge, without developed character can be a desirable citizen. The miner of today is just what his surroundings and those who are responsible for his environment have made him. He is no better and no worse than the miner of tomorrow will be under the same circumstances. It follows that the responsibility must fall largely on those who mold his living conditions. But the miner will react upon his surroundings and make them better or worse according to the motive and the spirit of the operator. All the miner needs is opportunity and friendly leadership, and this latter is all-important.

In some cases much money has been spent to provide clubhouses that have been poorly planned. In others there has been no thought or attempt to provide the proper leadership. In still other cases, men have felt that the company was not only commercializing their labor, but also making a profit off their leisure, even though the clubhouse was a losing venture to the company. Should space permit I could mention a number of cases where real attempts have been made to provide for the leisure time of the miner, but the employees have felt very little interest in it for various reasons.

Human Efficiency as an Outcome of Welfare Work

Successful welfare work can never be carried on without competent leadership. It is just as sensible to install the most recent and efficient mining machine, and then expect it to get results by turning it over to be operated by an ignorant foreigner, who knows nothing of machinery, as to expect a clubhouse to be successful without some competent and skilled leadership. Moreover, welfare work should never be regarded as a charity any more than the installation of uptodate machinery. No operator hesitates to engage the best engineer to lay out his mines and the various features of his operation, but the average operator seems to feel that when it comes to the very important subject of human engineering and raising the efficiency of his most vital factor, the most that is desired or needed is some sort of a place, and too often thinks that that place ought to produce revenue for his own pocket.

The miner has a right to resent any attempt to capitalize his leisure hours, and the exercise of this right has made many attempts unsuccessful. There is now, in the West Virginia fields, a clubhouse built at the expense of not less than ten thousand dollars, where there is absolutely no supervision except that exercised by the mine employees, who have no knowledge whatever of the best method of organizing such work. The operator expects the clubhouse to bring an income of one hundred dollars per month. The work has been done with the best of motives and the operator has the best interests of his men at heart, and honestly desires to serve them; but there is that undercurrent among the men which will doubtless make the success of the venture short-lived so far as the miner is concerned. The patronage will probably be limited to the officemen and the higher grade of employees. This, instead of closing up the breach already existing, makes it still wider, for one of the aims of welfare work should be to make the men of all grades feel that they, after all, have common interests and common needs.

The Need for a Sense of Possession

Successful welfare work must be coöperative so that the miner may feel a sense of proprietorship in the enterprise. Instances may be cited where welfare work under company auspices has been tried and failed, but, on turning the work over to the men themselves under trained leadership the success has been conspicuous. In all cases the emphasis is on strong and wise leadership.

Successful welfare work must avoid all appearance of paternalism and patronizing elements. The miner is an independent being, and resents any attempt to discount his independence. He feels abundantly able to take care of himself, and prefers to do it in his own way, even if it is not as well done as under a paternalistic regime.

In welfare work the initiative should lie with the miners rather than the operator. If the miners feel that they are responsible for the inception of welfare work they feel a much greater personal obligation to support it since the operation has come at their request, and not on the suggestion of the operator.

After studying the whole question of welfare work among miners, the Young Men's Christian Association feels that it has a program to suggest to mining operators that will not fail under any fair conditions. It has been working its way among miners for several years without a failure. It succeeds in enlisting practically every man in the operation in its program, and aims to meet all the social and educational needs of the community, and through coöperation with the church helps to meet the spiritual needs. It is not implied, however, that it holds the only solution to the problem, for doubtless the same method would apply under any competent organization.

The program of the Association calls first of all for an adequate building, which would include the machinery for the three-fold development of the individual. The building or clubhouse should contain shower-baths, a reading room, a bowling alley, pool tables, a hall for moving pictures and other entertainments, which hall could also be used for religious meetings, and classrooms for educational work. The entire plant should be in charge of a man trained in organizing this sort of work.

The Association would not feel justified in asking any company to provide such equipment unless at least 60 per cent. of their English-speaking white men pledge themselves to support the work after it had been established. The entire management of the work is vested in a local committee elected by the men themselves and carried on under the leadership of the general secretary. This feature gives the feeling of proprietorship which is vital to the success of the work. The fact that no work is to be done until the men have pledged themselves to its support makes them feel their responsibility for its success.

The welfare work carried on under such circumstances has brought about a complete revolution in many communities. It provides a clean place for recreation and amusement, as well as an incentive for the increase of personal efficiency. In a single instance the amount of liquor brought into a community by express was reduced from over two hundred gallons per month down to less than fifty gallons in less than three years' time. In the meantime gambling practically ceased. The entire community has put on a new aspect, and the change is noticeable even in the very countenance of the residents.

In another instance, a company had established a splendidly equipped welfare building, and maintained it as a company proposition. After being operated about two years, without success, it was turned over to the Association. The first month of the new regime showed a wonderful change. With a comparatively poorly equipped building the receipts more than doubled, while the saloon keeper in the town declared that his sales for the same month decreased something like four hundred dollars.

This clearly indicates that if the miner is given a clean place, under proper leadership, and allowed to feel that he is to a certain extent a proprietor in the enterprise, he will take care of its success. In all these clubhouses there should be a casino for the sale of soft drinks, candy, cigars and light refreshments, if needed. All these things tend to make the place attractive to the men, and bring about a generous response.

Moreover, in many communities a playground can be attached, to which the secretary can give attention. In all cases there should be provision made for any need of the community that the place can supply. The greater the sense of those requirements, the more easily the facilities may be provided. In all cases the success of the work will depend most largely upon the character and training of the person to whom the leadership is intrusted, and this, after all, is the most important feature of all successful productive operation.

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Effect of Belgian Mining Law

Most of the Belgian colliery companies in their annual reports this year, make some reference to the consequences of the law, which, since January, 1912, has limited the miner's day to nine hours. The Charbonnages de Courcelles du Nord, in the Charleroi district, state that their output was about the same as in 1911—450,141 tons, against 449,714 tons—but that it was only thanks to the discovery of a new seam that a reduction was not recorded. The coal, however, was dirtier than formerly, with the result that the cost of washing increased, and new washing installations had to be erected.

At the Gosson-Lagasse Charbonnages, in the Liège district, the new law has involved a rise of 1.53 francs (29½c.) per ton in the cost price, owing to the reduction in the output, combined with loss of effective work by the men, and greater difficulties in recruiting the necessary staff, workers finding it advantageous to seek employment either in the Pas de Calais and Nord districts, where wages are higher, or in other industries not subjected to limitation of the hours of work.

The report of the Charbonnages de la Louvière et Sars Longchamps, in the Centre district, lays stress on the necessity of having larger washing installations, the coal extracted there being dirtier, in consequence of the fact that the miners work with less care than previously in order to gain the same wage in a shorter time. In 1912, the company had to pay to the French Eastern Railways penalties amounting to 27,613 f. ($5329), for 27,257 tons supplied; or 1.013 f. (19½c.) per ton, as compared with 6260 f. ($1208) for 31,412 tons, or only 0.199 f. (about 4c.) per ton in 1911, owing to the dirtier condition of the coal.

The consequences of the new law have, however, been partially offset by a sensible rise in the selling price of coal.

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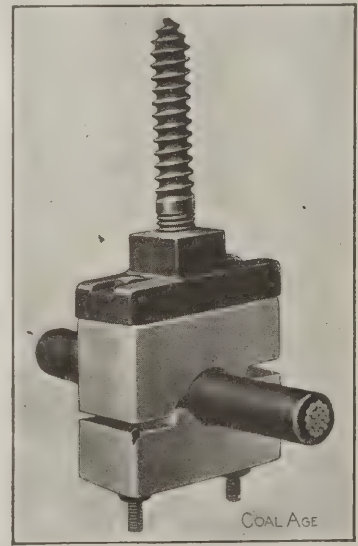
A New Cable Hanger

To facilitate the supporting of feeders in mines, a new cable hanger has recently been placed on the market by the Electric Service Supplies Co., of Philadelphia.

Although this device is particularly designed for suspending feeder cables in mines, yet it is adaptable for use in various other locations. It will accommodate a cable from ½ in. to 1 in. in diameter and permit its insertion or removal after the hanger proper has been permanently installed.



THE NEW HANGER

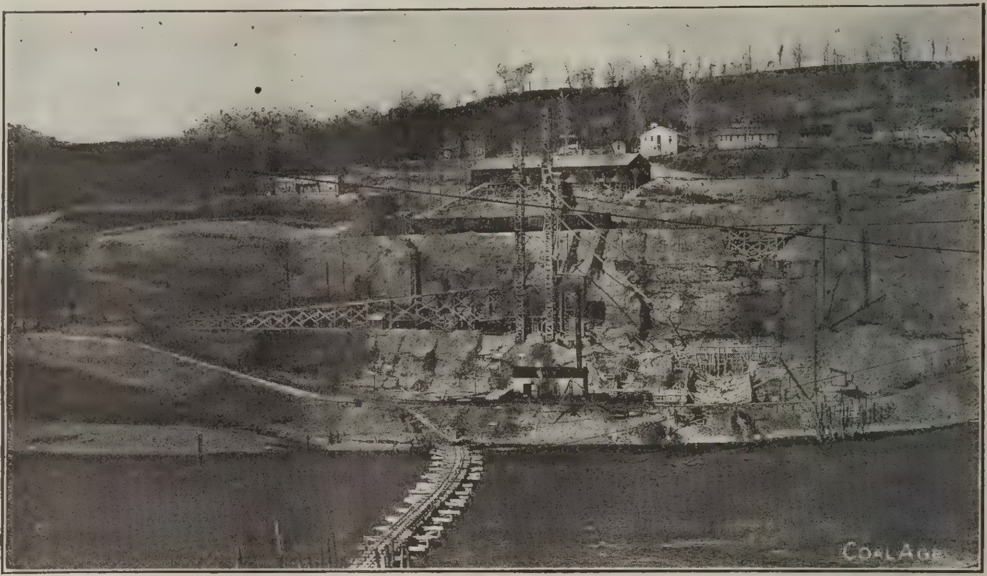
As shown in the illustration, this hanger consists of two porcelain insulators, notched and fitted together to receive the cable and clamp it squarely. These insulators are bolted together, the bolts extending through the cast-iron head which is especially designed to afford easy installation. The clamping surface of the insulators is ribbed to prevent any tendency the cable may have to slip through the clamp and damage the insulation.

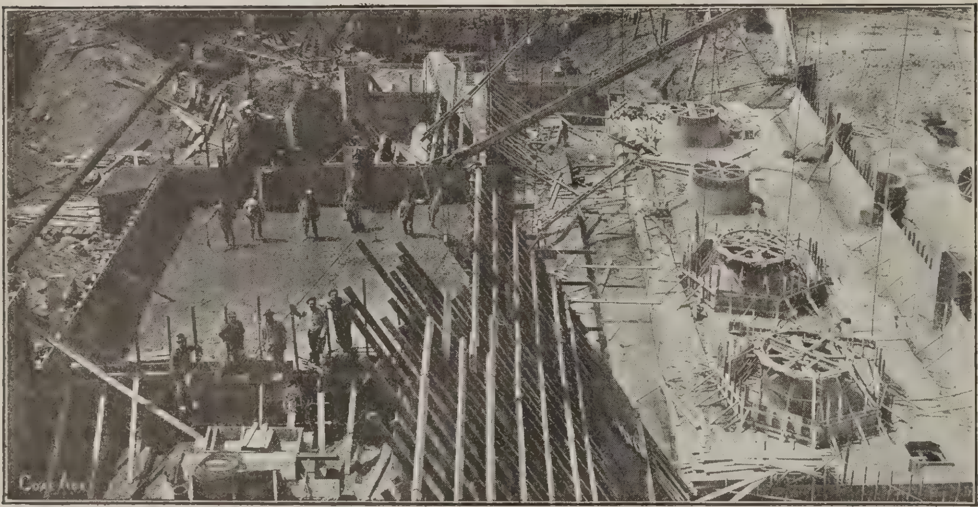
These hangers are ordinarily fitted with lag screws 3 in. long, for use in connection with wooden plugs, but for timber work a special lag screw of the same length is furnished. They may also be supported by special expansion bolts. The hangers are 3¼ in. wide by 4½ in. high, exclusive of the lag screws or expansion bolts. All metal parts are heavily galvanized to effectually withstand the action of rust, and all parts are designed to meet severe service and afford an easy means of supporting heavy cables.

The Cheat Haven Water-Power Development

A Plant Owned by the Hydro-Electric Co. Which Will Furnish Power to Compete with Coal. Visited by West Virginia Coal Mining Institute, June 24

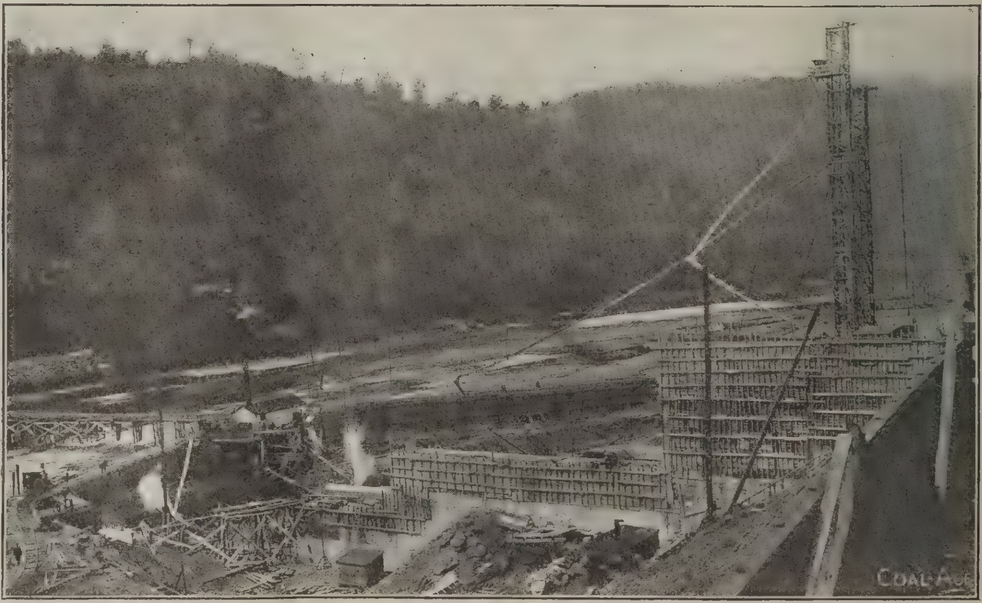
View of the west bank of the river, taken from the opposite side. Shows the T. A. Gillespie Co.'s concrete plant and the Cheat Haven & Bruceton R.R. Cheat River in foreground and at its edge cofferdam enclosing power house and a part of the dam.





View looking down on power house. Shows also bulkhead between power house and bank. One of the forms in the rear is being filled with concrete from a chute. On the right are the upper ends of the draft tubes.

View looking down the Cheat River from the east bank, showing another view of the power house and the towers from which concrete is spouted to the many forms on the left. A construction trestle can be seen crossing the river.



DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 3—In my opinion, it is not safe, under any conditions incident to coal mining, to use mixed lights in a mine known to generate explosive gas regularly or at intervals. I will offer three reasons in support of this opinion:

First, the workmen in the open-light section of the mine are liable to enter the gaseous section with their open lights and cause an explosion.

Second, the workers in the non-gaseous section where open lights are used are liable to encounter or meet an outburst of gas, at any moment, as the working faces advance.

Third, when one section of a mine is compelled to use locked safety lamps, it often creates dissatisfaction among the workmen.

It is a well known fact that few miners care to use locked safety lamps, especially when open lights are in use in portions of the same mine. The foreman often finds it difficult to get men to work in the safety-lamp section under these conditions. He will sometimes take chances and place some of the gassy workings on open lights, in order to get men to work in that section, and to advance the face equally with the open-light section.

I believe that if all mines that are gaseous or liable to encounter gas were worked exclusively with approved locked safety lamps and the miner thoroughly instructed in the use of the same and only permitted explosives were used for blasting and all places examined before a shot is fired, there would be less danger of accident from explosions of gas.

MINE FOREMAN.

Expedite, Penn.

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The Air Current and Mine Explosions

Anyone reading the interesting article contributed by Mr. Verner on the Cincinnati mine explosion cannot but be impressed with the fact that the installation of large modern fans for the ventilation of mines has not reduced the fatalities produced by explosions as we would naturally expect. The opposite of this seems to be the case; that is to say, we are having disastrous explosions in mines where we would least expect them, considering the efficiency of the ventilating machinery installed.

A notable example of this was the Marianna (Penn.) explosion, Nov. 28, 1908. The Marianna was a mine that was equipped with the express purpose of being uptodate in every way and free from danger. Some of the leading mining experts of Europe had examined it about two weeks before the disaster occurred, and gave it as their opinion that the mine was all that had been claimed—a really model mine. The state inspector had just finished his examination of the mine when it exploded.

These facts have given rise to questions similar to the questions raised by Mr. Verner; but seemingly mining men, thus far, have been unable to find out the reason why such uptodate equipment fails to provide the desired immunity from fatal and terrible disasters.

The gases pent up in the coal seam and surrounding strata, under pressure, are given off more freely in proportion as the pressure is reduced. Large exhaust fans have, therefore, evidently much to do with the rate with which gas exudes from the coal and other strata. The reduction of pressure when a powerful exhaust fan is in operation also allows the gas to expand in the gobs where it accumulates in considerable volume because the air current does not reach those places. This difficulty could be overcome, to some extent, by making the fans compressive instead of exhaustive. The compressive system of ventilation produces a greater pressure against the escaping gas than the atmospheric pressure. Then, if the barometer is falling, the pressure in the mine can be increased by increasing the speed of the fan and thereby offset the dangers that arise from atmospheric changes.

On such occasions some superintendents might desire to increase the pressure (water-gage) without increasing the quantity of air passing into the mine per minute. This could be accomplished by means of a regulator placed in the main return airway (blowing system), and which could be arranged to give the same quantity of air with almost any reasonable water gage. Regulators are not generally regarded as an uptodate appliance and should not be used where they can be avoided; but, for the purpose stated, I believe they could be used to advantage.

In the west of Scotland, many of the mines give off large quantities of blackdamp and the officials have some difficulty in keeping the mines in a healthy condition, even when the atmosphere is in a normal condition; and at times of sudden atmospheric changes they have had to shut down, owing to the gas almost filling the mine. At one of the mines, the loss of time from this cause was so great that the officials decided to try a compressive fan, with the result that there was no further trouble from blackdamp. The compressive fan, in this case, was able to regulate the flow of gas regardless of atmospheric changes. Had this mine generated marsh gas and the gobs been full of explosive gas, the flow of gas from the strata and the expansion of gas in the gobs would have been as readily controlled as was the blackdamp.

In the large modern mines of today, the old workings and other places where gas can accumulate are more extensive than in mines formerly. Large abandoned places may be sources of danger from causes that are not suspected. When these places are known to contain explosive gas they are generally walled off and made safe, as a brick wall will keep anyone from entering the place with an open light and causing an explosion. But it should not be expected to absolutely prevent the gas from escaping into the roadway.

It is well known that gas exudes more readily and in greater quantity at a fault or where the strata are broken or disturbed, and this was probably the cause of a greater quantity of gas than usual accumulating at the face of the heading, in the Cincinnati mine, where it was a little later ignited. Another point that should not be overlooked is that, although the mine was free from marsh gas to the extent that open lights were used, the fact that explosive gas was known to be generated in the workings, proves that there must have been a certain small percentage of gas in the air, which with coal dust would make a highly explosive mixture, in mines circulating large quantities of pure air.

Robert McCune.

———, Scotland.

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Waste of Mine Timber

The article on this subject, published in Coal Age, Apr. 26, p. 653, was particularly interesting to me, as my experience firebossing for a number of years has taught me that it is not what is *made* in coal mining as much as what is *saved* in mining operations, that makes the work successful.

The careful miner will consider that every prop, cap piece or tie lost or wasted increases to that extent the cost of the production of coal and makes it more difficult for the operator to pay good wages or to undertake needed improvements in the mine. In other words, waste on the part of the miner only makes the conditions under which he must work more disagreeable and dangerous.

I know from experience that there are thousands of good props and ten times that number of cap pieces lost and destroyed by the neglect and carelessness of the miner, who will order timber brought to his place when he has posts back in the gob that he could use if he would take the trouble to get them. In many cases, much of the blame rests on the men who select the timber and who send in sticks 4 ft. in length, instead of 4 ft. 6 in. as ordered. To avoid the annoyance of such a mistake, some miners will order a 5-ft. prop where a shorter length would do, intending to cut the stick to the proper length, which always means waste.

More care should be exercised by the room boss to see that every miner orders such timber as he can use without undue waste; and that the timber is delivered promptly to the right place by the driver; and that miners do not order more timber than they need and use what they order; and that no timber is left in the gob that can be used again.

In the mine, where I have been employed, it was the custom, as soon as a room was worked out, to send a day man into the place to get out every stick, cap piece, tie and rail that could be removed and used.

John Sutton, Fireboss.

West Terre Haute, Ind.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

PROPERTIES AND BEHAVIOR OF GASES

The symbols, molecular weights, densities and specific gravities of the common mine gases have been given in another place. The properties and behavior of these gases in the mine will be treated here from a practical, rather than a theoretical standpoint.

METHANE

This gas is commonly known as "marsh gas" or "light carbureted hydrogen," it being the lightest of the hydrocarbon gases. It is a colorless, odorless and tasteless gas. It is combustible, burning with a pale-blue flame, in the air or in oxygen. It contains no oxygen and is not, therefore, a supporter of combustion, in the generally accepted meaning of the term. A lamp flame is quickly extinguished by this gas unmixed with air. Mixed with air in certain proportions, the gas becomes explosive, the mixture being known as "firedamp." Marsh gas is not poisonous, but when unmixed with air suffocates by excluding oxygen from the lungs. The diluted gas can be breathed for a long time with no ill effects, except a slight dizziness, which quickly passes away on return to fresh air.

Marsh gas is the most common of the occluded gases of the coal formations. It seldom, if ever, occurs pure, but is mixed in varying proportions with other hydrocarbons (olefiant gas and ethane) and often with nitrogen. These mixed gases greatly modify the character and properties of the pure gas.

Marsh gas issues from the strata into the mine workings where it accumulates in quantity, unless removed by a copious air current. The most gaseous seams are those that are overlaid with a compact rock, slate, or shale that is impervious to gas and not traversed by faults, which would allow the gas to escape. Gas is generated most freely from a virgin seam and from a freshly exposed face of coal. Hence, new workings generate more gas than old workings; because, in the old workings, the gas has mostly drained from the strata and escaped.

Marsh gas diffuses rapidly into the air and other gases, the rate of diffusion depending on the relative densities of the two mediums. The question is often asked, if the diffusion of gas is so rapid how is it possible for a large body of gas to accumulate in a void place in the mine. The reason is that diffusion only takes place at the surface of contact, and is therefore limited, and the gas is being generated faster than it passes away.

Marsh gas being lighter than air tends to accumulate at the roof and at the head of steep pitches and in rise workings. It is found in such places where the air current is not sufficiently strong to sweep away the gas and in other poorly ventilated or abandoned places. Gas can generally be found at the roof or close to the face of the coal in chambers generating gas. It is detected by observing the flame of a safety lamp. If gas is present in sufficient quantity in the air a faint nonluminous cap will appear surmounting the flame of the lamp. The gas also lengthens the flame.

The Coal Age Pocket Book

FIREDAMP

All gases were formerly known to the miner as "damps," which is a word of Dutch or German origin meaning vapor or fumes. Later, as the characters of the different gases became known, they were named according to their several characteristics. The term "firedamp" was applied to any inflammable or explosive mixture of gas and air.

The word firedamp, today, in this country, means any inflammable or explosive mixture of marsh gas and air, with or without other gases. In England, the word is taken to mean any mixture of marsh gas and air without regard to whether or not the mixture was inflammable or explosive, which, however, is not its logical meaning.

When but a small amount of marsh gas is mixed with pure air the gas is so diluted that the mixture is not inflammable. In contact with flame, this small percentage of gas in the air adds to the combustion of the flame and lengthens the flame; but the flame is not propagated throughout the mixture, as the absorption of the heat by the air is too great to maintain the temperature necessary for combustion.

Lower Inflammable Limit—As more gas is added to the air, a point is soon reached where the combustion of the gas develops sufficient heat to raise the temperature of the air to that required to maintain the combustion. When this point is reached the flame causing the ignition is extended or propagated throughout the mixture. In other words, the mixture becomes inflammable, because the combustion is supported in the mixture independent of any other source. The theoretical percentage of gas in the firedamp at this point, as calculated, is slightly above 2 per cent., for dry air or saturated air. The heat absorbed by the water of saturation is so slight in comparison that it can be ignored without appreciable error. There are heat losses, however, that cannot be calculated, which fact raises the lower inflammable limit of pure marsh gas to about 5 per cent.

Effect of Dust and Other Gases—Owing to the fact that marsh gas is rarely, if ever, found pure, but is generally mixed with dust or other gases or both, it is never safe to work with open lights, in air containing more than 1 per cent. of gas, in bituminous mines; or 2½ per cent., in anthracite mines.

Gases are divided into two general classes, in respect to the effect they produce on the inflammability of firedamp. Gases having a lower ignition point than marsh gas, as for example, carbon monoxide, hydrogen sulphide, ethane and olefiant gas, lower the inflammable limit of firedamp, as given above. Fine coal dust floating in the mine air has a similar effect, in proportion as the dust is highly inflammable. On the other hand, extinctive gases such as nitrogen and carbon dioxide raise the limit given above.

In the working of bituminous mines, coal dust is a most dangerous factor, especially when the coal is highly inflammable. In many cases, the finely divided dust produces an explosive atmosphere even when no gas is present. The presence of such dust in the mine air, acted on by the flame of a blownout shot, is certain to cause trouble.

INQUIRIES OF GENERAL INTEREST

Effect of Carbon Dioxide on Flame of Carbide Lamp

What is the effect of carbon dioxide in the mine atmosphere, on the burning of the acetylene lamp?

CARBIDE.

Shenandoah, Penn.

Carbon dioxide (CO_2), being an incombustible gas, acts when present in the atmosphere not only to dilute the air and thus reduce the percentage of oxygen present; but, with the nitrogen of the air, absorbs a considerable proportion of the heat developed by the combustion. The acetylene gas is the combustible and the oxygen of the air the supporter of combustion. The reaction that takes place is as follows:

$$2\,C_2H_2 + 5\,O_2 = 4\,CO_2 + 2\,H_2O$$

The reaction shows that the acetylene flame, like other flames, is dependent on the oxygen of the atmosphere for its combustion; but not necessarily to the same degree as other flames. The acetylene flame, like the hydrogen flame, is more tenacious than either the candle or oil flame. In other words, the acetylene flame will continue to burn in an atmosphere where other flames are extinguished. This fact has been observed in the mine, in places generating blackdamp. Blackdamp is composed largely of a mixture of carbon dioxide, nitrogen and oxygen. The percentage of oxygen in blackdamp is, therefore, much below the normal percentage of oxygen in the atmosphere. Blackdamp, as found in the mine, is an *artificial atmosphere* and generally contains sufficient oxygen to support the burning of the acetylene flame. In such an atmosphere it requires 50 per cent., more or less, of carbon dioxide to extinguish the flame of the acetylene lamp.

When the acetylene lamp, however, is placed under a bell jar and allowed to burn until it is extinguished, the percentage of carbon dioxide in the air within the jar has been found to be 6.3 per cent. This is called a *residual atmosphere,* much of the oxygen of the air having been consumed by the combustion of the flame. In this connection, the article, "The Carbide Lamp and Carbon Dioxide," COAL AGE, Vol. 2, p. 128, will be of interest to those studying the subject.

Experiments were recently made at the U. S. Federal Testing Station, Pittsburgh, to compare the burning of the Taylor acetylene lamp with that of a candle. In these experiments, the candle was first placed under a bell jar and allowed to burn until it was extinguished, the time required being 1 min. 59 sec. The Taylor lamp placed alone under the same bell jar burned 2 min. 2 sec., when it was extinguished. The candle and lamp were then placed together under the same bell jar, the lamp having a small flame. In this case, the candle was extinguished in 47 sec., while the lamp burned 3 min. 9 sec. The same experiment was then performed, the lamp having a large flame. The candle burned 29 sec., and the lamp was extinguished in 1 min. 18 sec.

Fan Ventilation

Kindly explain in COAL AGE for what purpose the Pitot tube is used in fan ventilation.

READER.

Belleville, Ill.

The Pitot tube has been used, in recent years, for determining the velocity of the air current more accurately than can be determined by the use of the anemometer, in making fan tests. The Pitot tube is a simple tube of small bore about ½ in. in diameter, attached to the water-gage tube and used in connection with it, to determine the velocity head of the air current from which the velocity of the current may be calculated.

As is well known, the water-gage tube should be so arranged that the air current will pass its mouth at right angles to the length of the tube; and often a thin plate is fixed to this tube flush with its mouth so as to direct the current of air in a direct line across the mouth of the tube and prevent any tendency of the air either to enter the tube or draw away from the tube. By this arrangement the tube measures only the static pressure of the air current.

The end of the Pitot tube, however, is bent in the direction of the advancing current, so that the full force of the current is directed into the mouth of the tube. When so arranged, this tube measures the entire pressure producing the flow of the air, which corresponds to the sum of the pressure head and the velocity head.

Now, if the first tube is connected with one arm of the water gage, and the second tube with the other arm of the same gage, it is evident that the reading of the water gage will measure the difference of these two pressures, which is the pressure due to the velocity head, expressed in inches of water gage.

The velocity is then calculated from the reading of the water gage, the calculation being based upon the fundamental equation $v = \sqrt{2\,gh}$. It must be remembered, however, that in this equation, v is the velocity in feet per second and h the head of air column in feet, g being the value of the force of gravity (32.16), i the gage, and water being 815 times as heavy as air.

$$v_{ft.\text{-}sec.} = \sqrt{2\,g\,h_{ft.\ air}}$$

$$v_{ft.\text{-}min.} = 60\sqrt{\frac{2 \times 32.16 \times 815\,i}{12}} = 3965\sqrt{i}$$

Or, for any other gage than water, specific gravity $= G$.

$$v_{ft.\text{-}min.} = 3965\sqrt{Gi}$$

The velocity head is a comparatively small reading in a water gage, and, to increase the accuracy of the results, it is advisable to use either alcohol or petroleum instead of water, in the gage. In either case, the specific gravity G of the alcohol or the petroleum should be carefully determined. As an illustration, taking the specific gravity of petroleum as 0.878, a gage reading of $\frac{1}{16}$ in. would indicate a velocity of 928 ft. per min.

EXAMINATION QUESTIONS

Miscellaneous Questions

Answered by Request

Ques.—A shaft 500 ft. deep is full of water; what is the pressure per square inch and per square foot, at the bottom of the shaft, due to the weight of the water?

Ans.—The pressure due to the weight of the water is found as follows:

$$500 \times 62.5 = 31{,}250 \textit{ lb. per sq.ft.}$$
$$500 \times 0.434 = 217 \textit{ lb. per sq.in.}$$

Ques.—(a) How many 3-in. pipes will present a sectional area equal to that of one 12-in. pipe. (b) If all the pipes are of equal length, will this number of 3-in. pipes discharge more or less water, in a given time, than one 12-in. pipe, and why?

Ans.—(a) The sectional areas of these pipes are:

One 12-in. pipe, $0.7854 \times 12^2 = 113.1$ sq.in., nearly.
One 3-in. pipe, $0.7854 \times 3^2 = 7.07$ sq.in., nearly.

The number of 3-in. pipes, therefore, required to give the same sectional area as a single 12-in. pipe is $113.1 \div 7.07 = 16$ pipes.

(b) Approximately, the discharge of a pipe line, for a constant head, varies as the square root of the fifth power of the diameter of the pipe. In other words, the discharge ratio is equal to the square root of the fifth power of the diameter ratio. Indicating the discharge of one 12-in. pipe by G_{12}, and the dischargee for sixteen 3-in. pipes by 16 G_3, the ratio of discharge, in this case, is

$$\frac{G_{12}}{16\,G_3} = \tfrac{1}{16}\sqrt{\left(\frac{12}{3}\right)^5} = \tfrac{1}{16}\sqrt{4^5} = \frac{\sqrt{1024}}{16} = \tfrac{32}{16} = 2$$

This shows that one 12-in. pipe will discharge twice the quantity of water that sixteen 3-in. pipes will discharge, under the same head and for the same condition of the pipes, the length of all the pipes being equal. The reason is that sixteen 3-in. pipes present a very much larger rubbing surface, which increases the friction and decreases the quantity of the flow.

Ques.—What are the essential features to be observed in building and maintaining mine roads, in order to secure the safe, speedy and economical handling of the coal?

Ans.—When laying out a permanent mine-haulage road, it is advisable to straighten the entry as far as practicable by taking off a "skip" on the rib, where the entry has not been driven on line. It is also well to bring the roadway, as far as practicable, to a uniform grade that will favor the movement of the loaded cars. The most economical grade for this purpose is 1½ per cent. When this has been done, the road should be well timbered and drained and the roadway ballasted, especially where motor or rope haulage is employed. The track ties should be spaced an equal distance and not too far apart, so as to provide a good bedding for the rails. Iron rails should be used on all main-haulage roads, and the weight of the iron should be adapted to the weight of the loaded cars and motors. There is no economy in using too light rails. The haulage roads should be of sufficient width to afford a clear passage of not less than 2 ft. on at least one side of the track; but where this is impracticable, refuge holes should be cut in the rib, at short intervals. All roadways should be regularly cleaned at frequent intervals of time.

Ques.—Explain the method of calculating the percentage of gas in an air current.

Ans.—The percentage of gas in mine air is determined by observing the height of the flame cap, in an approved safety lamp exposed to the gas. It has been the custom among firebosses to guess at the height of the flame cap. The best results, in testing, are obtained by the use of a lamp having a free upward circulation of air. The air should enter the lamp at a point below the flame and, ascending, pass out through the gauze chimney. The lamp most commonly used in testing is the unbonneted Davy lamp. When such a lamp is used, burning sperm or cottonseed oil, the percentage of gas (J) may be calculated from the height (h) of the flame cap, in inches, by means of the formula

$$J = \sqrt[3]{36\,h}$$

For example, if the height of the flame cap is ¾ in., $h = 0.75$; and the percentage of the gas, in this case, is

$$J = \sqrt[3]{36 \times 0.75} = \sqrt[3]{27} = 3 \text{ per cent.}$$

It is often difficult to obtain a good average test for gas, in a strong air current. In such a case, it is necessary to shield the lamp from the direct force of the current and obtain a number of readings, in different parts of the airway, in order to secure a good average reading.

Ques.—Assume that a pair of headings, each 5 ft. high and 8 ft. wide, is being driven to the rise, on a grade of 10 per cent., and one of these headings is standing waiting for the crosscut, which is almost through, when the fireboss reports that the idle heading is filled with gas to within a foot of the bottom, at the face. Calculate the quantity of gas in the heading.

Ans.—The thickness of the seam being 5 ft., if the gas is observed 1 ft. from the bottom, at the face, there is $5 - 1 = 4$ ft. of gas, at that point. Then, the rise of the heading being 1 in 10, the distance the gas reaches back from the face is $4 \times 10 = 40$ ft. The section of the heading filled with gas is in the form of a wedge measuring 4 ft. on end and 40 ft. on the base and 8 ft. wide. The volume of this space is $\frac{8 \times 4 \times 40}{2} = 640$ cu.ft.

This method of measuring gas is that commonly employed by firebosses, but is only suggestive of the relative amount of gas present. As a matter of fact, there is no definite gas line above which all is gas and below which all is air. The point at which the fireboss reports gas is the point where he first observed the cap in his Davy lamp, and represents, approximately, 2.5 per cent. of gas. Above this poinut, the percentage of gas increases and below it decreases.

COAL AND COKE NEWS

Harrisburg, Penn.

A bill has been introduced amending the act which provides that wash houses be established at all collieries, when application is made by 20 or more men, and compels the company to erect a suitable place for men to wash and change their clothes after coming out of the mines; the amendment reads that the petition of the men must be complied with 8 weeks after making application. This bill passed the House and is now in hands of the Senate Committee on Mines and Mining.

The McKay bill making it unlawful to discharge into any running stream, any coal, culm, mine refuse or ashes, has been sent to the Governor the second time, for it was recalled a few days ago to be amended, the amendment striking out the word "ashes."

The bill does not apply to water pumped or flowing from any coal mine where the coal, clum and refuse have been removed therefrom, nor does it prevent the discharge of sewage from any public sewer system owned or maintained by any municipality.

The bill carries a fine of $100 for each offense and $50 for each day that the offense is maintained, or imprisonment not exceeding one month, or both at the discretion of the Court.

The purpose of this bill is to eliminate the polluting of streams in the anthracite coal region with culm, etc., which in times of high water washes onto the farmlands lying along the several rivers and creeks, resulting in suits for damages.

On July 1, a hearing will be held by the United States District Court in Philadelphia of the suit brought by J. B. Coryell, trustee in bankruptcy for Dimmick & Co., against a number of officials of coke manufacturing companies of Uniontown, Penn., alleging a conspiracy in restraint of trade.

The men against whom suit is brought, are Isaac W. Seamans., J. P. Brennan, C. E. Lenhart, A. P. Austin, R. W. Fry, Julian Kennedy, J. H. Hoover, G. D. Harrarh, J. W. Abraham, E. H. Abraham, R. W. Gilmore, G. B. Gilmore, L. W. Fogg, W. G. Rock, John Harding, G. D. Howell, J. V. Thompson and Wiley L. Byers. The alleged conspiracy it is charged is a violation of the Sherman anti-trust laws.

Dimmick and Co., before their bankruptcy last March were dealers in coke, having offices in Uniontown, Philadelphia and Cleveland, Ohio and doing a business, it is declared, of about $4,000,000 to $5,000,000 a year. They received most of their coke from ovens at Uniontown, owned and operated by the defendents in the above suit, and had contracts, it is alleged, for long terms with the companies of which these defendents are officials.

The charge is made that a combination was formed not to sell any more coke to Dimmick and Co., and it is alleged that they organized a selling company, called the Consumers Co., and, further, that they raised the price of coke from $1.70 to $4 a ton. Owing to the great increase in price, Dimmick and Co., refused to buy. The Consumers Co. took the coke thus refused by Dimmick & Co. and sold it.

Dimmick & Co., charge that they had contracts to meet, and in order to fulfil them had to buy coke at the greatly increased price. The result, they say, was a loss of $400,000 so that they were forced into bankruptcy. They now seek reparation for their loss, and claim that the sole object of organizing the Consumers Co. was to drive them out of business.

This is commencement month in the anthracite coal fields as well as at the great universities and colleges of the land The boys who receive their diplomas from the various technical schools have in the majority of cases only a vague idea of just what use they will make of their education. On the other hand, the young men ranging in age between 20 and 30 who have passed the examination of the technical schools maintained by the various anthracite companies and the Y. M. C. A., with the coöperation and financial assistance of many of the operators, have an extremely definite idea of what use they will make of their added knowledge.

These are the men who will earn more money because they are better fitted for the many positions in and about the mines for which special training is not only advisable but often necessary. These are the men who will save human lives, since it is the men familiar with such subjects as mine gases, mine ventilation, mine law, mine surveying, electricity and magnetism, mechanics, compressed air and kindred subjects who are best fitted to keep the mine safe and warn the uninstructed and ignorant of the dangers in their way.

These are the men who can save money for the public which must ultimately pay for the increased cost of mining due in some degree to the blunders of an ignorant past. These are they who can raise the standard of living in the anthracite coal fields and the operators are welcoming their awakening to the opportunities of the schools as it makes for better citizenship, more efficient labor and greater contentment.

This does not in any way detract from the value and dignity of our great universities. The students in these technical schools make more definite and immediate use of their opportunities than the average college graduate. The education acquired in the anthracite coal fields is secured in evenings of study after days of labor in the mine, and therefore is valued at its true worth.

In coal mining, as in many other walks of life, a man's efficiency depends largely upon his knowledge of the subject in hand and his ability to use that knowledge to the best possible advantage.

PENNSYLVANIA

Anthracite

Bloomsburg—Judge Evans of the Columbia County Court has granted a preliminary injunction against the Midvalley Coal Co., restraining it from mining coal on Columbia County land, which the Lehigh Valley Coal Co. claims. Back of this action is a controversy for title to a vein of coal which was discovered by Lehigh Valley engineers and is conservatively estimated to be worth $1,500,000. There has been some confusion about the leases to this property and the Lehigh Valley Co. claims that the Midvalley people have disregarded warnings not to mine the coal and have already sunk a tunnel into the property.

Hazleton—The State Railroad Commission has dismissed the complaint filed against the Lehigh Traction Co. demanding that cars be run exclusively for miners between Hazleton and Freeland. In so doing the Commission held that the traffic does not justify special cars since the miners quit work at different hours. The complaint admits that the company has separate compartments in its cars for miners returning from work, but the Commission holds that there is no way to prevent an occasional overflow which brings the miners in contact with other passengers.

Harrisburg—Although Senator Wm. E. Crow, of Fayette County, is quoted as saying that no settlement upon the controversy arising over the Workmen's Compensation Bill is in sight, it has been reported on good authority that a plan which may prove acceptable is being evolved and a final effort will be made to bring about the enactment of the measure.

A bill has been passed relating to the dockage of anthracite coal at the mines on which to compute the earnings of the miners.

Philadelphia—The strike of the Reading car repair men has as yet had no preceptible effect upon the coal tonnage handled by that railroad. The Reading authorities say that as things now stand they can get along with the force as reduced by the strike for a considerable time.

Pottsville—Rumor has it that the Mill Creek Coal Co. contemplates opening the coal measure in the Wolf Creek Valley north of St. Clair. The openings will be made west of or below the new reservoir recently constructed by the Pottsville Water Co., and hence will in no manner injure the quality or lessen the quantity of the supply.

Bituminous

Greensburg—The first-aid contest of the Keystone Coal & Coke Co. for the cup presented by L. B. Huff was won by the Arona team with a score of 99¾. Three teams tied for second place and the prize of $40, the money being divided among Keystone Shaft, Carbon and Saley. The Greensburg team took third place and a prize of $20.

Cairnbrook—At the new operation of the Lackawanna Coal Co. coal is being removed but is stored in cars on the ground, as the Pennsylvania R.R. has not yet completed its extension up Shade Creek. It will possibly be the middle of July before any shipments can be made. It is probable also that the Berwind-White Coal Mining Co. will soon start to operate in this territory and a large tonnage will, therefore, be taken out.

Pittsburgh—Word has just been received in coal and railroad circles here that the Coleman tract of land in the Allegheny Valley just west of Rimersburg, comprising about 9000 acres, has been purchased by a syndicate of Philadelphia capitalists. With the development of this property a new railroad will be built to haul the output, thus bringing heavy coal supplies into the market. About 800 men will be employed in the preliminary work.

Universal—A fire occurred on June 22 which caused damage to the amount of approximately $25,000 and was extinguished only after a bucket brigade of 500 men had fought it for four hours. The fire broke out in the kitchen in the home of Emil Elovich, a Lithuanian, at about two o'clock a.m. The entire family, father, mother and five children, made their escape down a ladder from the second story. The flames spread rapidly from house to house before the town could be awakened.

Bellefonte—During a heavy thunder storm on June 25, the lightning struck one of the rails of the track of a coal mine near Clarence. The current traveled down the rail into the mine, killing one man and injuring three others.

Connellsville—Two unknown men were run down and killed by a coke train on the track of the Davidson ovens near here June 26. Shortly before the accident the men wandered onto the property and told the workmen that they merely wanted to see the coke ovens. It was raining and they climbed on the ovens to dry their clothing. Not being familiar with the making of coke the men did not know that the small coke engine and cars pass over the tops of the ovens.

Active operations in the Greene County portion of the lower Connellsville coke region have been begun. The Portland Coke Co. has 50 of its 100 ovens completed and has begun shipping some coke. The Reliance Coal & Coke Co., which is building 400 ovens just below Brownsville, will begin shipments in a couple of weeks.

WEST VIRGINIA

Charleston, W. Va.—An official call for a strike of miners in the New River coal field was issued June 25, from the local Headquarters of the United Mine Workers of America. This order is to be effective July 1. Several thousand copies of the call for the strike have been ordered printed and will be distributed throughout the district within the next few days. Coal operators in the New River field have asked that these copies be recalled in the hope of reaching some terms which will avoid a strike.

The miners of the Paint and Cabin Creek coal fields plan to enter suits for heavy damages against those responsible for the killing and wounding of miners and members of their families during the recent labor troubles. One of the suits of principal interest will be that of Mrs. Maud Estep, the widow of Susco Estep, the young miner who was killed by a bullet while getting his wife and children to a place of safety. This shooting occurred at Holley Grove on Feb. 7.

Bluefield—It has been learned that a new coal company has been organized and will be in operation within a short time. This company will be known as the Trace Fork Coal Co., and will be located at Mullen. Side-tracks are now being laid. The Pocahontas No. 3 seam will be worked and everything is being rushed for the opening of the new mine.

KENTUCKY

Jenkins—The Consolidation Coal Co., now building a veritable city at Jenkins, has begun work on a $30,000 hospital at that place, which will be the largest institution of the kind in the northeastern section of the entire state. The new hospital will take the place of the temporary building erected there two years ago.

TENNESSEE

Nashville—The Nashville Traffic Bureau is looking for a decision by the Interstate Commerce Commission in the Nashville coal rate case. A decision has been expected in this case for some time and is awaited with much interest. A material reduction is sought in the rates on coal, it being maintained that there is discrimination against Nashville in this commodity.

South Pittsburg—The Rexton coal mines, owned by the Tennessee River Coal Co., are making preparations in order to begin working by the time the coal season begins in the fall.

OHIO

Cincinnati—There are numerous indications of a volume of business this summer and autumn which will exceed in value and tonnage all records that have yet been made. Orders for coal are said to be far beyond those of other years at this season, and the railways, both East and West, will probably be taxed to their utmost in order to meet their requirements.

Crescent—Two mines in the eastern Ohio coal fields went on strike June 24, throwing 600 men out of work. The men employed at Gaylord mine No. 2 struck on account of the refusal of the company to recognize the uniform outside wage agreement, while the exact nature of the trouble arising at the Crescent mine of the Lorain Coal & Dock Co. over which the men quit work has not been ascertained.

Brilliant—The Royal Coal Co., which controls a large acreage south of Brilliant, is shortly to open its mine which was projected several months ago. At that time trouble was met in securing the right of way for the mine siding, and the opening was delayed considerably on that account. Settlement of this difference has been effected, however, and development of the property will be started soon.

ILLINOIS

Benld—Considering output the three mines of the Superior Coal Co. near here are among the largest in the world. Mine No. 1 is averaging 3500 tons daily and on May 23 last hoisted 3808 tons. Mine No. 2 set a new monthly average in April of 4059 tons daily. During May mine No. 3 averaged 4061 tons a day, or 105,507 tons for the month. On June 6 the three mines broke all previous records, hoisting 12,294 tons.

Carlinville—The Superior Coal Co. have returned the options taken some time ago on land southwest of Benld, as it has been decided to postpone the sinking of shaft No. 4 for an indefinite period. The increased tonnage of the present mines and the extension of the road to connect with the mine at Staunton is the reason assigned for this decision.

IOWA

Knoxville—It has long been known that a vein of coal underlies the village of Pleasantville at a depth of between 300 and 400 ft. S. C. Frost has interested capitalists and raised money upon popular subscription for the purpose of prospecting. He has also employed Knoxville prospectors for this work.

NORTH DAKOTA

Minot—According to the latest reports from the Northern Briquetting Co., lignite briquettes will probably be produced in Minot by Sept. 1. The above named company owns 700 acres of lignite coal land near Burlington and is establishing a plant near the crossing of the Great Northern and Soo line tracks. The necessary briquetting machinery has been ordered and it is expected that the plant will have a capacity of at least 75 tons in a working day of 10 hr.

ARKANSAS

Fort Smith—A number of coal miners were reported entombed after an explosion in a mine at Jenny Lind. Ark., 12 miles south of Forth Smith June 24. It is understood that aid was summoned from the mine rescue station at McAlester, Okla.

OKLAHOMA

Venita—A company from McAlester has unloaded a prospecting drill at Blue Jacket and prospecting for coal will be started at once. No attention will be paid to oil or gas, but a prospect hole will be sunk on the west side of the town in the hope of getting a little closer to the railroad. This will be put down to a depth of at least 400 ft.

ARIZONA

Phoenix—The first of a number of petitions to initiate a law excluding all but English-speaking workmen from the mines of Arizona was filed June 21 with the Secretary of State. Petitions are being circulated in every mining camp and it is believed that the necessary 2168 names will be secured to place the measure before the people at the election in 1914.

FOREIGN NEWS

Cardiff, Wales—The strike called by the miners as a protest against non-unionism in the mines narrowed its area a week from its proclamation to the Rhondda Pit of D. Davis & Sons. The men still on strike, numbering 7000, are receiving financial support from the Miners' Federation.

New Hazleton, B. C.—An active campaign of development in the Kitseukla coal field has been undertaken by J. W. Hart and Wm. McDonald. These prospectors staked their claims last summer and say that they have one seam of coking coal 7½ ft. thick, upon which they will do most of their work. Another bed 2½ ft. thick is reported to be anthracite of good quality.

PERSONALS

Ernest Hutton, of Clarksburg, W. Va., has been recently appointed superintendent of the power and mechanical department for the Elkhorn Mining Co.

D. A. Thomas, English coal magnate from Cardiff, Wales, has been recently visiting various coal operations in the Pocahontas and Winding Gulf district of West Virginia.

H. B. Douglas has been appointed acting general manager in charge of the operation of the Clearfield Bituminous Coal Corporation, with headquarters at Clearfield, Penn. This appointment was made on account of the death of A. R. Shillingford, vice-president and general manager of the company.

J. F. Healy, formerly of Elkins, W. Va., has opened a consulting mining engineering office in Room 1201, Union Bldg., Charleston, W. Va., and proposes to make a specialty of reports on coal lands and subjects relating to coal mining for banks, trust companies, and investors generally, as well as other engineering business. Mr. Healy is a graduate of the Pennsylvania State college, with many years experience in mining engineering in Washington, Montana and West Virginia, as well as for years acting as general superintendent and manager of operations. He also acquired an intimate knowledge of the minutia of coal mining as a boy.

OBITUARY

Edward Nelson Saunders, aged 68 years, prominent in the coal industry of the Northwest and interested in several St. Paul financial institutions, recently died at his home in that city. He is survived by a wife, three daughters and one son.

Peter Donaldson, a partner in the firm of James Watson & Co., also President and Managing Director of the Dayton Coal & Iron Co., of Dayton, Tenn., and a heavy stockholder in the latter company, drowned himself June 24 at Kilcreggan, a watering place on the Clyde. The firm of James Watson & Co. suspended payment on June 11 and the Dayton company made a consignment shortly afterward. It is believed that Mr. Donaldson's act was the result of these business reverses.

COAL AND COKE PATENTS

Gas Producer—W. Hammick, Pittsburg, Kan., 1,060,755, May 6, 1913. Filed July 16, 1912. Serial No. 709,751.

Hoisting Bucket—A. Wirsing, Milwaukee, Wis., 1,060,730, May 6, 1913. Filed Dec. 12, 1902. Serial No. 736,260.

Coal Bit Sharpener—A. T. Upton, Mount Vernon, Ill., 1,061,149, May 6, 1913. Filed Aug. 5, 1912. Serial No. 713,424.

Coal Boring Machine—W. J. Hinds, Grant Town, W. Va., 1,060,840, May 6, 1913. Filed June 29, 1912. Serial No. 706,767.

Superheater for Locomotive Boiler—J. Primrose, New York, N. Y., 1,060,360, Apr. 29, 1913. Filed Mar. 9, 1911. Serial No. 613,349.

Apparatus for Superheating Steam—E. H. Foster, New York, N. Y., 1,060,334, Apr. 29, 1913. Filed Sept. 1, 1911. Serial No. 647,141.

Stoker—H. E. Stover, assignor to Baldwin Locomotive Works, Philadelphia, Penn., 1,060,036, Apr. 29, 1913. Filed May 22, 1912. Serial No. 698,904.

CONSTRUCTION NEWS

Whitesburg, Ky.—An Eastern syndicate has just purchased 5000 acres of rich coal land along lower Parr's Fork on the Knott-Letcher border and is planning an early and extensive development of the property.

West Newton, Penn.—The Connellsville Coke & Fuel Co., is pushing work on the erection of an 80 oven coke plant to develop 105 acres of Ligeonier Valley coal recently bought from ex-judge Charles G. Steel and other Greensburg men.

Lisbon, Ohio—Over two thousand acres of valuable coal land lying north of West Point and along the right of way of the Youngstown and Ohio River Railroad Co., will be extensively developed by the Kirk-Dunn Coal Co., of Cleveland, in the near future.

Birmingham, Ala.—The Pratt Consolidated Coal Co. that recently purchased the properties of the Milner Coal Co. of New Castle, is remodeling No. 6 mine, erecting a temporary tipple and preparing to resume the operation of this development in the near future.

Charleston, W. Va.—T. M. McClenahan, of Charleston, W. W. Keefer, of Pittsburgh, and John Sargeant, of Cincinnati, Ohio, will develop coal lands near Charleston, and are installing a plant to produce 2500 tons daily. The initial cost of this installation will be between $250,000 and $300,000.

Washington, D. C.—Work on the new building of the Bureau of Mines in Pittsburgh for which the last congress appropriated $500,000 is expected to be under way soon. W. G. McAdoo, Secretary of the Treasury, has asked Congress for an emergency appropriation of $15,000 to pay for surveying the plot adjoining Schenley Park which the city gave the government in exchange for the Arsenal site in Lawrenceville.

Edinburgh, Scotland—The Udston Coal Co. is now leasee of the three coalfields in East Lothien, Riggenhead, St. Germains, and Penston, covering a space of about three miles in length. The management met recently to consider the question of erecting 200 to 300 workmen's houses, half of them to be at Macmery, and half at Tranent. At Tranent and Elphinstone, which, when completed, will be productive pits in East Lothien, several hundred additional houses will be erected by the company.

Lexington, Ky.—Over $40,000,000 will be spent in the development of the property of the Elkhorn Fuel Co. within the next few months. It is proposed to build three new mining towns; one on Potters' Fork a mile from the main line of the Lexington and Eastern, which will be reached by a branch line, one on Wright's Fork, and one near Neon, the two last named being on the Lexington & Eastern main line.

Orders for millions of feet of lumber have been placed, two large band saw mills and several planing mills will be installed to work up native lumber, and a brick plant of considerable capacity will be built and its output used in constructing the new cities.

NEW INCORPORATIONS

Connellsville, Penn.—The Lake Trade Coal Co. has been organized at Windber with a capitalization of $25,000.

Columbus, Ohio—The Citizens Ice, Coal & Supply Co. has been organized with a capital of $40,000 at Sidney by Milton Bennett and others.

Osceola, Ark.—A charter has been granted to the Gay-Orr Coal & Ice Co., capital stock $25,000. The incorporators are B. F. Gay, W. E. Orr, and B. I. Gay.

Pittsburgh, Penn.—The Milburn Coal and Coke Co. a corporation organized under the laws of the state of West Virginia has discontinued business and dissolved.

London, Ohio—With a capital stock of $50,000 the Davies Block Coal Co. has been organized by W. B. Catching, McCall Fitzgerald, Sam G. Hardin and M. M. Elliott.

Louisville, Ky.—Amended articles of incorporation have been filed with the county clerk changing the name of the firm of Joseph Walton & Co. to the Pittsburgh Coal Co.

Louisville, Ky.—The O'Donnell Coal Co., capitalized at $50,000 has been incorporated. The founders are Joseph O'Donnell, and M. Lanning. The company will do a general coal mining business.

Kittery, Nova Scotia—The Nova Scotia Coal Iron and Railway Co. has been organized with a capital of $500,000 to carry on the business of mining all kinds of minerals. H. Mitchell is president, and H. A. Paul is treasurer.

Nashville, Tenn.—A charter has been issued to the Flat Creek Coal & Coke Co., of Knox county. The concern has a capital of $50,000 and the incorporators are Thomas Pruden, J. C. Gaut, G. N. Hacker, P. H. Smit, and J. M. Meek.

Charleston, W. Va.—The Coöperative Coal Co. of Charleston, has been organized with a capital of $15,000 to deal in coal lands. The incorporators are C. T. Davis, F. W. Johnson, T. E. McCoy, W. H. King and G. V. Rainey, of Charleston.

Wellsburg, W. Va.—The Ohio River Co. of Wellsburg has been organized to mine and deal in coal and other products. The incorporators are B. Cochrane, Elmer Hough, Robert Wheeler, John K. Paullas, and H. A. Stengle, all of Wellsburg.

Manhattan, Kansas—A charter has been granted to the Manhattan Lumber and Coal Co. with a capital stock of $25,000. The incorporators are, I. L. Inskeep, George E. Cragg, Oliver A. Hutchins, George W. Myers, and M. L. Hastings.

Wilmington, Del.—The General Fuel and Power Co. has been organized with a capital stock of $800,000 to operate coal mines, to manufacture ice, cement, gas, etc. The incorporators are H. E. Robinson, J. Jacobs and Harry W. Davis, all of Wilmington.

Wheeling, W. Va.—The Monroefield Coal Co., has been organized in Morgantown to develop coal lands in Monroe County, Ohio. The capital stock is $10,000 and the incorporators are J. Martin, W. J. Snee, M. C. Martin, E. P. Weaver, and B. C. Weaver of Morgantown.

Charleston, W. Va.—The Elma Mining Co. of Charleston has been incorporated to develop coal lands in Fayette County. The capital stock is $50,000 and the incorporators are R. M. Price, R. S. Stillman, Duke W. Hill, A. C. Collins and Buckner Clay, all of Charleston.

Phoenix, Ariz.—A charter has been granted to the Arizona & Mexico Mines Development Co., to mine coal and other minerals. The capital stock is $1,000,000 and the incorporators are, Sam B. Bradner, W. L. Barnum, M. L. Buckley, and Charles F. Hanson all of Phoenix.

St. Louis, Mo.—The City Coal Co. has been recently organized with Wm. W. Shook holding 34 shares, Philip Riley and Joseph Moriarty holding 33 shares each. The purpose of the new company is to do a general coal and ice business, and the capital stock, which is fully paid up, is $10,000.

INDUSTRIAL NEWS

Coshocton, Ohio—During a recent thunder storm a bolt of lightning set fire to the timbers in the air shaft of the Henry Lear mine near here.

Louisville, Ky.—William Martin recently sued the Monongahela River Consolidated Coal & Coke Co. for $1000 damages alleging he was injured while working on a barge belonging to the defendant.

Somerset, Penn.—W. T. Hoblitzell, F. B. Black, and J. M. Black, of Meyersdale, recently disposed of their interests in the Meyersdale Coal Co., the heirs of the late J. R. Stauffer, of Scottdale, acquiring the controlling interests.

Columbus, Ohio—The Athens & Pomeroy Coal & Land Co., has leased its coal land in Meigs County to the Calvin Essex Co., of New Straitsville, and arrangements are now being made to operate upon the leases this summer.

Ashtabula, Ohio—The steamer "Colonel James H. Schoonmaker" left Ashtabula June 21 with the largest cargo of coal ever carried on the lakes. This aggregated 13,712 tons and represented 296 carloads, or a train over two miles long.

Washington, D. C.—The Red Bank Milling Co., of New Bethlehem, Penn., has filed a complaint with the Interstate Commerce Commission against the Allegheny Valley division fo the Pennsylvania Railroad and other carriers, alleging discrimination.

Ehrenfield, Penn.—During a recent storm lightning struck the fan house of the No. 8 mine of the Pennsylvania Coal & Coke Corporation, and the fire that followed completely destroyed the building, the fan and the motor. The loss is estimated at $5000.

Omaha, Neb.—Some twelve or more ice and coal companies recently appeared in police court at the summons of Inspector John Grant Pegg to account for their failure to pay the occupation tax amounting to $1 a year for each team and $3 for the company.

Mason City, Iowa—A deal has recently been completed whereby Thompto & Heiny take over the coal business of the Northwood Mfg. Co. The former concern also purchased the coal sheds belonging to the latter and will have them moved from their present location.

Memphis, Tenn.—The test of burning coke in switch engines to eliminate smoke recently conducted by the Southern Ry. in Memphis, has brought the announcement from the officials of that company that the fuel is unfitted for railroad use. It was found to be a poor steam producer, yet cost nearly four times as much as coal.

Montreal, Canada—The rumor is afloat that the International Coal & Coke Co. is expected to reorganize shortly. It is understood that the bondholders will be called together with the ultimate idea of exchanging the bonds for preferred stock. The company is understood to be in good condition but needs additional working capital.

Indiana, Penn.—Considerable drilling has been done in Indiana County by a real estate company said to be the coal land agents of the Pennsylvania Railroad. About $50,000 was spent in drilling, and large tracks of land in Pine, Brush Valley, Conemaugh, Rayne, Grant and Mahoning Townships were thoroughly tested for coal, but no options have been taken.

Toledo, Ohio—Officials of the Pere Marquette and Ann Arbor railways say that the decison of the Interstate Commerce Commission increasing the rates on coal by way of the translake route of the two railways to Milwaukee, Manitowoc and Kewanee will mean a gain in revenue to these roads of approximately $50,000 per annum to the former and $100,000 per annum to the latter.

Birmingham, Ala.—It is reported in the coal mining circles that local coal operators are negotiating for the purchase of the De Soto Mining Co. which operates the Indio mine in the northern part of Jefferson County near Warrior. The De Soto company owns between 8000 and 9000 acres of valuable coal land and the daily production of the mine now operated is between 250 and 300 tons.

Pittsburgh, Penn.—There is a persistent though quiet inquiry for good coal lands throughout the mining region of western Pennsylvania, and some large purchases are being made. For three tracts totaling 67 acres in Hempfield Township, Westmoreland County, Ex-Senator John M. Jamison recently paid $72,500 , or a little over $1082 per acre. The coal purchased, however, is said to be some of the very best in the country.

Denver, Colo.—Prince Henri Decroy, member of the ruling house of Belgium, Camile Perin, managing director of the Societe Generale, Charbonnages of Brussels and W. J. Van Maanen proprietor of the Gazette, an English financial paper of Belgium, will arrive in Denver shortly to take over 30,000 acres of Routt County coal land and to close the deal entered into by Paris and Belgium bankers for the purchase of $28,000,000 in bonds to finance the Yampa Fuel & Iron Co.

Punxsutawney, Penn.—James A. McClain, cashier of the Spangler First National Bank, has taken an option on the MacHenry coal tract on Little Yellow Creek near Nolo, Indiana County. The field consists of approximately 5000 acres and the option price is stated as $100 per acre. The total amount involved, therefore, will be in the vicinity of one-half million dollars. An investigation will be made and if the coal proves suitable for coking purposes an extensive plant will be constructed.

Pottsville, Penn.—The Philadelphia and Reading Coal & Iron Co. has recently installed a storage battery locomotive at the Glendower Colliery, which gives promise of doing away with approximately 70 per cent. of the mules now used in the underground workings. The motor is somewhat similar to those now in operation. The storage batteries are concealed in a large case beneath the car, and are so arranged that they are capable of hauling long and heavy trips of coal for a period of ten to fifteen hours. At night they will be recharged, and be ready for operation the following day. Inasmuch as it has been necessary to use three or four mules for transporting coal on the long gangways, the company officials believe that a very large per cent. of the number of these animals can be done away with upon the adoption of the new style motor.

COAL TRADE REVIEWS

GENERAL REVIEW

Many of the hard-coal consumers have now definitely closed down for the summer and the trade is dull. However, shippers are still somewhat behind, so that there is no campaigning for orders and domestic grades are all steady. With a slightly curtailed production in July, there will probably be sufficient demand to keep the trade steady. Only the smaller sizes are going into storage, and the outlook is favorable for the first two weeks of the current month.

The Eastern bituminous situation continues firm, with coal moving freely. The strike outlook in West Virginia is becoming acute; the entire output of the Pocahontas field is sold up, while the New River district is working on half capacity or less. There is a briskness in the trade that no one is able to account for, and it is evident that the Southern agencies have more than enough orders, so that there is sure to be a broad market for the Pennsylvania grades. Georges Creek producers are being pushed to meet their contracts and are declining orders in all directions.

A further slight decrease in the manufacturing demand is noticeable in the Pittsburgh district, due to the arrival of midsummer. Prices are firm, with premiums occasionally obtainable on spot orders, while the labor and car shortage are still in evidence and will probably become more acute as the summer advances. The Lake movement is heavy, but somewhat delayed by congestion, due to the lack of adequate motive power. There has been an advance in quotations at some of the outlying districts.

In Ohio there is a heavy domestic demand much earlier than usual. The Lake movement continues excellent all along the line, the shipments from the docks in the Northwest being particularly good. The production is heavy, manufacturing demand large and the steam consumption good, due to the heavy railroad movement. There was a heavy dumping at the Hampton Roads piers during the week, the port being almost congested with vessels awaiting tonnage; the exports were particularly heavy, and indications are that they will continue so throughout the summer. There are rumors in the South of a curtailment in the production of pig iron, which will necessitate the blowing out of a number of furnaces; this is naturally having a depressing effect on the local market.

The Middle Western trade is a trifle stronger in spite of the unusually warm weather; this is due probably to the labor trouble in West Virginia, there being a heavy demand in the local market for the Eastern steam coals and an advance expected shortly. There is also some improvement on the local fuels, the mines working better generally, with the car supply excellent, except in spots; when the car shortage develops later, as is expected when the heavy crop movement starts, it is probable that Eastern shipments will be curtailed, which should bring about an advance on the Western coals.

BOSTON, MASS.

Bituminous—The situation on Pocahontas and New River coals is fast becoming acute. Practically the entire output of Pocahontas is understood to be sold up and shippers of New River are said to be getting out only 40 to 50% of the normal output of that district. As a result prices are likely to go higher for spot coal, $3.15 having been paid within a week f.o.b. Norfolk for an emergency shipment. Reports of a suspension through the Chesapeake & Ohio districts are received here with more or less concern, according to individual points of view, but the belief is that with all the Southern agencies abundantly suplied with orders there is sure to be a broad market for the Pennsylvania output. There are a number of fair-sized buyers that have yet to cover on their fall and winter requirements, and there can be no question now that prices will be firm for the balance of the year. The Georges Creek district is being pushed to keep up with the contract business in hand, and sales agents are declining orders in every direction.

The demand is strong for all the better grade Pennsylvania coals, and there are rumors that the shippers are not accepting orders now except for prompt delivery. Prices are firmer from week to week on all brands, and just now there is some hurried buying in the effort to get coal forward before the Gettysburg anniversary celebration, which is expected to work practically an embargo against coal movement in Pennsylvania. All-rail, the market shows signs of steady improvement.

Anthracite shippers are still somewhat behind on their orders. New England, however, is only fairly well supplied, and the prospect is with probably a slightly curtailed output in July there will be enough business to keep the demand steady through the summer months. There is no campaigning for orders on the part of the companies, and practically all schedules for domestic sizes are accepted subject to delay. The steam sizes are also in strong request, particularly for delivery on Long Island Sound.

Current wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.45	$1.30@1.65	$1.67@1.77	
Philadelphia*	2.35@2.70	2.55@2.90	2.92@3.02	
New York*	2.65@3.00	2.85@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.15
Providence†				3.88@4.00
Boston†				4.00@4.10

*F.o.b. †On cars.

PHILADELPHIA, PENN.

There is much lethargy manifested in the anthracite market in this vicinity. The usually hot weather, and the fact that at this season of the year, many of the homes of the large coal users are closed, has made the local market rather dull, and this condition of affairs is not likely to improve for some time. There was a slight improvement at the end of the month of June, such as is always manifested, due to many of the dealers desiring to get a car or two of coal before the advance, but this business soon ends. The only feature to the market is the tidewater business, which still continues good. It is understood that this trade looks favorable for the first two weeks in July, and perhaps longer. The talk of partial suspension of mining is likely to become a fact in the present month. The mines were closed over the fourth of July, and this may be but the commencement of a period of curtailed mining, which is not unusual at this season. Many of the large operators state that outside of the small sizes little coal is going into stock, but it is the New England market and the large consignments to the Lakes for trans-shipment to the Northwest, which is making this possible. Any cessation of the demand from these directions, is likely to cause storage of prepared sizes.

The bituminous market has slightly recovered from its relapse of last week. Conditions, according to various inquiries, nearly all point to a period of prosperity for sellers of this product, although it must be said that many of the trade look rather for substantial tonnages, than any marked inflation in prices.

NEW YORK

Bituminous—The local soft-coal companies anticipated a dull period during July and August, as is usually the case, but such has not materialized as yet, and indications are that it will not. Stocks at tide water are smaller than usual, inquiries are coming in good, and there is not much coal around. The demand on contract is particularly heavy. In the stock market things are rather quiet, with few sales being made, but nevertheless there is a strong, healthy undertone, and prices are firm in every particular. There are rumors in the local market that Pocahontas has sold during the week at Hampton Roads at $3.50.

The labor situation in West Virginia continues to be the predominating feature in the local soft-coal situation. Should the miners effect a curtailment in production there to the extent they claim they will, the situation will be grave. The market at the present time does not need any strike to improve it. Car supply on the Pennsylvania R.R. has been a trifle uncertain, but entirely satisfactory; on the New York Central the supply has been fully up to requirements. Labor shortage still continues throughout the mining regions.

We quote the New York market unchanged, but strong and firm as ever.

Anthracite—The last week witnessed an active mine movement among consumers endeavoring to land their stock at the 30c. discount, which expired July 1. As a result, there was a temporary, but abnormal, activity. On the whole, however, the trade is in a strong position, and promises to recede but little over the dull summer period. Producers were looking forward to a depressed market over July and August, but the trade is developing an unexpected strength. There is, however, a good, healthy undercurrent through the market, and while insufficient orders will necessitate some shutdowns during the next two months, it is not expected that this will be of serious proportions.

The hard-coal companies do not report any serious shortage of labor, and seem to be somewhat better off in this respect than the bituminous operators. Stove coal still continues the shortest in supply, with pea and buckwheat the longest; a number of companies report that they are stocking these sizes heavily.

The New York market is quotable on about the following basis:

		Individual		
	Circular	Lehigh	Scranton	Schuylkill
Broken	$5.00	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.25	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.25	4.90	4.95	4.90 .....
Chestnut	5.50	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.70

PITTSBURGH, PENN.

Bituminous—There has been a slight further decrease in manufacturing demand for coal, due merely to the arrival of midsummer. The Lake movement is heavy, and mines in the district are operating at practically as high a percentage of capacity as at any time for years. Prices are firmly maintained, with a disposition to ask premiums on prompt lots of 5@10c. a ton. Prompt slack, however, is quotable at 60@70c. Car supply is fairly good, but there are delays in transit, and a congestion is feared later which would result in a definite shortage. Most of the roads are clearly short of motive power. We quote regular prices unchanged as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The Geologic Survey reports the total production of beehive coke in the United States last year at 32,868,345 tons, and the "Connellsville Courier" had previously reported the Connellsville production at 20,000,000 tons, which would indicate that the Connellsville output comprised 61% of the total beehive output of the country, a slight gain in the proportion as compared with five years or ten years ago. On account of the rapid increase in byproduct coke, the proportion of total coke output is not increased. Last year byproduct coke constituted 25 per cent. of the total coke output, showing a great gain in proportion, and with new byproduct plants starting this year, a further important increase in the proportion is certain for this year and next. There is no prospect that the Connellsville region will adopt the byproduct process, as this should naturally be practiced where the coke is consumed, but within a few years the Connellsville region will probably be a large shipper of coal to byproduct plants. At present it labors under a handicap in freights, which average 15c. a ton higher than from the Pittsburgh district, but this condition is likely to be remedied.

The deadlock between Connellsville operators and furnacemen over contracts for furnace coke for second half has not been broken, the operators continuing to insist upon $2.50, while the furnacemen regard this price as entirely too high in view of the pig-iron market. The operators say they are now making the coke price, and it is up to furnacemen to make pig-iron prices to correspond. A partial bridging of the deadlock has occurred by the operators selling several furnacemen July coke at $2.50, thus postponing the necessity of such furnaces to close contracts. In Pittsburgh coke circles, it is thought these sales were with a guarantee, for the prompt market, while firmer, is hardly quotable above $2.25, and $2.50 for July coke thus looks out of line. Demand for foundry coke is moderately good, with prices firm. We quote: Prompt furnace, $2.25; contract furnace, $2.50 asked; prompt foundry, $2.85@3; contract foundry, $2.75@3, per ton at ovens, with a few operations asking $3.25 on contract foundry coke.

BALTIMORE, MD.

Interest in Baltimore trade circles during the week centered in the strike call for July 1 in the New River District of West Virginia, for if there is a serious tie-up in these particular fields it will mean that local operators will be rushed with orders to supplant the supply of New River coal, of which consumers in the West and in New England have been large users. Whenever there is a shortage of New River coal, the consumers look to the local market for their supply.

Even the issuance of the order has had an effect on coal-trade conditions in Baltimore. The market is firm as far as prices are concerned, and fuel is moving freely. Line business is also good. The salesmen who returned to the city during the week reported first-class business.

Anthracite business is light on account of the prevailing warm weather.

Some idea of the activity in the movement of coal may be gleaned from the report of the coal tonnage of the Baltimore and Ohio R.R. for May, 2,995,812 tons being moved as compared with 2,786,580 tons in 1912, an increase of 209,232 tons. The coke tonnage for the month was 432,898 tons, as against 439,631 tons for last year, a slight decrease.

The coke market is weak, and the demand light, the output being about equal to the demand.

BUFFALO, N. Y.

The end of June is when bituminous coal ought to be about as dull as at any time of the year, yet Buffalo jobbers are finding it so difficult to get a supply of Youghiogheny coal that nobody dares to take an order unless the fuel is actually in sight. This means a briskness in the entire trade that nobody can account for. There is considerable slackness in coke, but coal is so scarce that the consumer does not dare to allow his supply to run down.

There is much the same condition of things reportetd from Canada. At one time the competition from Nova Scotia coal extended well west of Montreal and was very sharp, but is now hardly worth mentioning. There is but one complaint of the Canadian trade. There is in many sections a land boom that has tied up money badly. If this speculation turns out well, business generally will not suffer.

The scarcity of both miners and cars grows worse. The eagerness to get a good output causes coal men to take special note of anything that will reduce the production. Accidents often appear to be many, but the loafing of the men and the failure of the car supply, is a constant source of complaint. The worst of it is that as the fall approaches there is prospect of the shortage increasing.

There is no weakening of prices for bituminous coal, jobbers insisting on an advance of all quotations except slack, the list running up to $2.90 for Pittsburgh lump, $2.75 for three-quarter, $2.65 for mine-run and $2.15 for slack. The demand for the latter has been quiet of late, though it is improving somewhat. Allegheny Valley coal is about 25c. below Pittsburgh. Coke is as quiet as ever, the furnace men trying hard to break the market. Quotations remain on the basis of $4.85 for best Connellsville foundry.

In the anthracite trade there is also some complaint of car shortage. Shipping agents are eager to keep the Lake movement up. It has been heavy right along, but the idea is that more coal should be laid down on the Upper-Lake docks than ever before. There is no improvement in the local anthracite market and the all-rail trade is also quiet. It is impossible to stimulate the buying of coal in warm weather for winter consumption. At the same time the agents of independent anthracite mines are active and claim to have secured a better supply than ever before.

The week's shipment of anthracite to the Lake trade was 164,000 tons. The coal still goes to the leading ports chiefly, but there were 11 ports in the list, showing an increase of activity in that direction. Just now Fort William, on the Canadian side of Lake Superior, is a large receiver.

COLUMBUS, OHIO

With a good demand for steam tonnage and the lake trade ruling strong, the coal business has been strong in every respect. One of the best features is the increased demand for domestic grades, which is somewhat earlier than usual. This shows that dealers are trying to place their orders before the expected advance, which will be brought about by a prospective car shortage and other conditions.

The lake traffic is still one of the most active departments of the trade. The docks of the Northwest are in fairly good shape and no congestion of consequence is reported. The movement from all of the Ohio fields is steady, and chartering of bottoms is going on actively. The Toledo docks of the Hocking Valley Ry. Co. during the week ending June 27 loaded 113,000 tons. The present season is expected to be a record breaker insofar as the lake trade is concerned.

The domestic trade in every part of the country which looks to Ohio for its fuel supply is active. Dealers' stocks, depleted by the recent floods, are being replenished and consumers are placing their orders earlier than usual. Threshing, which will be at hand soon, is expected to produce a demand in rural districts. There is also some activity in school and other public contracts.

The steam trade is still active, although it is being placed in the background by the domestic and lake branches of the business. Railroads are requiring a large tonnage for freight movement. Many factories are having a good run of orders, and as a result their fuel requirements are large. Most of the steam contracts for the coming year have been closed, although some railroad contracts are still unawarded.

The output from Ohio mines during the week was large under the circumstances. In the Hocking Valley, where the car shortage is least noticed, the output is about 90 per cent. of the average, and the same proportion prevails in many of the strictly domestic fields. In eastern Ohio, where the car shortage is the most pronounced, the output is estimated at 60 per cent. In the Pomeroy Bend district there has been a considerable increase in the production during the past few weeks.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump........	$1.55		$1.60	$1.55
¾ inch................	1.40	$1.20	1.40	1.35
Nut..................	1.25		1.25	
Mine-run.............	1.20	1.10	1.15	1.15
Nut, pea and slack....	0.65		0.70	0.65
Coarse slack..........	0.55	0.70	0.60	0.55

HAMPTON ROADS, VA.

The past week has been a busy one at Hampton Roads, and while the dumpings at all piers have been heavy, it is believed that these at Lamberts Point will more than equal the combined dumpings of Newport News and Sewalls Point. From the beginning to the end of the week, berths at Lamberts Point have been kept filled and the anchorage off the piers blockaded with vessels awaiting their turn.

It is expected that the June dumpings over Lamberts Point piers will show a decided increase over May figures. This is especially true as regards export coal, as heavy shipments to foreign ports have been moving from these piers daily. All through the month of June shipments of export coal have been heavy from all Hampton Roads piers, and it looks as if the foreign demand will continue well on into July.

The labor situation in the New River fields is growing worse daily and is causing much uneasiness. Rumors that the miners will walk out July 1 are reaching tidewater, and suppliers are holding such coal as they may have on hand or in transit and decline to name any prices for coal for early delivery.

The heavy dumpings at Hampton Roads have greatly reduced the number of cars in the various railroad yards, and as the shipments from the mines during the past week have been anything but heavy, the coming week will find less coal on hand for the week's dumpings than there has been for months, with considerable tonnage in the stream waiting for cargo.

BIRMINGHAM, ALA.

There are rumors that several pig-iron furnaces are to be closed down in the near future. As is generally known, the pig-iron market has been declining rapidly for several months, and some sales during the current week were reported as low as $10 per ton f.o.b. cars Birmingham for No. 2 Foundry, which price is below the cost of production of less favorably located furnaces.

Any reduction in the consumption of either coal or coke at this season of the year is bound to have a depressing effect, and would somewhat overthrow the optimism which has prevailed for some time as to the summer prospects of the local coal industry.

The foundry-coke market has not been affected sentimentally or otherwise, and the prices prevailing at this time on Alabama product are higher than for many years past at this particular season. Current quotations, with only limited tonnages offering, are from $3.75 to $4.50 per net ton f.o.b. cars local ovens.

LOUISVILLE, KY.

Coal men, as well as the rest of humanity, expect warm weather in June and July; but it has been a good many years since the country as a whole has known such a June as that which has just passed into history. That the torrid weather which prevailed has had its effect upon the coal market can hardly be doubted. Of course, nothing like an active demand for spot coal for immediate use can be expected during the summer months under any circumstances. Just now, however, it seems that even the majority of the industrial consumers who usually buy at this time, have shut down on their coal supply, and are running on sawdust and other plant refuse.

An important market has been developed in the Northwest, and it goes without saying that the whole district will reap the benefit of the introduction of Kentucky coal into the Middle West, and that within a few years. There appears to be a great and growing demand all through that section for a high-grade bituminous coal, and this demand eastern Kentucky is in a splendid position to fill.

Prices for July delivery are quoted at $1.65@$1.70 for block, $1.60 for block and lump, and $1.40@1.45 for round. June deliveries are very much behind, however, with a large volume of orders still unfilled. There is some fear of a mild car shortage, which would throw deliveries still further behind, but at present the movement is about as rapid as the production of the coal.

KNOXVILLE, TENN.

The coal operators in the Kentucky-Tennessee field are in exceptionally fine spirits, owing to the good condition of the market for this time of the year. It is the prevailing opinion that, for this season of the year, the market has never been in a more satisfactory state. While there has been a slight decrease in the demand for the finer grades of steam coal, there has been an equal increase in the demand for domestic. The result is that the demand for 3-in. steam, nut and slack, which was abnormal some time ago, is now about normal. Prices on 3-in. steam are about the same as 30 days ago, while nut and slack are selling from 5c. to 10c. less.

Considering the season, the larger grades of steam coal are strong—prices running from 5c. to 15c. higher than last year's prices. During the past 30 days, a shortage of cars has been felt, and operators predict that this fall will see a serious situation with stiffening effect upon prices. Many operators are sold up to Sept. 1, and few desire to make quotations, now, for later shipments, as they believe a strengthening market will develop early in the fall.

DETROIT, MICH

Bituminous—The soft-coal market is a trifle stiffer this week, notwithstanding unusually high temperatures prevailing locally. This firmness is attributed to the strike situation in West Virginia, where it is rumored 15,000 men will shortly lay down their tools. At the present moment, the coarser grades are in the greatest demand, slack coal being in good supply on track; mine-run is more plentiful than screened coal, but it is not probable that this condition will prevail long. Both Ohio and West Virginia lump and three-quarter have been steadily recovering from a slight slump experienced a short time ago, and are now nearly back to circular. Contract business at the present time is not brisk, but any further alarming news from the strike zone will cause the buyers to fall into line rapidly.

The local market is quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	....	....	....	$2.25	$2.00
Egg...........	1.65	....	....	....	....	2.25	2.00
Steam lump....	1.35	....	....	....	....	....	....
¾-in. lump......	1.20	$1.20	$1.20	$1.10	$1.10	....	....
Mine-run.......	1.10	1.10	1.05	0.90	0.90	1.50	....
Slack..........	0.75	0.75	0.50	0.60	0.60	Open	....

Anthracite—The hard-coal market is firm, with circular prices being strongly held; the only exception to this rule is on pea coal, which has sold at slightly under the circular. This was due to a concentration of the demand from consumers on the larger domestic sizes, leaving pea to accumulate. Egg and stove are the strongest grades, and seem to be in heavy demand, with nut fair, while the steam sizes are inclined to be inactive.

Coke—The spot market for coke continues unsettled, with the demand limited. There has been a slight decline on Connellsville foundry coke, some of this now being offered on contract at $2.75, with more than $3 being seldom asked. Prompt foundry coke is not so easy, being affected by the labor shortage at the local ovens; the minimum on good grades is about $2.85. Semet Solvay is quoted at $3 on all sizes, with gas house, $2.85, f.o.b. ovens.

INDIANAPOLIS

There is some improvement in conditions at Indiana mines, reports showing they are working better than half time. Prices remain at the midsummer level. The wheat harvest is on, and while the acreage is short, the yield is good, and a total crop of not less than 30,000,000 bu. is expected. This looks big compared to the 10,000,000 bu. last year when most of the crop was winter-killed. The oat crop is poor, but is offset by the wheat crop. The corn crop is progressing finely, in a big acreage.

Coal dealers report the situation satisfactory, and say general trade and industrial conditions are beginning to reflect the confidence inspired by the crops. Operators say there has been a slight letting up in the demand for Eastern coals. The season started off with a rush, following the anthracite shortage of the winter. The call for hard coal and Pocahontas was so insistent as to interfere seriously with the Eastern bituminous demand; and some May orders for the latter are not yet filled. A peculiar feature is the plentifulness of chestnut, which has been hard to get for several seasons, and in which there was a practical famine last winter. Nobody seems to know what makes this grade so easily obtainable this year. Notwithstanding all this, the official railroad report shows over 60,000 idle cars, but it appears probable that few, if any, of these are coal cars. The supply of cars at Indiana mines is ample, but there is some trouble on the Chesapeake & Ohio, particularly the Big Sandy branch, and on the Baltimore & Ohio. Some wholesalers are pessimistic enough to predict a car shortage this fall as bad as any in the history of the roads.

CHICAGO

There is a heavy demand at the present time in the Chicago market for Eastern steam coal and an increase in prices is anticipated. Producers of a large number of Western coals report that a comparatively small volume of business is being transacted.

Local dealers express the opinion that a car shortage will develop within the next few months on account of the crop movement and that a curtailment in the supply of Eastern coal will be followed by a large number of buying orders for Western fuel. Prices for spot mine-run are quoted all the way from $1.40@1.50. Both lump and egg coal are selling at from $2@2.25 a ton on the spot market. The market for Hocking coal is active, and an advance in prices of 5c. a ton was effective July 1. The amount of anthracite coal shipped into this territory is increasing and prices remain firm. An increase to $1.50 a ton in the price of Franklin County lump and egg coal went into effect last Tuesday. Low-grade screenings command from 80@85c., while prices for better grades range from 85@90c. The coke trade continues to be active.

Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$1.97@2.07	$2.55	$2.27	
Egg		2.55		$3.94@4.20
Steam lump	1.82@1.87		2.07	
Mine-run	1.77@1.82	$2.20@2.30	1.87	3.30
Screenings	1.62@1.67	1.90@1.95	1.62@1.67	

Coke—Connellsville and Wise County, $5.25@5.50; byproduct, egg and stove, $4.85; byproduct nut, $4.75@4.85; gas house, $4.50@4.60.

ST. LOUIS, MO.

There has been little change in the trade conditions in St. Louis in the past two or three weeks. It was expected a few weeks ago that business would become good about July 1, but indications now are that coal will drag until after July 15 or possibly the beginning of August.

It is a hard mater to make the trade realize that there is a car shortage staring them in the face, and that at least half a dozen mines are in the hands of receivers who will not operate them, so that when the demand for coal becomes general there will be an actual shortage.

Selling below cost is still general in the Standard field, while Carterville is picking up. There is practically no smokeless for this market, and indications are that very little of this coal will come in here for the balance of the season. Coke is also a drug on the market at the present time, and anthracite is being thrown in here in a volume so great as to overcome the demand for it, with the result that it is nearly always under demurrage on the east side.

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.80@0.85
3-in. lump	....	....	....	....
6-in. lump	$1.15 @ 1.25	....	....	0.85@0.90
Lump and egg	....	$2.00	$1.20	....
No. 1 nut	1.10 @ 1.20	....	....	....
Screenings	0.80 @ 0.85	....	....	0.75@0.80
Mine-run	1.00 @ 1.10	....	....	0.75@0.80
No. 1 washed nut	1.40 @ 1.50	....	....	....
No. 2 washed nut	1.25 @ 1.30	....	....	....
No. 3 washed nut	1.25 @ 1.30	....	....	....
No. 4 washed nut	1.25 @ 1.30	....	....	....
No. 5 washed nut	1.00 @ 1.05	....	....	....

St. Louis prices on July anthracite are: Chestnut, $7.25; stove and egg, $7; grate, $6.75; smokeless lump and egg are $4.65; byproduct coke, $5.10, and gas-house coke, $4.85.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for May and the first five months of this year and last year:

	May 1913	May 1912	5 Months 1913	5 Months 1912
Coal	2,995,812	2,786,580	13,604,039	12,557,130
Coke	434,898	439,631	2,050,968	1,860,883
Total	3,430,710	3,226,211	15,655,007	14,418,013

FOREIGN MARKETS

GREAT BRITAIN

June 20—Coal-market conditions are without material changes. As regards prompt coal, the inquiry for all descriptions is slow, while the tendency in prices is still unsteady. Very few transactions have been recorded recently for forward delivery, the ideas of buyers and sellers showing too much disparity.

Quotations are approximately as follows:

Best Welsh steam	$4.68@4.92	Best Monmouthshires	$4.20@4.38
Best seconds	4.44@4.56	Seconds	4.03@4.14
Seconds	4.20@4.32	Best Cardiff smalls	2.40@2.52
Best dry coals	4.44@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

COAL SECURITIES

The following table gives the range of various active coal securities during the week ending June 28:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	87	87	87	87	87
American Coal Products Pref.	109¼	109¼	109¼	109¼	109¼
Colorado Fuel & Iron	28	26¾	27⅞	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	225	210	215	....	....
Island Creek Coal Com	48	48¾	48¾	....	....
Island Creek Coal Pref.	85	84	84	....	....
Pittsburgh Coal	16	15½	16	24⅜	14½
Pittsburgh Coal Pref.	77	74	77	95	73
Pond Creek	16½	17	16½	23¾	16½
Reading	158⅞	155¾	158⅞	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	86	86	86	95	84
Virginia Iron, Coal & Coke	40	39	40	54	37¼

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93⅝	Sale	93⅝	93⅝	93⅝	99⅛
Colo. F. & I. gen. 6s	..	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	79	79½	79	79⅞	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	86½	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	70	78	76	June '13	76	80
Tenn. Coal gen. 5s	99¾	Sale	99¾	99¾	99¾	103
Birm. Div. 1st consol. 6s	100½	102¼	101	April '13	101	103
Tenn. Div. 1st g 6s	100	102	102	Feb. '13	102	102
Cah. C. M. Co. 1st g 6s	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	Sale	92	92	92	98

DIVIDENDS

Delaware, Lackawanna & Western Coal—Dividend of 2½%, payable July 15 to holders of record July 1.

Lehigh Coal & Navigation Co.—Dividend No. 139 of 2%, payable Aug. 30 to holders of record July 31.

Lehigh Valley Coal Sales Co.—Regular quarterly dividend 2½%, payable July 21 to holders of record July 10.

Nova Scotia Steel & Coal Co., Ltd.—Regular quarterly dividend on the common of 1½%, and on the preferred of 2%, both payable July 15 to holders of record June 30.

Pittsburgh Coal Co.—Regular quarterly of 1¼% on the preferred, payable July 25 to holders of record July 15.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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Advertising Index, Last Page

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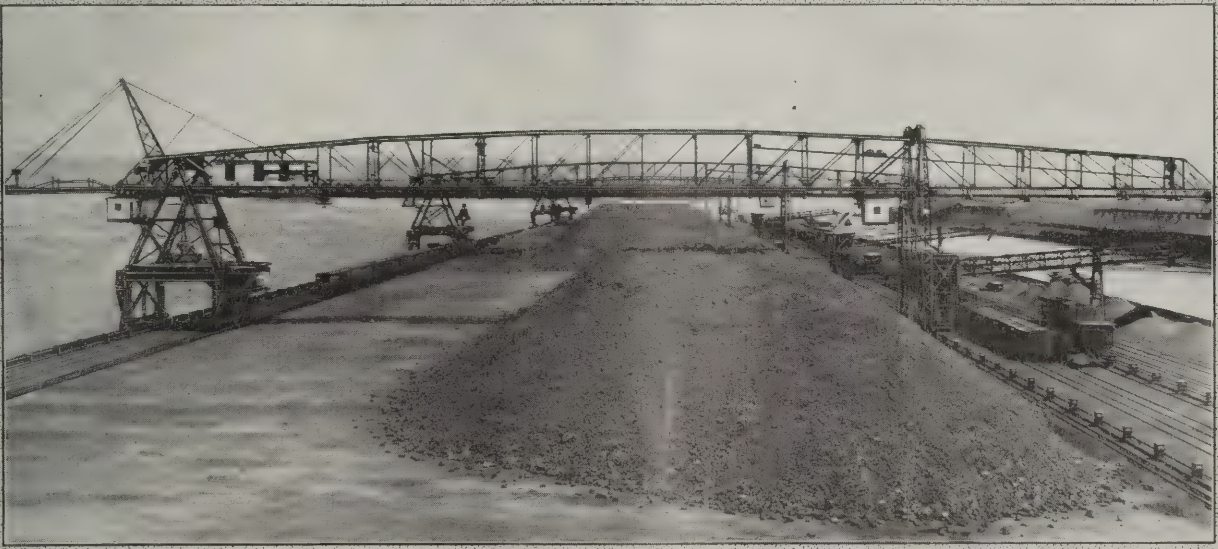

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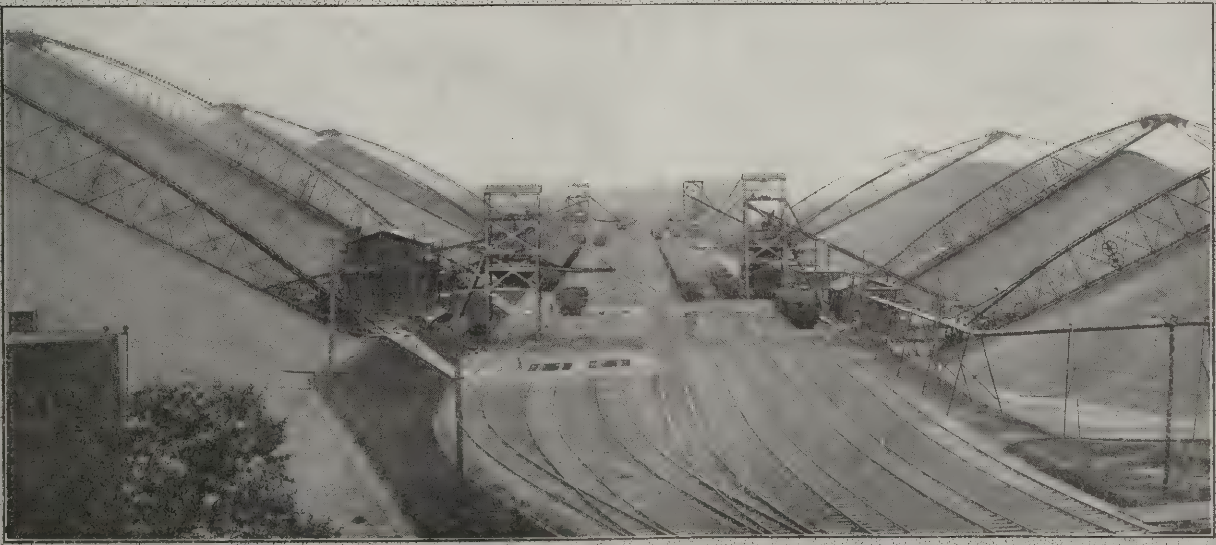

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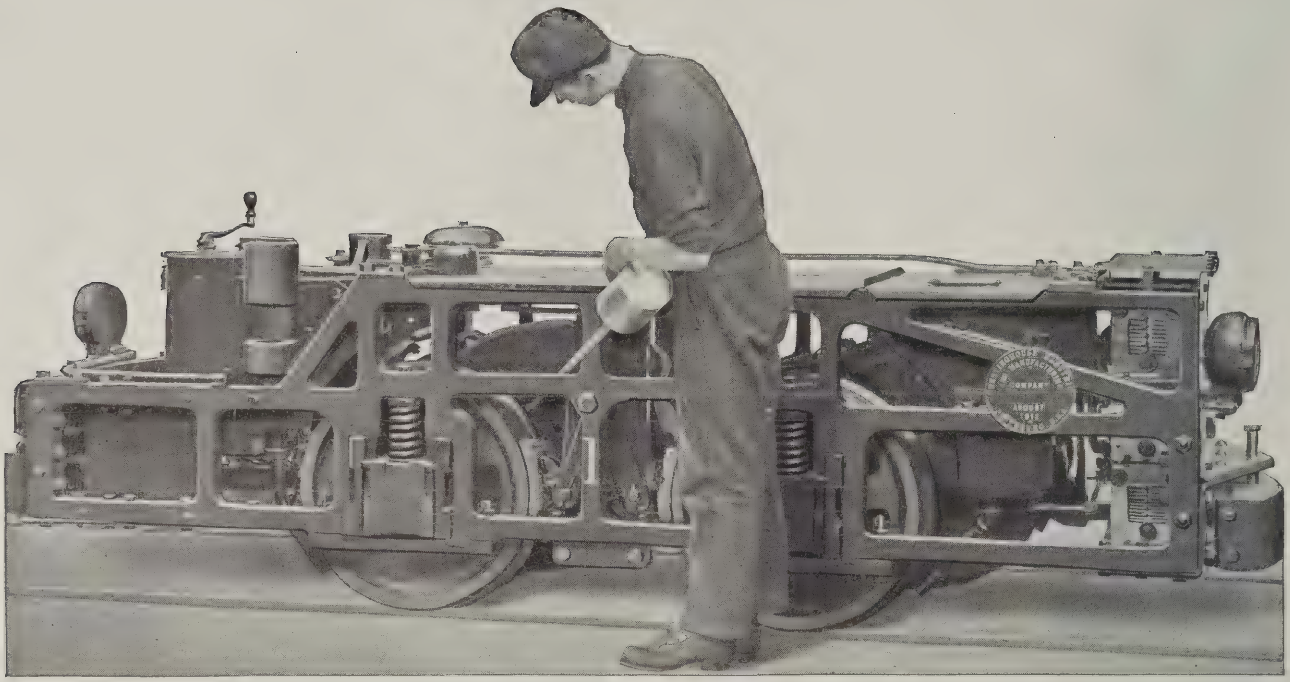

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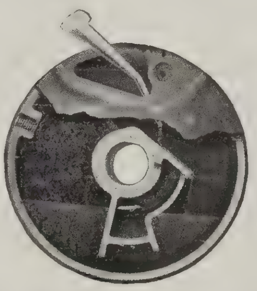

This system, with specially designed bearings for long life in service, has been adopted as standard after years of investigation.

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COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

The Story Of The Shortstop

The Weekly Ad-Talk Page

Suppose a shortstop is a cracker-jack at handling batted balls yet throws wild to first. Suppose he has developed a natural aptitude till he can take care of everything, bounders or grounders, that come anywhere between second and third, and yet, after he has speared the sphere, can't put it—one time out of a hundred—within ten feet of the first sacker's mitt. What good is his fielding to a team?

Picking up the ball is important, but the most important thing of all is getting it to first—*quick*. A man who foozled half the grounders that shot his direction, but *did* get the other half to the initial station, would be a better fielding asset on the team than said brilliant fielder but rotten thrower.

So in many things. To do a thing with infinite pains and then *throw it away* by ignorance or misjudgment or carelessness is the worst kind of inefficiency.

To prepare an advertisement with great trouble and cost, and then virtually toss it away by placing it wrongly is as sheer vicious waste as tossing the actual cash away. What's the use of hiring a copy-writer to study the special features of your machine or whatnot; of having him write about it interestingly and arrestingly; of having an artist devise a drawing illustrating its use; or having a photograph of it in actual service; of combining the whole into an expensively made advertisement—and then inserting that advertisement in the wrong medium?

Yet some advertisers do this—and they are men who, in other respects, are hard-headed, canny, conservative, economical, foreseeing.

Why do they do it? God knows, we say. Yet it is simply for failing to recognize that little principle of the shortstop—*of getting the ball to first*—a principle they readily would understand were it put to them in such graphic metaphor.

Now there are two kinds of papers where a man selling a particular kind of mechanical equipment, for instance, may advertise his goods:

The *general* paper and the *special* paper.

The general paper is *always* right for *everything*. Everybody reads it—and *those readers interested* in the particular kind of machine this man is making will read his story when it's there. But the waste is stupendous. If the paper have 1,000,000 readers there may be, out of that number, 1000 for whom the selling talk about this machine will possess interest. The other 999,000 inevitably pass it by—just as they pass by an ad for Bent's Crackers, if they have no teeth.

That's the first element of waste. The second is that when you put your selling argument on a special machine into that general magazine you pay *for the privilege of talking to that whole million*. That costs you as much for every half inch of space as you would pay for a whole page in the special magazine. It's none of the general magazine's business if you haven't the story that will appeal to even a plurality of its whole million. Against the inquiries coming out of that 1000 *possible* answerers, must be charged the whole cost of that million-circulationed piece of space.

The *special* paper—like Coal Age—appeals to and is read by a special class. It is the *business* paper of that special class. When a man buys a page in Coal Age to talk to you he pays to speak to 12,000 men, practically *every one of whom* is directly interested in the advertisements placed here.

People don't advertise tubs in Coal Age or razors, or hammocks, or socks or textile machinery. They don't advertise general stuff nor do they advertise stuff that belongs to *another special* class. They voice selling arguments about material and equipment in the coal mining and coke manufacturing field. Everything that pertains to that field bears a direct grip on the eyes and mind of you, the Coal Age reader.

Or let us sum the whole thing up in our metaphor of the shortstop:

Everything advertised in Coal Age must belong to Coal Age field. The copy itself (if it be good forceful copy, is the *ball fielded—and the paper puts it to first*.

Instead of making a put-out possible only once in a thousand times, like the general magazine, Coal Age makes one *possible every time*. The worst the advertiser has to contend with is a fielder's choice.

In other words, the circulation of Coal Age is practically wasteless. That's why Selling Arguments placed in Coal Age or any other wasteless-circulation technical paper bring so large a return *in proportion* to their cost!

COAL AGE

Vol. 4 NEW YORK, JULY 12, 1913 No. 2

Did you ever hear of an accident something like this?—

A miner leaves his working face before shooting time, expecting his "buddy" to fire all of the shots. The "buddy" follows instructions, but unfortunately is so severely injured by a windy shot that he is not able to make his way out. After suffering all night he is discovered by the fireboss and eventually reaches the company hospital.

Of course you have. What's the remedy?

Install a gate house at the manway entrance, so arranged that every man must pass it going in and out of the mine, the gateman hands each employee a brass check as he goes in. These checks are kept on a board inside the gatehouse and in easy reach of the gateman. The men keep their brass checks through the day so that every blank space on the numbered check board indicates a man underground. On coming out of the mine each man must hand his brass check to the gateman, who hangs it on the board. Thus, when all the men are out, the board is filled. If there are blank numbers on the board it is known that men are still in the mine.

The gateman keeps two side records. One is a book showing the hour each man went in and came out; the other is a set of cards on which is shown the home address, occupation and working place of each employee. If at 6 p.m. the board shows Jack Thomas still inside without the mine foreman's permission, a rescue party is sent to his working place, as indicated on the gateman's record card: In several instances where this system was employed the man was found seriously injured. In one case several men threatened by damp were reached just in time.

If the man cannot be found in the mine, the card shows where he lives and a messenger is sent there. It may be found that he got by the gatehouse without leaving his brass check; a suitable fine will jog his memory for the future.

The cost of operating such a checking plan is small. A competent gateman can be secured for $50.00 per month, and the night watchman can do the night checking. The mine foreman can tell every afternoon when all of his men are safely out of the mine. In case of fire or explosion in one section of the workings, the location of every man in danger would be easily obtainable by means of telephone connection with the gatehouse, so that help could be furnished to those most in need.

Then, too, think of the value of the gatehouse records for timekeeping purposes. Generally speaking, this alone will nearly pay for the checking. Under this plan, also, it is impossible for a foreman to turn in a shift for a man not in the mine.

If you have never tried a checking system, *start one today*. If you have a better plan than the one outlined above, tell us about it.

Ash- and Coal-Handling Equipments

By Henry J. Edsall

SYNOPSIS—The kind of equipment that should be installed in any power plant for the purpose of handling coal and ashes, is dependent upon the size of the plant and the service rendered. The various types of equipment are discussed in this article and the power plants for which they are adapted.

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In planning coal storage for a power-plant supply, there are quite a number of factors to be considered, among which are the following:

1. Daily coal consumption.
2. Kind of coal used.
3. How coal is received.
4. Regularity of coal supply.
5. Advantages in purchasing to be gained by storage facilities.
6. Amount of primary storage advisable.

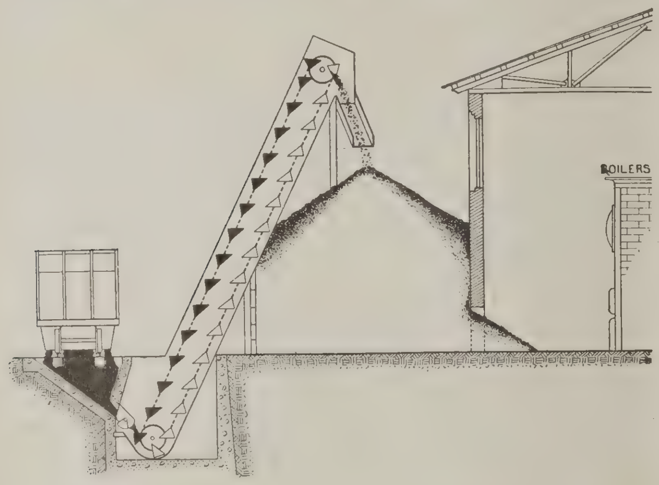

Fig. 1. Bucket-Elevator Arrangement for Unloading Coal Car

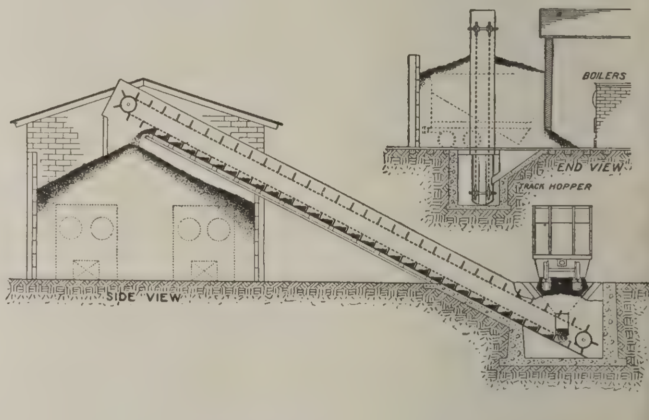

Fig. 2. Arrangement for Unloading by a Conveyor

7. Amount of secondary or reserve storage advisable.
8. Advisability of mechanical method of handling ashes.
9. Method of firing or feeding coal to furnaces.
10. Advisability of crushing coal, and to what extent.
11. Relation of railroad track or wharf to boiler room.
12. Space available for bins in boiler room, or adjacent thereto.
13. Space available for outside reserve storage.
14. Advisability of housing this reserve storage.

On the daily coal consumption depends largely the amount of investment justified. A large investment for handling a small amount per day is obviously not justifiable. For handling a large amount per day, however, there is frequently a choice of several possibilities, and the problem is to pick out the equipment which will give the best return on the investment with due consideration given to cost of labor, power, maintenance, depreciation and interest on the investment. In many cases there are other considerations of importance, such as the importance of a large storage as insurance against a shutdown, more favorable prices to be obtained by purchasing coal at certain seasons, irregularity of winter supply, dependability of machinery versus dependability of the human element in keeping the plant going, additional efficiency to be obtained in boiler furnaces by proper crushing of coal and proper feeding to mechanical stokers and so on.

Small Plants

The small plant naturally comes in for first consideration. Where there are only one or two boilers of moderate size, one man can do the firing and wheel out the ashes. If the coal is placed within easy reach on the boiler-room floor, one man should be able to look after 400 or 500 rated horsepower of boilers. This will depend somewhat on the number of boilers which go to make up this total, as it is, of course, much easier for a fireman to handle one 500-hp. boiler of the three- or four-door type than two wide and low boilers of 250 hp. each. In any case a fireman should be able to handle 1500 to 2000 lb. of coal per hour. The coal supply for a boiler room of this size is frequently brought in carts or wagons and dumped on the boiler-room floor. If the supply is regular, for instance, from a dealer with a good supply in his own yard, it is unlikely that any coal-handling equipment is justifiable. If, however, the coal is received by rail with a siding run in along the side of the boiler room there is the necessity of unloading the coal from the cars. Shoveling coal over the side of modern coal cars is expensive and almost always requires other labor than the boiler-room force. In such cases, therefore, it is usually justifiable to provide some method of unloading the cars as they are designed to be unloaded, that is, through the bottom doors. In most cases the first thought is to build a trestle or elevated siding for the cars, or to drop the boiler-room floor down below the ground level and make a vault for the coal under the track. Both of these methods are, as a rule, a mistake. A low trestle means distributing the coal along a considerable length so that the fireman has to go farther for it, and this outside wheeling of coal is especially objectionable in winter. If the trestle is built of wood, it means considerable expense in first cost, and a high maintenance cost with the increasing prices of lumber. If it is built of more permanent materials, or built higher, it is still more expensive in first cost.

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*Engineer with Link-Belt Co., Philadelphia, Penn.

If the boiler-room floor is dropped below the ground level and vaults built, these are quite expensive for the amount of storage obtained, and there is still the necessity of considerable wheeling of coal. It also increases the difficulty of handling ashes as it is necessary to get them up out of the boiler room and either wheel them away or load them onto carts or cars.

Use of Conveyors Best

The simplest and best way, ordinarily, is to build a bulkhead or fence so as to form a coal bin just outside the boiler-room wall and use a simple chain and bucket elevator or flight conveyor to unload the cars and deliver the coal to the bin. By making doors or openings in the boiler-room wall, the coal can then be allowed to flow through to the floor in front of the boilers within easy reach of the firemen. The machinery for such an elevator or conveyor will usually cost between $500 and $1000, depending on the length required and the size of buckets or flights, and the labor and power cost for unloading the coal from cars and delivering to a bin, will usually amount to less than two cents per ton. The maintenance cost for both the bin and machinery equipment is very low. Equipments of this type are illustrated in Figs. 1 and 2. Where it is desirable to make the bin longer for a longer row of boilers, it is best to use a chain and bucket elevator at one end, and a horizontal flight conveyor over the bin for distributing the coal lengthwise, as shown in Fig. 3.

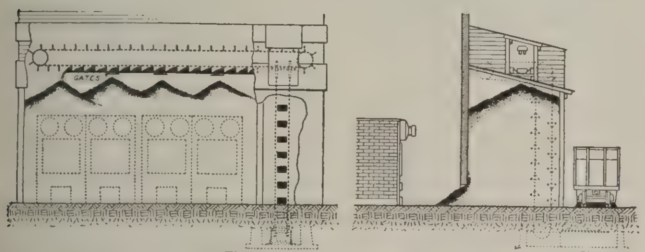

Fig. 3. Bucket Elevator and Horizontal Conveyor to Distribute Coal

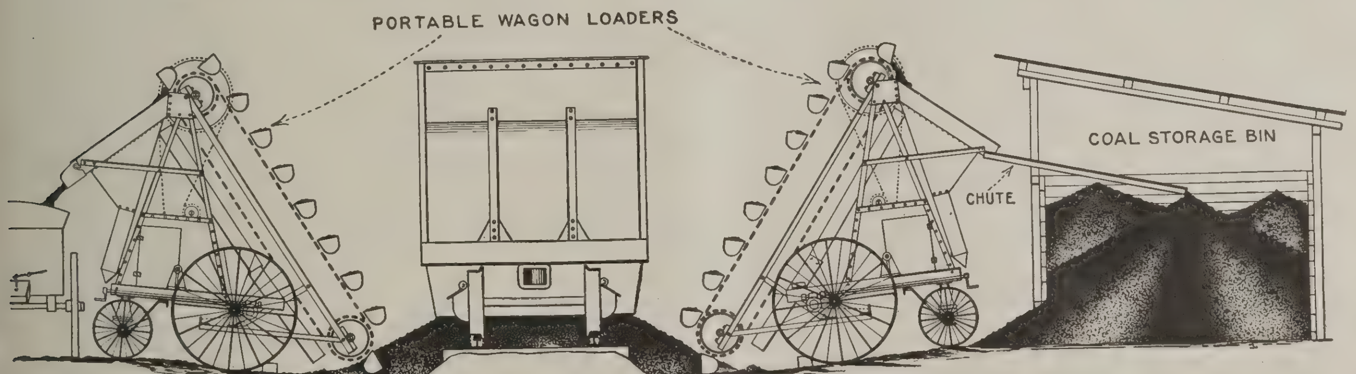

Fig. 5. Use of Wagon Loaders for Stocking or Loading Coal

Sometimes it is necessary to unload the coal from cars at a distance from the boiler room, or, perhaps, there are two or three boiler rooms that have to be supplied. Fig. 4 shows a simple chain and bucket elevator for unloading the cars and storing the coal on the ground, and a portable wagon loader for taking it from the ground storage and loading it into carts or small industrial cars. The cost of the elevator and the cost of operating it would be about the same as the one described above, and a wagon loader equipped with a motor can be purchased for about $700. They will load coal at the rate of about 60 tons per hour with one or two men to help the coal to the foot of the machine. Fig. 5 shows the possibility of using a wagon loader for unloading bottom-dump railroad cars and delivering to carts or industrial cars or to low bins or ground storage.

Simple Unloading from Boats

Where coal is unloaded from boats in small quantities, the simplest and cheapest rig is a mast and gaff with a single-drum hoist to handle a tub which is filled by dipping and shoveling. The tub delivers direct to ground storage or to an automatic or hand-pushed car on a small railway for distribution over a greater area. Such an equipment is shown in Fig. 6. For picking this coal up from the ground a wagon loader will show a good saving if the quantity handled is not too small. For a boat-unloading equipment of somewhat larger capacity, a mast and gaff with a double-drum hoist operating a self-filling clam-shell buckets is frequently used, but for an outfit of this handling capacity, a locomotive crane is much more flexible and satisfactory for operating the clam-shell bucket. This is described later on.

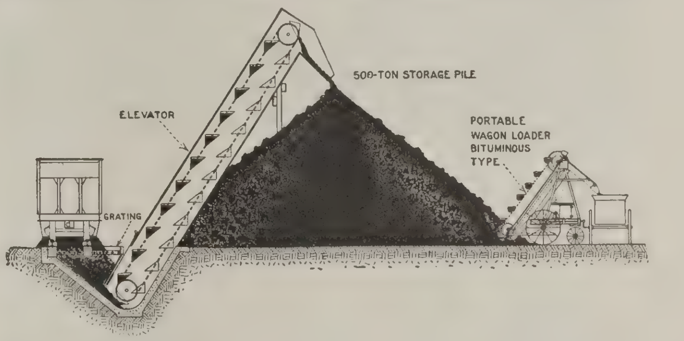

Fig. 4. Reloading from Ground Storage with Wagon Loader

As a boiler room increases in size, the amount of coal and ashes to be handled is increased, and either more men have to be used, or the facilities for handling have to be improved. When the amounts to be handled get to be too much for one man firing by hand, there is the possibility of reducing the labor by using mechanical stokers and feeding the coal to them automatically from an overhead bin. Besides the saving in labor there is the additional efficiency to be obtained by the use of mechani-

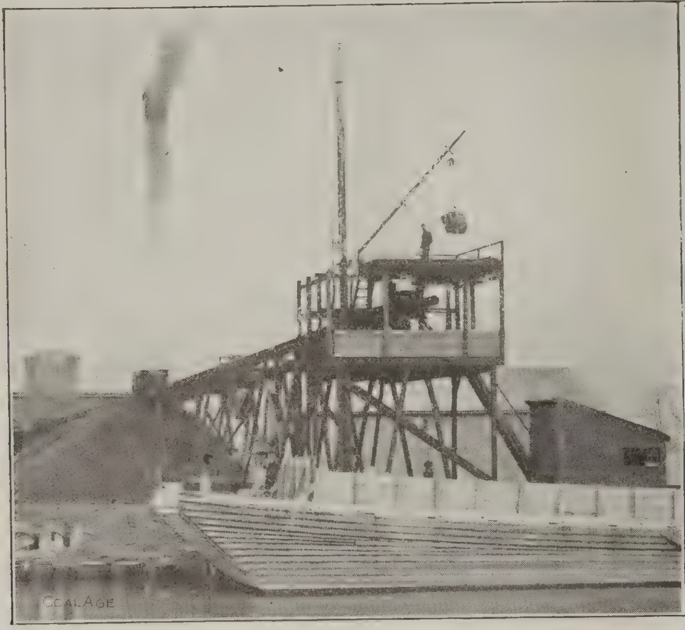

Fig. 6. Unloading Coal from Boats with Mast and Gaff

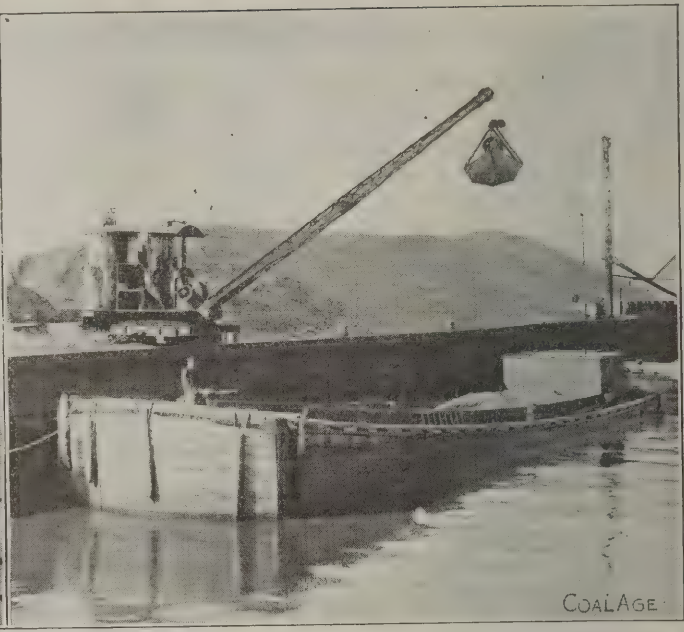

Fig. 7. Unloading Boats with Locomotive Crane and Clamshell Bucket

cal stokers. With such an arrangement one man is ordinarily able to look after about three times as much total horsepower of boilers as when firing by hand; that is, he could look after about 1200 or 1500 rated horsepower comfortably. This, of course, would depend on the number of boilers and the type of stokers, but one fireman should be able to handle from 4000 to even as high as 8000 lb. of coal per hour when it is delivered by gravity to the stoker hoppers. While some of the plants equipped in this way are comparatively small, there is more or less of a similarity between them, and they can, for purposes of description, all be classed as larger power plants.

Larger Power Plants

In figuring the saving to be obtained by reducing the number of men in a larger power plant, if we figure the cost of a man as $12 per week, or $624 per year, the saving of one man should justify the investment of at least $3120, or five times the amount saved, that is, there should be a saving each year of 20 per cent. of the investment to pay for maintenance, depreciation and interest and a certain percentage in addition. There are usually other advantages to be gained besides these, such as a neat and ship-shape boiler room that tends toward higher efficiency, more contented men and less danger of strike trouble,

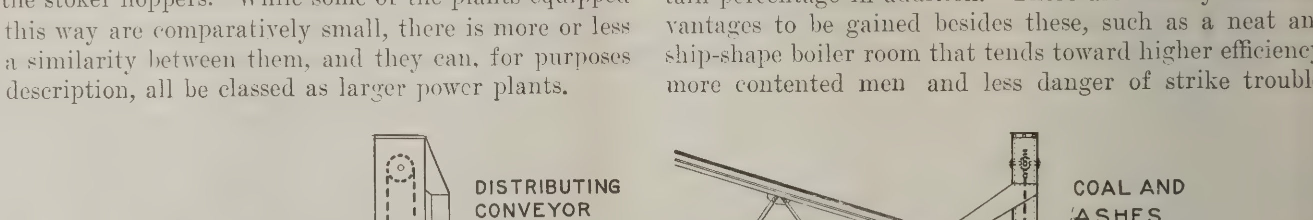

Fig. 8. The Same Elevator Handling Coal and Ashes

larger storage facilities, better efficiency from the furnaces, etc.

For overhead bin storage in a boiler room, a suspension type of steel bunker is usually the cheapest in first cost, and these will discharge a large portion of the coal without any manual labor and last for a long time. They can either be supported on columns resting on concrete piers, or if it is a new boiler room, the roof trusses can be designed with sufficient strength to carry the bin. Sometimes the bin is supported partly or entirely on the boiler-room walls, or on the boiler-room walls and walls around the boilers. In any case the bin must be placed high enough to give ample slope for the chutes to the stokers and not to interfere with cleaning or removing boiler tubes, and there must be room over the bin for the conveyor for filling it.

As with the bin outside the boiler-room wall, there is sometimes the possibility of using a single elevator of the chain and bucket type with divided spout for distributing the coal in the bin. Where the bin is very short, however, it is better to use a horizontal distributing conveyor placed high enough to fill the bin to maximum capacity, that is, with the coal piled up above the top and the sides of the bin at the natural slope for the kind of coal used.

Elevating to Overhead Bins

Fig. 8 shows an elevator and conveyor arrangement for handling coal, and in this case the same elevator handles the ashes. A steel Berquist bin was located in the boiler room with spouts to the stokers and, in order to increase the storage, an additional bin was built in a room directly above and openings cut in the floor to allow the coal to go through to the Berquist bin underneath. In place of building an elevated storage bin for ashes, the ashes are stored in a ground bin formed by four brick walls, and when it is desired to load them to a railroad car, they are fed back to the foot of the elevator, reëlevated and delivered, by means of a chute, direct to the car. The ground storage bin is, of course, much cheaper to build than an elevated bin, and the reëlevating adds only about 2½ cents per ton for power and labor, to the ashes-handling cost. While with mechanical stokers it is usually necessary to crush the coal fairly small, in this case the crusher was omitted and a grating with 5¾x6¾-in. openings was placed over the track hopper so that any lumps too large to pass through the grating have to be broken by an attendant. This means some additional labor, but even with this handicap a large steel car of soft coal containing about 50 tons of run-of-mine soft coal can be unloaded in about 3½ hr. with one man in the car and one man outside at the grating to break the large lumps.

There are two boilers in the boiler room aggregating a rated horsepower of 764. One day man and one night man look after the boilers, and have an easy job of it, and the boilers show a high efficiency.

(*This article will be concluded next week.*)

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The Coal Production of Utah

The production of coal in Utah in 1912 reached the record figure of 3,016,149 short tons, valued at $5,046,451, an increase, according to E. W. Parker, of the U. S. Geological Survey, of 502,974 tons over the output for 1911. The known workable areas in this state aggregate more than 8,000,000 acres. The largest and, commercially, the most important coal field is that of the great Uinta Basin, which lies parallel with and along the south side of the Uinta Mountains.

This field extends from Crested Butte, about one-third of the way across Colorado on the east to the western part of Carbon and Emery counties, Utah, on the west. This basin underlies large portions of Uinta, Wasatch and Carbon counties, its southern border being in Grand and Emery counties. The principal mining operations are carried on in Carbon County, more than 85 per cent. of the state's production coming from that locality.

Although by far the larger part of Utah's production is mined by hand, the efficiency record of the miners averages with the highest among the states. In 1912, the average production per man employed was 906 tons, while, in 1911, the average was 821 tons.

The reports to the U. S. Bureau of Mines show that there were 18 fatal accidents in the coal mines of Utah, in 1912, being four more than in 1911, but none of which were due to explosions of gas or dust.

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Virginia's Coal Production in 1912

According to figures compiled by E. W. Parker, of the U. S. Geological Survey, in coöperation with the Geological Survey of the state of Virginia, that state, in 1912, produced 7,846,683 short tons of coal, valued at $7,518,576.

The figures given above are a gain over the preceding year of 981,971 tons in quantity, and $1,263,772 in value. Over 75 per cent. of the total increase was made in Wise County, whose production, in 1912, amounted to 4,500,174 short tons; or a gain over the preceding year of 745,114 tons, equaling nearly 20 per cent.

The coal areas of Virginia, which have produced or now are producing coal, belong to the Atlantic Coast region and include the Richmond Basin and the Appalachian region. The latter comprises a number of separate areas extending across the western part of the state. The Richmond Basin is the only area of free-burning coal located immediately adjacent to the Atlantic seaboard. The first coal mined in the United States was from this area, mines having been opened and worked as early as 1750.

Virginia makes a somewhat unfavorable comparison with the other states of the Appalachian region in the quantity and percentage of coal shot off the solid. In 1912, of the total production of the state, 3,741,533 tons, or 47.7 per cent., was "mined" by the powder. This was an increase for the year of approximately 12 per cent. in coal so produced. On the other hand, the percentage of machine-mined coal increased from 27.2 per cent. to 40.85 per cent.

As the percentage of coal shot off the solid in Virginia is high, so is the death rate. In 1912, there were 75 fatal accidents, of which 67 were underground and eight on the surface. Thirty-three of the deaths inside the mines were due to falls of roof, 10 to explosions or burns of gas, 10 to premature blasts, or similar accidents, and nine to mine cars and locomotives.

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It is claimed as a result of British coal-dust experiments that the extent of an explosion will not necessarily be limited by keeping certain underground zones free from coaldust. The pioneer blast which precedes the actual flame of the explosion is sufficient to stir up enough coaldust to provide the necessary combustible material.

Prevention of Accidents in Coal Mines

By John McNeil

SYNOPSIS—An abstract of a paper delivered at the second meeting of the Rocky Mountain Coal Mining Institute, in which the practice of blasting off the solid and legislation requiring payment on the run-of-mine basis is condemned.

⁂

As early as 1835 Great Britain appointed a Royal Commission of talented men possessing special knowledge in the conduct of coal mining, as well as eminent authorities in science, to examine into the subject of mine accidents. Since that time there has been a succession of such commissions at frequent intervals in all countries wherever coal has been mined. These commissions have applied themselves faithfully to the cause entrusted to their care, but, unhappily, there still remains a direful toll of mortalities and injuries.

The most prolific cause of accidents is from falls of roof and coal and, approximately, 50 per cent. of the fatalities are due to this cause alone. The greatest number of accidents occur at the working face, due to the neglect of the miners to stand props promptly upon the first evidence of bad roof. While the miner must necessarily be responsible, to a large degree, for the safety at the face of his working place, yet the mine superintendent and boss have direct supervision over him, and it is their especial duty to prevent carelessness, whenever cognizant of it.

In late years a large number of workmen, more or less inexperienced in mining, and unable to speak or understand the English language, have entered the mines, so that it is all the more essential that a vigilant watch be kept throughout the chambers and thorough discipline employed. It is not enough for the mine boss to tell the miner that his roof is poor and then to leave the place, but he must remain until the work he has ordered, has been done and obedience has been obtained.

Now I have been a pitboss myself and have not infrequently received notice from the superintendent that the cost of coal the month before was too high, and that a better showing for the present month would be expected. In turn, the superintendent would show me a letter he had received upon the subject from the general manager. So our anxieties in the matter were mutual, and faithful to our superior officer, we did our best to reduce the cost.

Hard To Watch the Miner

Working under such high pressure, I had, as boss, but little time to keep a vigilant watch over Tom, Victor or Mike. My attention, under the circumstances, was more closely directed to the mule drivers, the cagers, the dumpers and the box-car loaders, so as to increase the output and lower the cost.

To have engaged an assistant for the purpose of watching the faces, would have seemingly increased the cost, but just that very thing should have been done. When I now read the mining laws demanding that the mining boss visit and examine carefully all working places daily, or every other day as the case may be, I know from experience the physical impossibility of his doing so in a very extensive coal mine, and yet there is the most urgent necessity of doing it.

I talk from experience when I say that probably in no other direction in the mining of coal can accidents be minimized more readily and completely than by keeping a vigilant and eternal watch on the miners in close proximity to the working face; and in the absence of the mine boss, there should be an experienced inspector clothed with authority to examine the roof, not only by ocular observation, but by sounding the top, in a careful and practical manner with a pick. His orders should be absolutely obeyed.

Explosive Character of Dust

The explosive character of coal dust is now universally acknowledged, and for many years systematic experiments have been carried on in Great Britain and other foreign countries, with the object of finding some means of preventing or mitigating the disastrous effects of colliery explosions.

During the past few years our Federal Government has made a searching inquiry into the causes of all recent mine explosions and established a testing station at Pittsburgh that is now under the supervision of the Bureau of Mines, and has published a number of bulletins of great interest on coal-dust experiments. Such research at home and abroad has shown conclusively that coal dust is a great source of danger, especially in the presence of firedamp.

Tests at Experiment Station

Certain tests at the Station have shown that finely pulverized coal dust (200 mesh) caused an explosion where there was only 0.032 oz. of it suspended in each cubic foot of air, or 1 lb. in 500 cu.ft. of air. It has also been determined that to burn completely 0.12 oz. of such dust would take all the oxygen in a cubic foot of air and the combustion of 1 lb. will take all the oxygen in 133 cu.ft. of air.

If a ray of sunshine could possibly penetrate the chambers of a dusty coal mine, we would be astonished to see the densely charged atmosphere around us, but in the gloom of the mine we are seemingly not cognizant of the latent dangers that lurk in the air. Custom makes one feel at ease. The surroundings are the same as they were yesterday; but in such an atmosphere, we are not safe if we tolerate heavy blastings with common black powder, or even permissible powder, for that matter, for all at times spread flame.

Whenever at such a mine I feel the vibration of a windy shot, I am grateful for my deliverance, and the more I see and learn, the more I feel that we often step on the very brink of disaster with frequent and heavy shot firing.

Explosion in a Tipple

In this connection I will relate a peculiar explosion which occurred on the 18th of October, 1897, at the tipple of a coal mine belonging to the Colorado Fuel & Iron Co., at Crested Butte, Colo., under the following conditions:

Note—Abstract of paper read before the Rocky Mountain Coal Mining Institute, Salt Lake City, Utah, June 12, 1913.

The mine entrance is situated on the side of a mountain and the coal is run to the tipple over a tramway about 1200 ft. long on a grade of from 5 to 20 per cent. In some manner a loaded trip of cars got over the "knuckle" without the rope being attached. The cars remained on the track and passed through the tipple shed at a fearful rate. The commotion of this passing body raised a dense cloud of coal dust in the shed and an explosion occurred simultaneously. Clouds of dense smoke and flame extended 35 ft. above the crown of the building and in a few moments the structure had taken fire in several places.

Two men employed in dumping the coal, seeing the runaway cars coming, made their escape, as they supposed, from flying timbers, but notwithstanding, both were severely burned and considerable damage was done to the building.

The only accountable source of the fire was from a stove in the weigh house. There were no inflammable materials stored in any part of the building, neither were the pit cars oiled there. The explosion, of course, was due entirely to coal dust ignited by the fire of the stove.

Happily, but few of our Western mines generate firedamp, but those that do are all the more susceptible to an explosion, when coal dust is present in suspension in the air, or deposited on the roof, sides or floors so as to intensify the consequences greatly, should a gas explosion occur. In a number of our best regulated mines there are water-sprinkling systems to moisten the coal dust and saturate the air. There are also other appliances that humidify currents of air upon entering the intake air course, such as radiators, steam injectors and mechanical water sprayers. Also some of us sprinkle adobe dust over the sides, roof and floor of the haulageways.

While we greatly appreciate the value of these admirable precautions, yet, if we, at the same time, permit heavy shooting and blasting coal off the solid with highly inflammable black powder, which is the most prolific cause of coal-mine explosions, it would appear very much as if we were straining at a gnat and swallowing a camel.

Sea Sand Taken into Mines

Upon visiting some very extensive coal mines in England some four years ago, I noticed great quantities of sea sand being taken into the mines, which was spread liberally over all permanent haulageways, almost giving them an appearance of stone when compared with our entries. As their cars, unlike most of ours, are of the closed-box doorless type, they do not strew coal dust along the haulage roads.

But in addition to all such precautions, Great Britain, unlike us, strikes at the root of the greatest evil by absolutely prohibiting shooting off the solid, and not only is the coal seam undermined, but sheared as well, and where wedges, plug and feather, hydraulic cartridges, or other devices can thrust down the coal, the use of explosives is eliminated entirely. When powder is resorted to in blasting coal, it is used in light charges, the machine and pick being used as much as possible, in order to bring down the explosive charge to a minimum.

It is estimated that a little over one-half pound of explosive is used on an average to each shot fired in British mines, though the amount varies in different districts. In the Newcastle district, England, 4,508,290 lb. of explosives were used in firing 8,608,850 shots.

We have no data to draw a definite comparison with the Newcastle statements, but from experience and knowledge of the conditions, in this respect, throughout the coal mines of Utah, Wyoming, New Mexico and Colorado, I think you will all agree that our shots will average 1½ lb. of explosives. Remember it is of average conditions I speak.

Comparison of Death Rates

The British death rate in coal-mine fatalities per 1000 persons employed, ranges from 1.25 to 1.36 for a number of years. The fatal accident rate per 1000 employees in the United States, taken as an average from 1866 to 1908 is 3.10. The number of lives lost per 1000 employees in Utah, Wyoming, New Mexico and Colorado, taken on an average for a number of years, is 9.04.

We must frankly admit that the death rate has greatly increased in our mines during the last decade, but in the past 12 months, we have shown a marked improvement, and I know just how earnestly all of you are watching and working for a continuance of this good work. Now, as members of the Rocky Mountain Coal Mining Institute, I would recommend that we, as a body, exert our energy toward securing by law the abolishment of that dangerous practice of blasting coal from the solid; and let us demonstrate before our legislatures, by overwhelming evidence, that the enactment of the "run-of-mine" basis granted a license which may have been the cause of grave disasters. I am well aware that as the years go by, the prevailing custom of undermining and shearing the coal by pick mining is gradually but surely becoming a lost art in this Western country. The use of powder is so much less arduous for the miner in comparison to hand mining, and therefore the miners take a risk and strenuously oppose any change to either pick or machine mining.

To be successful in lessening the recurrence of disasters, we must install sufficient undermining and shearing machines to cut the coal and reduce the use of powder to a minimum; and the explosive that is used must be the safest product which we can obtain. Blasting operations being practically unavoidable in coal mining, we should, after reducing the shot charges to a minimum, adopt the best firing regulations practicable. The method of performing the blasting by shot firers with electrical appliances after all the workmen have left the mines, is a valuable precaution; but better still is the system of wiring the numerous shots in one circuit and firing the same by an electric current from the surface, when no one is in the mine, especially in those mines where firedamp is given off. Accumulations of coal dust should be removed as much as possible from the vicinity of blasts and all shots should be tamped with incombustible material.

In this connection, I will quote from an article in the *Transactions* of the Manchester Geological Society of England, Vol. 18:

"This is an account of some experiments made in Germany in the Saar coal field in October, 1893. The gallery was constructed on the surface, 167 ft. in length, of elliptical cross-section (5½x4½ ft.) with a cross-gallery to represent the actual state of the colliery level.

One end was closed with masonry, in which cast-iron canons were placed, having bores the size of the holes generally used for blasting in the mines.

A Series of Experiments

Firedamp was conducted in pipes from a "blower" in the mine. The following experiments were made with one-half charges of powder:

First: tamped with clay, the length of the flame was nearly 10 ft.

Second: tamped with coal dust; the length of the flame was 26 ft. Neither firedamp nor coal dust were in the gallery during these experiments.

Third: tamped with clay; the gallery being strewn 131 ft. in length with nongaseous coal dust; the length of the flame was 18 ft.

Fourth: similar to No. 3, but tamped with coal dust; the length of the flame was 31 ft.

Fifth: tamped with clay; coal dust in No. 3 being replaced by the dust from Pluto colliery in Westphalia; length of the flame was 190 ft., with a heavy detonation and much afterdamp.

Sixth: a repetition of No. 5 without the addition of fresh dust, with almost identical results.

Seventh: tamped with clay; without coal dust and fired in air containing five per cent. firedamp; the flame was 36 ft.

Eighth: similar to No. 7 with 65½ ft. of the gallery strewn with coal dust from the Pluto colliery; the length of the flame was 170 ft., with very severe detonation and strong development of afterdamp."

Mine fires sometimes originate in a way that leaves no doubt as to the source of their origin, but a mystery remains as to how they became ignited. Therefore, precautions should be taken to minimize them as far as possible. Lumber cabins, seats, cupboards and boxes should be done away. Underground stables should be made fireproof, and only incandescent lights should be used in them. All cotton waste and other oily substances should be put in an iron keg reserved for that purpose and should be removed frequently from the mines. Overcast air-bridges and all permanent stoppings should be constructed of concrete or other fireproof material. Manways for the miners to travel to and fro from their working places should be maintained and men should be kept off the branch and main haulageways as far as is possible, in order to lessen the risk of accidents by mine cars.

Injurious Effect of Bad Air

We have recorded the prominent causes of accidents, but we have yet to record the injurious effect on the general health of coal miners, caused by breathing stagnant or impure air, vitiated by powder smoke, finely ground coal dust and the presence of carbonic acid gas, better known as blackdamp. C. E. Foster, a late British inspector of mines, makes the statement "that there are quite as many miners killed prematurely from breathing impure air and carbonic acid gas, as there are from inflammable gas.

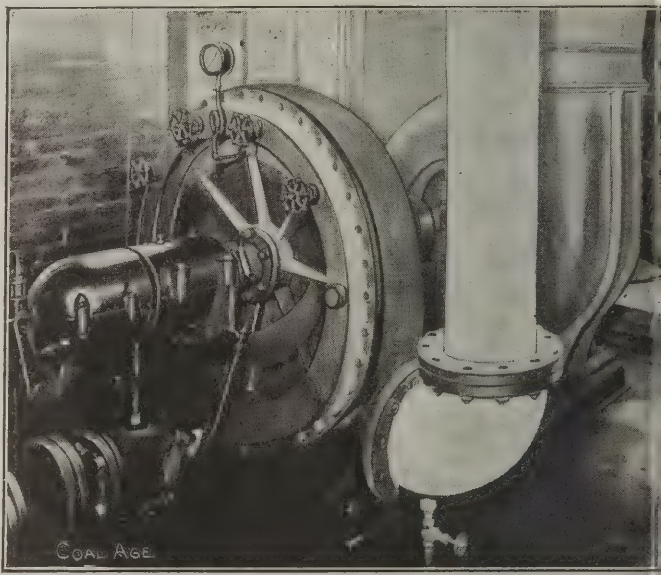
Therefore, a large ventilating current at the intake and the outlet of a mine is a good thing, but the ventilation will be bad, nevertheless, if the air currents are not continuously distributed and carefully conducted to the room faces where the miners are at work.

A Rugged Blower Unit

In the production of water gas, whether for purpose of power or illumination, the blower unit plays an important part. As it is constantly called upon for sever service, its reliability is responsible for the continuou and satisfactory operation of the plant.

At the works of the Lynn Gas & Electric Co., there i an interesting installation of a turbo-blower. This i shown in the accompanying photograph. The set consist of a Sturtevant, type 5 steam turbine, direct-connecte to a No. 9 gas blower of the same manufacture, and i used to blow the gas generators.

The turbine is operated intermittently, being starte and stopped by a chain which is attached to a quick-opening valve. This subjects both turbine and blower to sudden and severe variations in load and speed, which are a constant test of reliability and rugged construction.



Blower Direct-Connected to Steam Turbine

This set, which has been in constant operation ever since January, 1912, and has received practically no attention except for oiling, has never given the slightest trouble in any way, in spite of the fact that it is called upon to undergo the severe service outlined above, for 15 hours every day.

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The Production of Coal in Michigan During 1912

The production of coal in Michigan in 1912, according to E. W. Parker, of the U. S. Geological Survey, amounted to 1,206,230 short tons, valued at $2,399,451. Compared with 1,476,074 tons, valued at $2,791,461 in 1911.

Of the total production in 1912, more than half (635,560 tons) was mined by machines, of which 125 were in use. Of the remainder, 433,222 tons were reported as shot off the solid, and 120,637 tons as mined by hand.

The number of men employed in the coal mines of Michigan in 1912 was 3133, a decrease from 3323 men in 1911, and the average number of working days decreased from 218 to 183.

Don'ts for Inside Employees

By Anthony Barrett*

SYNOPSIS—A concise statement of essential precautions for coal miners, based on long observation and experience in anthracite mines.

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1. Don't pass the firebosses' station without first seeing the fireboss.

2. When the fireboss notifies you there is gas in your breast, don't go up in it until the gas is removed.

3. Don't start to work at the face before examining and seeing that it is safe.

4. Always cut your fuse off the roll before you put the cap on it, then tighten the cap with a crimper. Never use your teeth as it is a dangerous practice.

5. Don't push the charge in the hole with a drill. Use a wooden tamping stick.

6. Don't light your squib with your mining lamp when using black powder. Use a piece of touch paper.

7. Don't neglect to place your prop as soon as you have room. It is too late after you are injured.

8. Don't neglect your brattice. Put it up as soon as you have room to build.

9. Don't stay and work in your breast if the top is working. Leave and go for the fireboss and tell him about it.

10. Don't leave your breast at quitting time before you examine to see if it is all right. There may be a feeder of gas burning.

11. Don't fire a hole when driving a heading to another breast before you have told the party on the other side about it. Always get an answer when you rap to him.

12. Don't go into old workings. There may be gas there of which you are not aware.

13. Examine your safety lamp before going down the shaft. If you find any fault with it, show it to the foreman or fireboss.

Rules for Gangway Miners

1. If you are using fore-poles, don't take the cut out before putting in the poles. You may get hurt.

2. Don't use black powder and dynamite in the same holes. It is dangerous.

3. Don't let the laborer work at the face when you are not there.

4. Don't leave the colliery if there is any gas in the gangway or chute before you tell the foreman or fireboss about it.

Rules for Drivers

1. Don't beat your mules with a club or piece of lagging. Carry a whip and use your best judgment when to use it.

2. Don't form the habit of shouting at your team. They may become excited and turn the wrong way, causing an accident.

3. Don't ride on cars in a gangway where the timber is low. Walk alongside of your team.

4. Don't pass, when going in, a lagging or plank that is lying on the gangway, it may trip you when coming out, thereby causing an accident. Stop when you see it and place it out of the way.

5. Don't fail to report to the loader boss or repairman if you find a bad joint in the road. By so doing, you may avoid and prevent an accident to yourself and others.

6. Don't slide your foot on the rail or sit on the bumper of the car. Many good drivers are in the cemetery from these causes.

7. Don't allow any person to ride on your loaded trip.

Rules for Loaders

1. Don't uncouple your car while it is in motion. Have the driver stop first.

2. Don't go up in the breast when you want to load. Rap on the battery for the miner.

3. Don't ride on loaded mine cars.

4. Don't clean off the rail with your hands. Use a shovel.

5. Don't pick up a piece of coal before you have examined to see if it is shattered. When shattered lift it up to your waist and let it drop on the platform, then you can shovel it into the car. Shattered coal may break in your hands while loading it into the car, thereby causing injury.

6. Don't forget to report to the fireboss when the gangway timber is crushing.

7. Don't unload timber and sheet iron on the gangway. Put it on the platform.

Rules for Loader Bosses and Repairmen

1. Don't walk along the gangway in the morning as though you were outside of the mines. Examine the road and top as you go. If you see anything wrong report it at once to the fireboss. If there are any laggings or plank lying on the gangway, place them on the platform, or some place where they will not cause an accident.

2. Don't be careless about erecting a battery. Make it air-tight.

3. Don't unload plank along the gangway. Put it up in the chute.

4. Don't allow any person to ride on the locomotive except those in authority. Allow no one to ride on a loaded trip.

Rules for Door Boys

1. When trip is on inside stay on the inside. When on outside stay on the outside of your door.

2. Don't let the door stand open longer than is necessary.

3. Never leave the door at quitting time until all the drivers are out.

4. Don't bring books or papers to read while at work as you may get interested in reading them and forget the door, causing an accident.

5. Don't go to sleep at your door.

These are simple rules which, if practiced, may be the means of preventing injury and possible loss of life.

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*Inside foreman, Wadesville Colliery, Philadelphia & Reading Coal & Iron Co., Pottsville, Penn.

SNAP SHOTS IN COAL MINING

Consol Breaker, Hillside Coal & Iron Co., Avoca, Penn.

Tipple and Power House of Sunnyside Coal Minin Co., Strong, Colo.

Canada West Coal Co.'s Plant, at Faber, Alberta, Can.
(Produces a high grade of domestic coal, and has a capacity of 2000 tons per day.)

Group of Miners at a Virginia Bituminous Operation
(Each man is shown wearing a new type "Hirsch" electric lamp.)

How To Reduce Falls from Roof and Sides

By D. J. Griffiths

SYNOPSIS—This is a paper which was delivered at the June meeting of the Rocky Mountain Coal Mining Institute and provoked a good deal of discussion, as attacking any method of systematic timbering.

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Beyond doubt it is practically impossible to eliminate all chances of accidents from falls. Mother Earth is not going to give up her treasures without some sacrificing on our part.

This particular question ranks among the important subjects connected with coal mining, and has been given less attention as a factor of life and limb destroyer than any other cause. The single fatalities which happen, create very little attention, nevertheless, when counted up at the end of the year, they outnumbered the unfortunate ones that are mowed down on the wholesale by mine explosions.

Firedamp and coal dust were often considered as the greatest evils in coal mining. All records, however, prove this conclusion to be wrong; the second annual report of the Bureau of Mines, gives the loss of life caused by falls of coal and roof in 1910 as 1310 and in 1911, as 1321.

The reports of Pennsylvania Mine Inspectors for a period of 33 years, show that 59.38 per cent. of all the accidents underground was caused by falls of roof and coal. Also, the Bureau of Mines shows in their last issue on fatalities that accidents from falls of roof and coal killed more men than any other two causes combined, and that they account for more than half of the deaths underground.

It seems we are getting too accustomed, taking too many things for granted, running too many risks, trusting too much for the best and preparing too little for the worst. We must remove the cause then the effects will cease. However, I can see that a better day is here.

The main damaging factors underground are falls of roof and sides. Bad roof is tender and lacks the adhesive qualities to sustain its own weight over comparatively small areas. A roof of any character which is frequently penetrated by well defined slips and cleats, is characterized as treacherous roof. The carelessness of men has been one of the main causes of most of the accidents in mining as well as in any other industries.

Three Grades of Miners

Miners can be classified into three distinct grades, to wit: The experienced and careful, the experienced and reckless, and the unexperienced. The accidents with which the first class usually meet, occur through the carelessness of their coworkers as well as through accidents which are termed unforeseen, such as falling roof between timbers, and between the timbers and the face of the coal. This may have previously given evidence of being absolutely sound and safe, but be released by invisible slips or by sudden outburst of occluded gases in large quantities, as we term big blowers or feeders, or by a sudden squeeze and seismic movement. The competent but careless or unenergetic miner takes too many chances under threatening pieces of roof and sides and the coal at the face, neglecting to timber or pull down roof as the conditions demand. The unexperienced most of the time put up the timber in the wrong places. Owing to the scarcity of skilled miners, the mines of the West employ annually hundreds of men who are far from being familiar with all phases of danger, and therefore are not watchful.

There are causes that make or transform safe roof into dangerous roof. First: Poor or inadequate ventilation causes the roof and sides to disintegrate, while decomposition of timber is noticeably hastened in the presence of highly contaminated air. The men become depressed and indifferent, losing alertness, quickness and ambition. In a sluggish atmosphere the men cannot see the same as if the air is good. J. S. Haldane and T. L. Llewelyn, British Experts on Mining, have recently made experiments to determine the degree to which lamps are dimmed by the presence of impurities in the air. The results show that every diminution of one per cent. in the oxygen present, lowered the illumination power of a safety lamp, burning colza oil and paraffin 3.5 per cent, and I assume that it also affects the hearing of men to a certain degree. Therefore, in as much as poor ventilation is a factor of so much importance in damaging property and crippling life in all directions, it is one of our chief duties to see that the volume of air is sufficient and see that it is as nearly perfect in quality as practicable, and that the air is properly conducted through the various parts of the workings. Secondly, lack of sufficient pillars for support renders the roof unsafe. The pillars should safely bear the load; small pillars permit squeezes at the face and on the haulage roads, so causing the roof to fall, and many deaths are a result.

Blasting Off the Solid

Blasting off the solid is injurious to the roof. The expansion of the powder is upward as well as downward and sideways. The flying coal knocks out the props and sometimes breaks them in two, allowing the roof to fall or giving it an opportunity to become released. The resetting of displaced timber is hazardous work. In southern Colorado, the coal is undermined so that the danger from flying coal has been practically eliminated.

I am pleased to say that the motto of the majority of the companies, today, is Safety First.

The miner is better taken care of today than ever before. The fireboss makes a thorough inspection of the roof and ascertains as well that the place is perfectly free from firedamp and blackdamp, and adequately ventilated. The pitboss visits the working places every day, and frequently the superintendent enters the place. It is becoming common for companies to have inspectors, who devote all their time to the health and safety of the underground employees, and further, we have more state inspectors than before.

In the mining world there is at present a controversy over the methods of timbering. Some believe in systematic timbering, where there is a maximum for the distance between each prop. The idea looks good on the surface but when carefully analyzed, it falls short. In the first place, it would create a tendency on the part of the miners to timber their places according to the specified rules, losing sight of the importance of putting the timber where they would be most serviceable. Moreover, it would make the officials neglectful of sounding the roof, as they would see the place thickly timbered and the law complied with. A system cannot be applied that can be of any benefit, where conditions vary in every foot of advance in a room, entry, pillar and cross-cut. In my opinion, mine timbers should be set in such a manner that they will give the greatest degree of safety. Conditions of the roof govern where and how many timbers, and what kind of timbering is needed. The trouble is not the failure to use sufficient timber, but to place them where they are needed. It is necessary to sound the roof often and place timber according to the sound.

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*Note—Abstract of paper read before the Rocky Mountain Coal Mining Institute, Salt Lake City, Utah, June 12, 1913.

How can a method of systematic timbering prevent a pot hole, a trough-shaped rock, and various other shapes of rocks surrounded by slips, from falling? There can be no set rule for placing props. The people that advocate systematic timbering, must believe that all the miners are inexperienced, and that the company officials never visit the miners' places. Firebosses, pitbosses and company inspectors visit the places every day and other officials occasionally. I am afraid by compelling men to timber according to fixed rules, the standard of safe timbering would be lowered. Such an attempted remedy would create a larger number of accidents.

Eight years ago the British Inspectors of Mines instituted inquiries to ascertain whether the earth trembling had any effect upon falls of roof and sides in the mines. They appear to have taken this course, because the adoption of the new special rules to secure the roof did not reduce the number of falls; falls of roof and sides continued to be as disastrous a source of accidents as in the presystematic days.

Systematic Better Than No Timbering

I take it for granted that someone will say that systematic timbering has reduced the fatalities in some sections of the country. In answer to that, I will say, yes. But why? Because previous to that very little attention had been given to the men and the roof, so that any kind of a system would naturally help matters in those particular sections. We cannot have a set rule to hold the roof any more than we can establish a rule to fight a fire in a mine where practically all the coal had been extracted. It would be a good move in the right direction to see that all the miners and timbermen are equipped with axes and saws in perfect condition. If the tools are not in perfect condition, they will postpone timbering. Every post should be set with a cap-piece, which should be in thickness the width of the prop and a little wider than the width of the prop. Under great pressure the cap-piece is liable to split the prop if it is not covering the whole end.

And further, I advocate a good electric lamp; one that has illuminating power to expose the joints of the slips and breaks.

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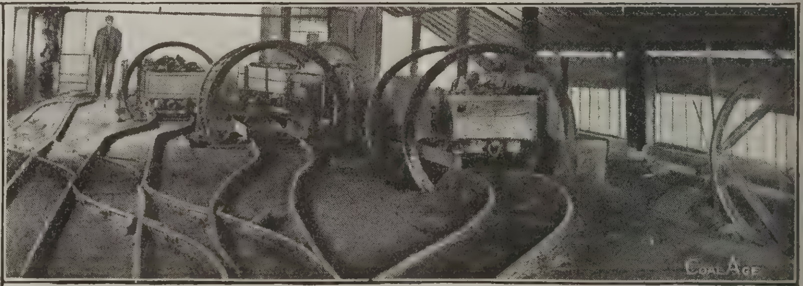
Views at a British Colliery



Cylindrical tipplers in the screening house

Headframe at No. 1 deep pit

General view of entire surface plant

The Shelton Iron, Steel & Coal Co.'s Colliery in Staffordshire, England

The M-O-I. and Kokoal Dealers' Convention

By A. T. Shurick

SYNOPSIS—A description of one of the most important conventions of coal dealers that has ever yet been held. About 700 members of both societies were present. A number of important papers were presented and considerable discussion was devoted to the relationship between the coal industry and the railroads.

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The joint convention of the Michigan-Ohio-Indiana Coal Dealers Association and the Order of Kokoal, at Cedar Point, Ohio, on June 17, 18 and 19, brought together one of the largest and most representative assemblages of coal dealers and wholesalers that has ever met. These are the two most powerful organizations of their kind in the country, and this was the second occasion on which they have met in joint convention. Add to this propitious weather conditions, an ideal place of meeting and all the requisites were at hand to assure an excellent attendance.

The Kokoal's Annual Meeting

Members and guests of the two associations began registering at the Breakers Hotel at Cedar Point on the morning of June 17. Cedar Point is about three miles by water from Sandusky, and the Breakers Hotel, which was the headquarters, proved all that could be desired; it was not yet opened up actively for the summer trade and the coal men had it practically for themselves.

The Kokoal meeting, which was scheduled to take place in the morning, was not held till 2:30 p.m., due to the nonarrival of members until that time. The meeting was called to order by Imperial Modoc Coleman who introduced Vice-President Ballard, of the M-O-I.; the latter extended a hearty welcome to the Kokoal members which was appropriately responded to by Past Imperial Modoc A. M. Hull, of the Kokoals.

Following this, Imperial Pictor Lester read the secretary's and treasurer's annual report. In this he commended the work of the Birmingham Breaker in general, in the highest terms, and W. C. Adams, of that breaker in particular, following with remarks on a number of the other more successful breakers. Mr. Lester regretted that in order to obviate the possibility of a deficit the sum of $300 had been donated by a number of companies who indorsed the principles and work being done by the order.

Imperial Modoc Coleman's paper was then read. His address was confined almost entirely to the weakened condition of the society's membership. The records showed that only about 50 per cent. of the members had their dues paid up and in addition to this he deplored the inactivity on the part of the local breakers. He stated that he had attempted to strengthen the order's financial position by the opening of a new membership designated as associate members. The initiation fee was to be $5 each and he had hoped to secure some 2000 members but had only succeeded in getting about 70.

Mr. Coleman said that he now favored cleaning out all the "Dead timber" from the society's membership and making a new start. He is also of the opinion that all members should be affiliated with some local breaker and that the latter be held responsible for the collection of all dues of its members. On the question of initiation of new members he thought that the present system was becoming rather old and should be brought uptodate. He concluded his remarks with an expression of his sincere appreciation of all the assistance given him by the members, press, etc.

Mr. Adams, of the Birmingham Breaker, then made a short talk on rejuvenating the organization. He quite pertinently pointed out that there was no other industry in the world producing such a staple product as coal and yet so loosely organized as the coal dealers were; and in his opinion there was no other organization that could be established on so high a plane were a reasonable effort made. He ascribed the success of the Birmingham Breaker to the concerted action, coöperation and close interests of the individual members and concluded by stating that the coal men should be impressed with the advantages to be obtained by organization.

The session was concluded by the Imperial Modoc appointing a committee on resolutions and another on constitution and bylaws which were to report on Thursday.

In the evening one of the most enjoyable koruskations ever held was given by the Birmingham Breaker at which eight new members were initiated into the order. Complimentary cigars from the Minneapolis delegates were distributed to all who attended the evening meeting.

At the end of the first day 431 members and guests of the two societies were registered

The Official Badge

The M-O-I. Meeting on Wednesday

The annual meeting of the Michigan-Ohio-Indiana Coal Association was held in Convention Hall at 10:10 a.m., on June 18, President Lake presiding. The opening address was made by President Ryan, of the Cedar Point Resort Co., who extended a hearty welcome to the visitors on behalf of his company. Mr. Lake responded with a few appropriate remarks, and was followed by G. A. Ballard, chairman of the executive committee who made a short talk on the organization of the convention.

President Lake's annual address was then given. He stated that he had not expected to be present because of a serious illness and had not therefore prepared a formal paper, but he delivered one of the most interesting talks of the session, confining his attention mostly to the association and its work. He found that this was growing quite rapidly and he now considered it one of the most powerful in the country. Evidence of this fact was clearly shown in the recognition accorded the association by the large transportation companies, there being nine representatives of these latter present at the meeting; it was obvious that they were awakening to the necessity of working in closer harmony with the coal men and also to the importance of their organization. It was only within the last few years that shippers had been able to recover for losses in transit and this was a result that he had long predicted, and it was gratifying to him that his prediction had proved true.

The next evil of this character to be corrected, is the car-service rules. Railroads carefully specify that they are not liable for "acts of Providence," but, on the other hand, the coal man must fulfill his agreement regardless; it is a poor rule that does not work both ways and he believed that the association should push this issue aggressively. However, he was of the opinion that when the transportation companies become better acquainted with the coal men and more familiar with their troubles that a better understanding would prevail and such difficulties easily adjusted.

Concerning the Retail Prices of Coal

On the question of the retail selling prices of coal, about which there has been much unfavorable comment in the press of the country, Mr. Lake stated that this was entirely unjustified and unfair. He said that the dealer could not handle coal under average year around condition for less than 70c. per ton, and in view of the fact that New York retail prices are from $1.50 to $2 per ton above the wholesale, this seems to be a modest estimate. Some dealers might believe they could do better on this price, but unless they kept accurate accounts and made full allowance for depreciation and other charges they were not in a position to determine this and should be careful about selling low. He then cited conditions in other industries, such as the drygoods, for instance, where a profit of 20 to 25 per cent. was demanded; this is much more than the dealer expects.

He concluded by extending his sincere personal thanks to J. A. Ballard and the committee for the efficient and able way in which they had handled the meeting.

The treasurer's report was then read and this was followed by the secretary's report. During the past year there were 248 claims filed against the railroads, of which 23 were declined, 101 collected and 124 still pending; the total amount involved was $4547.80, of which $2056.60 was collected. The total membership is 1790, of which 192 were taken on during the year and 63 dropped out for different reasons. Cash on hand to the middle of June was $436.60 as compared with $456.78 at the same time last year.

Following this the papers of members were read in the order given herewith:

"Coal the Essential." By Frederick W. Saward, of the *Coal Trade Journal*, New York.

"Anthracite Conditions—Your Troubles and Ours." By D. F. Williams, Scranton, Penn.

"Coöperation as between the Coal Man and the Railroad." By J. B. Nessle, general coal and ore agent of the New York Central Line, Pittsburgh, Penn.

"Value of Railroad Claim Department." By H. B. Wolf, Marion, Ind.

"Result of Coöperation as between Shipper and Dealer." By W. J. Hamilton, Columbus, Ohio.

A committee of nine (three from each state) on nominations was then appointed and instructed to report later, and the president concluded with the statement that this had been one of the most interesting sessions the association had ever held.

The Boat Ride in the Afternoon

In the afternoon the members and guests of both societies had an enjoyable sail on the steamer "G. A. Boeckling." The steamer left at 2:45 p.m. and crossed the bay to the Sandusky shore, passing by the B. & O. R.R. coal docks. These are equipped with two loading derricks and under them are the bins of Bert Smith, a local dealer. After touching at Sandusky, the steamer proceeded down the shore line past the Big Four R.R. docks and on down to the Short Line (Pennsylvania R.R.) piers.

At this point the operation of picking up entire railroad cars and dumping them into the vessel's hold was witnessed; the freighter "A. B. Stewart," of about 10,000 tons capacity, was being loaded at the rate of about one railroad car every two minutes. From here the steamer turned out to Johnson's Island, at which point all the rock is obtained for the breakwaters both at Sandusky and Cleveland; scows were being loaded by derricks at the piers there.

The return trip was made by Sandusky and hence into Cedar Point again. During the entire journey a one-man, spectacled, colored orchestra ably assisted by Mr. Draggins and others rendered excellent selections on the stern of the boat.

The Concluding Day

The final meeting of the Michigan, Ohio, Indiana Association was called to order in the Convention Hall on June 19 with a small attendance present. The first business was the report of the committee on nominations, which was read and adopted, the officers for the new year being as follows:

President—H. H. Deam, of Bluffton, Ind.

Vice-President—James A. Ballard, of Detroit, Mich.

Treasurer—W. A. Gipson, of Upper Sandusky, Ohio.

Directors—Robert Lake, of Jackson, Mich., to succeed George T. Calvert; W. G. Voegele, of Mansfield, Ohio, reelected; J. W. Landrum, of Terre Haute, Ind., to succeed H. H. Deam, and H. B. Wolf, of Marion, Ind., reelected.

The new president was installed, appropriate addresses being made by both him and retiring President Lake. Talks on the following subjects were then given mostly in an informal manner:

"Looking Things Square in the Face." By Benjamin F. Cobb, Monon Bldg., Chicago.

"Value of Sociability in Business." By D. W. Sherry, Connersville, Ind.

"The Value of Gaining Public Confidence." By H. P. Gaukler, Pontiac, Mich.

"Credits." By H. W. Kelly, Angola, Ind.

"Preparing Your Selling Talk." By C. H. Enderlin, Chillicothe, Ohio.

The meeting was concluded with the adoption of a resolution extending a hearty vote of thanks to the Cedar Point Resort Co. and others for the many courtesies and unfailing attention which had been accorded the members of both societies during the meeting.

In the afternoon the concluding meeting of the Order of Kokoals was held, at which the annual election of officers took place, the result being as follows:

Imperial Modoc—James A. Ballard, sales manager Semet-Solvay Co., Detroit, Mich.

Imperial Baron—W. C. Adams, sales manager Alabama Fuel & Iron Co., Birmingham, Ala.

Imperial Baronel—A. J. Moorshead, president Madison Coal Corporation, St. Louis, Mo.

Imperial Baronet—George W. Edmonds, George B. Newton Coal Co., Philadelphia, Penn.

Imperial Pictor—R. S. Jones, Berwind Fuel Co., Minneapolis, Minn.

Imperial Mazumer—E. V. Sidell, retail coal merchant, Poughkeepsie, N. Y.

Imperial Gazook—Daniel Howard, Central Fairmount Coal Co., Clarksburg, W. Va.

Imperial Pit Boss—John A. George, president Indianapolis Coal Co., Indianapolis, Ind.

Imperial Acolyte—F. C. Atwill, Atwill-Makemson Coal & Coke Co., Chicago.

Imperial Swatta—G. T. Rider, Scanlon Coal Co., Louisville, Ky.

Imperial Spotta—Pratt Thompson, Lehigh Coal & Navigation Co., Hartford, Conn.

The Exhibits

F. S. Converse, of Binghamton, N. Y., manufacturer of coal-handling tools and machinery, had one of the largest exhibitions at the convention, showing a line of chutes, screens, bags, baggers, etc.

One of his products which attracted considerable attention was the Converse Portable Rotary Screen for rescreening coal. The screen is cylindrical in shape and covered with wire screen of different mesh set on a frame and fed by a hopper; the whole equipment is on wheels so that it is readily moved about. The object of the device is to eliminate what commonly requires three distinct operations when screening the coal over a yard screen.

The exhibit of the *Domdoff & Joyce Co.,* of Cincinnati, Ohio, attracted considerable attention, owing to the large variety of cokes and coals displayed. The company was represented by Charles A. Sargeant, secretary, and W. H. Underwood.

The New York Coal Co., Columbus, Ohio, operating eight mines in the Hocking Valley district in the Nos. 6 and 7 veins, was also an exhibitor, displaying Manhattan washed coal. They claim to have the largest coal-washing plant in the East; it has a daily capacity of 1500 tons of washed coal. The coal on display was the various sizes used by retail dealers. They also showed photographs of the washer plant, revolving screens and cars loaded with Manhattan and Knickerbocker rescreened lump.

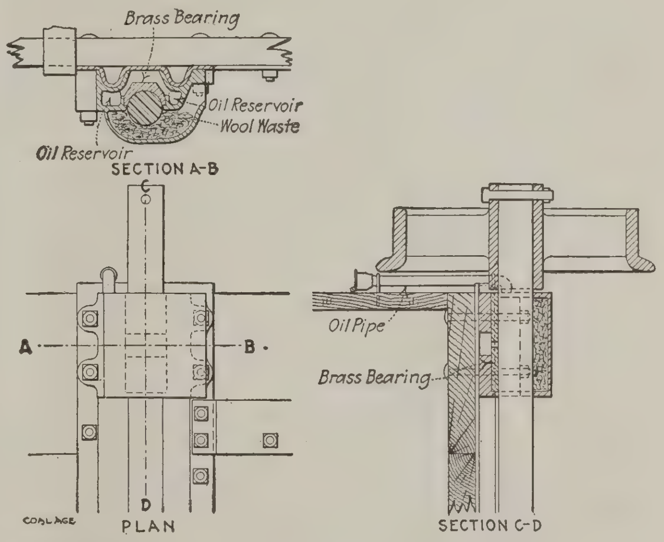
The Gifford Wood Co., of Chicago, exhibited a working model of a retail coal-yard pocket which was one of the most interesting features there. The model was in operation much of the time and proved of interest to the visitors. In addition to this, they had different sizes of gravity-discharge buckets and steel-roller chains with special self-adjusting attachments.

The Hunter W. Finch Co. had a unique exhibit in the shape of a block of Dixie Diamond Block coal from old Kentucky and to the dealer who came nearest guessing the weight of this block, a car load of the same coal was to be given free. The company was also distributing lapel watch chains and a handy little bullet pencil.

A Substantial Journal Box

Although the railroads have for many years employed brass bearings in waste-packed journal boxes on practically all of their rolling stock, the mining industry has been slow indeed to follow their example. Lately, however, the Helmick Foundry-Machine Co., of Fairmont, W. Va., have perfected a journal box of this kind. This device is illustrated herewith, and embodies several features not ordinarily found in mine-car construction.

As may be clearly seen in the drawing, this journal box is waste packed, and consequently self-oiling. The waste, furthermore, is easily accessible, so that the packing may be readily stirred up or renewed without removal of the axles or wheels. Oil may be easily and quickly introduced into the waste receptacle by means of the cups and pipes fastened to the side of the car and extending above the flange of the wheel.



The New Journal Box and Pressed Corrugated Base

The top of the journal box is grooved to fit a corrugated axle base pressed from steel plate. This stiffens the bottom of the car considerably, thereby tending to prevent the axle from bending to a great extent. Heavy bolts extending entirely through the bottom of the car hold the journal box and plate securely in place. This arrangement makes an extremely strong and rigid axle base.

The axles proper are of cold-rolled steel without collars, and can be removed without taking the journal box from the car bottom. One wheel is made tight upon the axle, while the other is loose, thus allowing the car to pass around the sharp curves frequently employed in mines with a minimum of draw bar pull. The whole device is simple, compact and strong, and well adapted to the hard knocks and severe conditions invariably encountered in underground transportation.

Some Notes on Railroad Claims

By H. B. Wolf* and J. B. Nessle†

SYNOPSIS—Some comments on the difficulties the dealer is liable to encounter collecting damages for coal lost in transit. The railroads are prone to take a rather obstinate position in such matters and unless the shipper is able to bring some pressure to bear, his claim will usually receive scant attention. On the other hand, shippers frequently file such inadequate claims that the roads find it impossible to take action; in fact, they claim to be eagerly seeking reasons why claims should be allowed. Both sides of the question are presented.

⁂

By H. B. Wolf

I have never been able to satisfy myself why a coal dealer should have any use for a railroad claims department. I believe he should buy coal f.o.b. destination and let the other fellow stand the shortage or fight it out with the railroads. The producer has always told us to accept what was in the car or make the railroads pay for whatever shortage there might be. I wish to say to the retailers that this is one of the biggest leaks in our business and should be given the same attention as the delivery and collection of a ton of coal to our customers. When we give this leak the attention it should have, the railroads will protect our coal while entrusted to them and our shortage will be less, our money more, collections for short weights will be much easier and payments by railroads more prompt.

The roads doing business in these three states are now taking notice of the retail coal dealers, and while at the writing of this paper I do not know what our secretary's report will contain as to results obtained by the association railroad claims department, I am sure that it will be a surprise to many of us. (See page 50.)

Some Collections Made

Last year I determined to know something of the shortage of coal consigned to our company. I ordered some railroad claim blanks of our secretary and served notice to the railroads entering our city to weigh all cars consigned to us unless otherwise ordered.

Owing to one excuse or another by the railroads we failed to get 202 cars weighed at all but we did manage to get 159 cars weighed. Ninety-six of these overweighed or underweighed less than 1000 lb., 63 cars fell short over 1000 lb., and it is of these 63 I wish to speak. These cars were from almost all coal-shipping districts and contained all kinds of coal from $8.66 anthracite to Indiana mine-run. The total shortage was an even 100 tons, amounting to $369.55, or an average shortage of 3348 lb., amounting to $5.86 per car.

The first lot of claims we sent to the railroad, but as all the satisfaction we got was a card notice, stating the number of claim, we soon changed and sent all our claims to the association, and through them we have been able to collect a great many that otherwise would not have received much attention. We have many claims still pending, but we are so confident that they are just and that we will get them that they were listed on our inventory May 1, as an asset at their face value. It takes time to collect these claims, and if you do not get action on them as soon as you wish, do not give them up but make the railroad pay that which it owes you.

After filing your claim you will probably receive a letter reading as follows:

> Beg to advise claim so and so is herewith returned to you for your withdrawal, as investigation has developed the fact that the car did not meet with any rough handling or theft while on the rails of this company or its connections.

In other words, the railroad will accept this car and issue a bill of lading, showing contents and amount, and on arrival at destination again weigh the car and issue a way bill showing a shortage over their own agent's signature. Then because they cannot find where the shortage occurred, they expect you to believe there was no shortage.

I do not wish to leave the impression that all roads are alike on the question of settling short-weight claims. Our experience has been varied with the four roads entering our city. One road, whose chief revenue comes from carrying coal, had a car of coke it had hauled from the ovens, a distance of 40 miles. I ordered the car over to another road for delivery to one of our yards, and also ordered this latter road to weigh the car, for which they charged $1. It was short 2000 lb., amounting to $3.35. I filed bill for this amount plus the $1 that had been charged by the other road for weighing, and the whole claim was allowed.

By J. B. Nessle

No industrial or railway-traffic man claiming Pittsburgh as his home can hear the word coöperation mentioned in any discussion without swelling up a bit, and if at all possible to do so he finds an opportunity to speak of the Traffic Club of Pittsburgh. This organization, founded some ten years ago, is made up of representatives of the principal industrial organizations and railway-traffic officers whose business interests are located within what is known as the Pittsburgh district. The watchword, object and practice of this organization is coöperation as between industrial interests and railroads first, last and all the time, and it is with a feeling of great pride on the part of members of this organization that they point to the records made in the Pittsburgh district in the adjustment of the many questions that come up from time to time as between railroad and industrial representatives which are amicably settled without recourse to commissions or the courts.

The Value of Organization

This organization has brought the railroad representatives and the shippers of the Pittsburgh district in a close personal relationship with each other. Instead of each trying to find a way to embarrass the other, they are today and for some time have been devoting their energies in an effort to harmonize any differences that may exist and coöperate to the fullest extent.

People wonder and ask the question, why is it that the Pittsburgh shippers are not down at Harrisburg advocat-

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Note—Abstract of papers read before the M. O. I. Coal Association at Cedar Point, Ohio, June 18, 1913.

*J. G. Wolf & Sons, Marion, Ind.

†General coal and coke agent, N. Y. Central Lines West.

ing and insisting upon the passage of an air-tight public-service law and the establishment of a public-service commission? The answer is that through the application of the principle advocated by the Traffic Club, insofar as the steam railways and shippers are concerned, a public-service commission is not necessary in order to secure and protect the rights of either interest.

There is absolutely no community anywhere approaching the size of the Pittsburgh district where so few complaints before state or interstate commissions are filed by the shippers against the railroads. We have a way of settling these things out of court; largely through the spirit and influence of coöperations as advocated by the Traffic Club.

With a membership scattered over three or more states your organization and the railroad cannot, of course, get as close together as we do in Pittsburgh, but it is quite apparent to me that the association certainly appears to have adopted coöperation as its watchword. If we are to judge from the manner in which the officers of this organization are endeavoring to handle the questions arising from time to time and attend to the disputes that are brought to their attention by members as against the carriers, there is absolutely no doubt that the vast army of coal dealers throughout the country and the railways are going to be brought closer together, and to a better and clearer understanding of each other's troubles and requirements.

Railroads have been blamed for lack of interest, desire to shift responsibility and actual refusal to pay legitimate claims. As a matter of fact, the entire trouble and responsibility for the failure to receive prompt action for adjustment of claims is often due to the claimant himself, in that he has not supplied any evidence whatsoever which would enable the railroads to even locate the shipments in question. Your officers are endeavoring to correct all this, and I wish to assure you that in the railway claim offices this effort is most thoroughly appreciated.

Coal dealers have the idea that a railroad claim office is created for the purpose of finding excuses, evasive language and reasons why a claim should not be paid, without the slightest regards to its merits. It is possible that in the past there may have been some grounds at least for this suspicion, but I feel quite safe in saying at this time that instead of finding a way not to pay claims, they are today bending every effort to find a way to settle all legitimate claims promptly. In other words, we want to find a way to pay your claims at the earliest possible moment.

The Railroads Require Help

Another instance in which your association is coöperating with the railroads is the advice they are giving us from time to time where your members report pilferage. A number of these cases have been reported to me by the secretary and the information has been welcome, since it has given us an opportunity to so police the points mentioned as to eliminate entirely the losses. You all realize, I am sure, that it is absolutely impossible for railroads to carry a detective on each car of coal, or to police the entire line of their road in such a manner as to absolutely prevent the possibility of someone getting on and throwing off coal from cars in transit. But we can and will prevent this wherever possible to do so, and when your members notify the carriers that at a certain place systematic stealage is being practiced, you are doing the railroads and the coal trade a positive service.

Another thing the officers of your association are doing through advice from members is calling attention to the railroads where they find the agents engaging in the coal business to the detriment of the legitimate dealer in the town in which the agent is located. The carriers welcome this information, since they are not always able to check up on this sort of business, and it enables them to at once break up the practice. It is hardly necessary for me to assure you at this time, insofar as the lines I represent are concerned, and I believe this to be true of practically all of the railroads in the territory, that we are absolutely opposed to our agents engaging in coal or any other business to the detriment of the legitimate shippers located on our lines.

Your organization is one that can accomplish a great deal for the coal dealers and at the same time in many ways help the railroads, and I feel confident in predicting that, notwithstanding all that may have happened in the past, we may reasonably expect the "dead past to bury its dead" and find the representatives of the coal trade and the railroads, like the lion and the lamb of old, lying down peacefully together.

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A Comparison of Fatal Accidents

The following is a comparison of the fatality rates of the H. C. Frick Coke Co., with those of Scotland, South Wales, and Great Britain. These figures were given at the recent meeting of the Coal Mining Institute of America.

DEATHS PER MILLION TONS PRODUCED

	1910	1911	1912
Scotland	5.06	4.12	3.50
South Wales	5.60	5.67	6.53
All Britain	6.54	4.47	4.52
H. C. Frick Coke Co.	1.99	1.72	1.88
TONS OF COAL PRODUCED PER DEATH			
Scotland	197,600	242,000	285,000
Scuth Wales	150,700	176,100	153,000
All Britain	137,100	243,500	248,000
H. C. Frick Coke Co.	502,049	578,151	531,328
DEATHS BY FALLS PER MILLION TONS MINED			
Scotland	2.10	1.76	1.86
South Wales	3.18	3.20	2.79
All Britain	2.36	2.33	2.03
H. C. Frick Coke Co.	0.97	0.90	0.70
DEATHS BY CARS PER MILLION TONS MINED			
Scotland	0.68	0.84	....
South Wales	1.68	1.47	....
All Britain	1.02	0.98	0.87
H. C. Frick Coke Co.	0.79	0.41	0.91

The H. C. Frick Coke Co. produces twice as much coal per death as the bituminous region of Pennsylvania, Ohio and Illinois, three times as much as West Virginia and South Wales and twice as much as the whole of the United States.

Figures for Scotland, South Wales and Great Britain were taken from the "Blue Book," published by the British Government. Figures for Pennsylvania, Ohio, Illinois and West Virginia were taken from the year book, published by the mining department of those states. Figures for the United States were taken from Technical Paper No. 48, United States Bureau of Mines "Coal-Mine Accidents in the United States."

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To preserve iron from rust, immerse it for a few minutes in a solution of blue vitriol, then, in a solution of hyposulphite of soda, acidulated with hydrochloric acid. This gives a blue-black coating which is affected by neither air nor water.

Selection of Portable Electric Mine Lamps

By H. H. Clark*

SYNOPSIS—The purchaser of a portable electric mine lamp will consider not only its safety but the cost of maintaining it, its weight and the candlepower. In considering the latter, due weight should be given to the manner in which it is evaluated, that is, whether the average or the "head-on" intensity of light is considered and whether the lamp has or has not a reflector.

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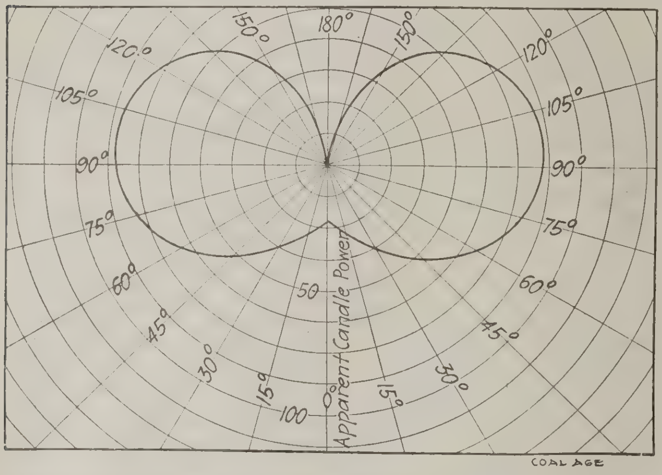
Portable electric lamps first of all should be safe; that is, they should not be capable of igniting gas and should not be so poorly constructed that a man will be left in darkness, due to failure of any part of the lamp equipment. The lamp should give the proper amount of light for from 10 to 12 hours on one charge of the battery. The lamp equipment should be as light as possible so that the burden of carrying it and working with it may be reduced to a minimum. Some of these qualities are more or less apparent after a brief examination. There are other qualities that are not so easily determined and I will mention a few of them.



Showing How the Intensity of Light from a Lamp Bulb Varies

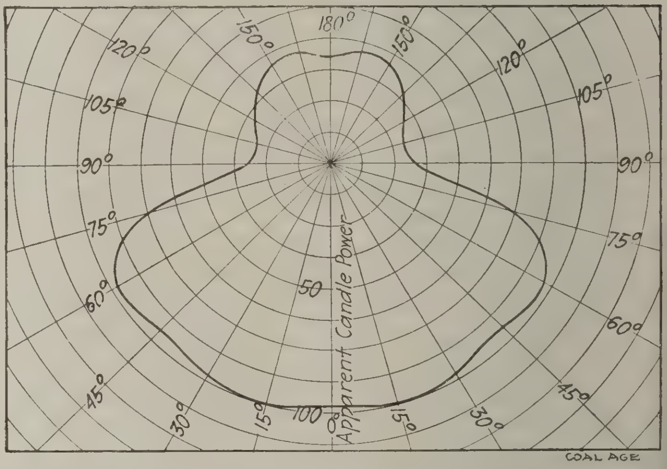
Lamp Upkeep

It is important that the cost of repairs and upkeep of portable electric lamps should be reduced to a minimum. Nor must the interruptions of service, due to equipments getting out of order, be overlooked. The principal item of upkeep is the expense of replacing the lamp bulbs which have been burned out. The life of these is, therefore, an important consideration. The manufacture of miniature lamp bulbs does not seem to be thoroughly standardized in this country. Those which the bureau has examined have varied a great deal in their characteristics. These bulbs cost from 17 up to over 40c. and it may be supposed that the higher-priced lamps are more durable, but I cannot give any definite information as to their relative life, although tests are now under way to determine this fact.

The candlepower that these bulbs will give is not a fixed quantity, as it varies with the voltage at which the lamps are burned. If a lamp designed for two-volt service is burned at less than two volts it gives a considerably decreased candlepower and has a considerably longer life. If, on the other hand, it is burned at 2¼ volts its candlepower would be largely increased and its life proportionately shortened. It is not always a good sign to see a lamp bulb glowing with extreme brilliancy, because it may mean that it is being burned at too high a voltage and may last but a few hours under such conditions.

Candlepower Ratings

Up to the present time, so far as I know, no standard candlepower rating of portable electric lamps has been adopted. Different meanings may be given to the word "candlepower" as applied to portable electric lamps. If a man speaks of his lamp as giving five candlepower he may refer to the intensity of light given by the lamp bulb, or to the intensity of the lamp when used in connection with its reflector. In either case he may refer to the candlepower measured at one point or to the average of measurements at several points. The true candlepower of the lamp is, of course, the average candlepower that it gives over its illuminating range. Some lamps if measured from a point directly in front of their reflector will give from 5 to 10 times the candlepower that they would give if the intensity of light were measured from a point 30 deg. on either side. An effect of this sort is, of course, to be expected, but the statement as to how the candlepower is measured should always be made, because two lamps that really give the same amount of light give widely different candlepowers when measured "head-on."



The Same Light with Its Intensity Modified by a Reflector

As an illustration: Two lamps give the same amount of light, but the "head-on" candlepower of one is more than 12 times that of the other, and the average candlepower of one is nearly seven times that of the other.

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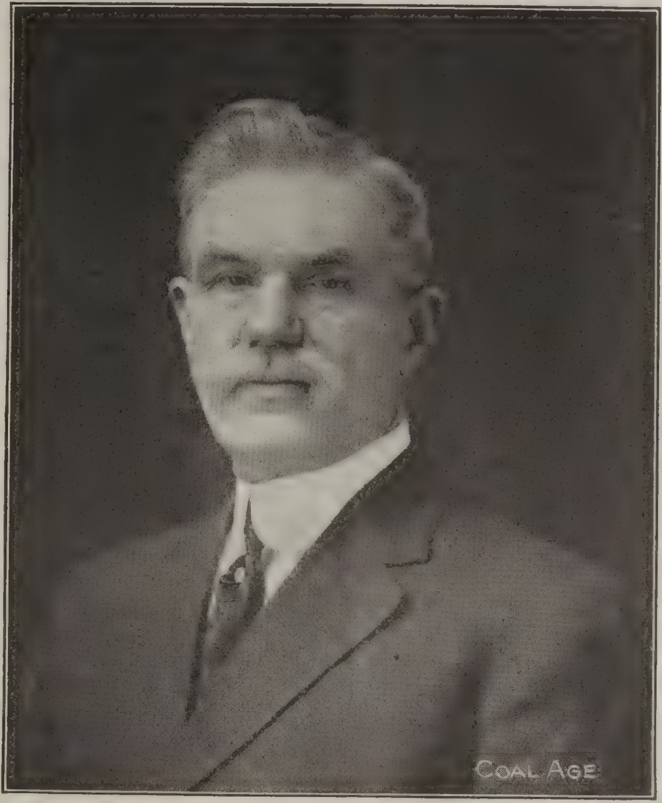
*Electrical engineer, U. S. Bureau of Mines, Pittsburgh, Penn.

Note—Article read before the Coal Mining Institute of America at the summer session, June 16, 1913. The illustrations accompanying this article are added in order to exhibit how the light of a lamp varies with the point of measurement. The figures are taken from a catalog of the Luceo Reflectors.—Ed.

WHO'S WHO—IN COAL MINING



Thomas K. Adams

There are probably few mining men of eminence, whose life record shows more clearly what a true ambition, supplemented by a strong purposeful determination to rise to a sphere of usefulness, can do to achieve success, than the following simple, unsophisticated sketch of the career of of Thomas K. Adams, who is at present the oldest, in service, of the mine inspectors of Pennsylvania.

Born in 1849, near Edinburgh, Scotland, and left fatherless in six months (when the father died, leaving the mother with six children), Thomas entered school at five years of age. His early education was all included between the ages of five and eleven years, when he was taken from school (1860) and put to work in the mines of the Midlothian district, where he continued working 13 hr. each day, until 16 years of age. During all these five years of work in the mines of Midlothian, the boy attended night school regularly. Few can understand but those who have had a similar experience what it meant for a boy of tender years to work 13 hr. of the day and study at night to gain the education he so much coveted.

At the age of 16 years (1865), Mr. Adams came to this country and at once entered the mines of Mercer County, Penn., where he worked as a miner, doing all kinds of practical work. At that time, there was no law n Pennsylvania requiring that a miner should serve two years, in the mines of the state, before he could mine coal on his own responsibility.

Seeking constantly for betterment, and to secure experience and information, Mr. Adams worked for six months in the anthracite mines of Pennsylvania, and ollowed this with six months of toil in the mines at McAlester, Oklahoma, then Indian Territory. Then came a change. Having saved some money as a miner, Mr. Adams entered the Edinboro State Normal School of Erie County, Penn., and continued to attend that institution during four full terms. It was here that he received a good English education. Following this, he taught for a short time, as a regular teacher, in the ommon schools of Mercer County, Penn., to which place he had returned.

It was not long, however, before his ambition for mining again asserted itself. While still a young man, Mr. Adams took an active part in the affairs of the Miners' Local Union and was soon appointed to the position of secretary of that organization. His duties as secretary of the Miners' Union led him into active participation in the work of securing the appointment of a mine commission, which was the first appointed (1874) in Pennsylvania. As a member of that commission, he performed excellent service in the formulation of a bituminous-mine code, which was afterward (1877) made the bituminous mining law of Pennsylvania.

In the meantime, Mr. Adams had reëntered the mine, working as a miner, thereby adding to that fund of practical information and experience which, in later years, placed him in the foremost rank of practical mining men. It was while working in the mines of Mercer County that Mr. Adams (1881) went to Pittsburgh to take the first examination for mine inspector ever held in Pennsylvania. He passed this examination successfully, receiving a rank of 95 per cent., and was immediately appointed and commissioned to act as mine inspector, by Gov. Hoyt. Mr. Adams rereceived this appointment May 15, 1881, and has continued to hold the position of mine inspector from that time, having just been recommissioned for another term.

Four years later, in 1885, and again, in 1893, Mr. Adams was appointed a member of commissions to revise the bituminous mining law, being selected chairman of the last named commission.

As a student of mining, Thomas Adams has few equals. While engaged in the numerous activities incident to the office of mine inspector, he continued his studies of mining, in correspondence and other schools; and added largely to his fund of information by the constant reading of mining books and papers. He did not confine his reading, however, to mining subjects, but devoted many spare moments to the reading of standard works of the best English authors. Mr. Adams has, by industry and frugality, collected a fine library, comprising many of the standard works on history, philosophy, theology, sciences and general literature.

Mr. Adams has thus, from the age of 11 years, supported himself and gained an enviable reputation for sobriety, industry and practical knowledge. He is a total abstainer from alcoholic beverages and the use of tobacco in any form. He has always shown an active interest in labor movements, being especially desirous for the betterment of all classes. He served as the local and district secretary of the Miners' and Laborers' Benevolent Association, and was master workman of the Knights of Labor at the time when labor officials gave their time and efforts without remuneration.

Mr. Adams is a republican in politics, a churchman of the United Presbyterian faith, and a school director in his own town. He is, this year, the retiring president of the Mine Inspector's Institute, U. S. A., of which organization he is a charter member. He states that he is satisfied to have done his best with what he modestly styled "a limited capacity."

Our Front Cover This Week

The upper illustration on the front cover of Coal Age this week shows the 400,000-ton bituminous coal-storage equipment built by the Link-Belt Co. for the Berwind Fuel Co., Superior, Wis. The equipment consists of four traversing bridge-tramways, two revolving locomotive cranes and three movable screening towers.

Each bridge has a span of 295 ft. and an overall length of 506 ft. Two of the bridges are equipped with three-ton buckets, and two with four-ton buckets. All motions of the bridge and bucket are controlled by one operator from either of two fixed-control stations.

Run-of-mine bituminous coal is unloaded from vessels and delivered either to storage, or through reloading hoppers on front tower of tramway direct to box or open cars for reshipment. Transfer from stock pile to cars is accomplished by similar bucket delivery to the reloading hoppers.

When sized coal shipments are desired, coal is taken from vessels or stock pile by tramway buckets to movable screening towers, which may be likened to traveling tipples.

Slack coal, screened from the sized coal shipments, is discharged into open-top cars or conveyed to slack-storage pile, from which the cranes or tramways deliver to movable screening towers for box-car shipment as needed.

The revolving locomotive cranes travel on a track of 10-ft. gage and are arranged to operate 54-cu.ft. buckets at a maximum radius of 45 feet.

Run-of-mine storage is also tributary to the cranes for delivery to cars through the hoppers on the movable screening towers as required.

Delivery to box-cars is facilitated in all cases by traveling box-car-loading machines.

The entire plant is of the most modern construction, and is operated by alternating-current motors.

The lower illustration on the front cover shows a general view of the largest anthracite coal-storage plant in the world, built by the Link-Belt Co., of Philadelphia, for the Philadelphia & Reading Coal & Iron Co., at Abrams, Penn.

The immense tonnage of this plant is divided into eight piles—four on each side of a central railway system—each pile having a capacity of 60,000 tons. The guaranteed performance of the equipment is 1800 tons per day of 10 hr. for each of the incline conveyors, or a total stocking-out capacity of 14,400 tons per day.

For replacing the coal into cars, each of the reloading conveyors has a capacity of 2500 tons, making the total reloading capacity of the plant 10,000 tons per day of ten hours.

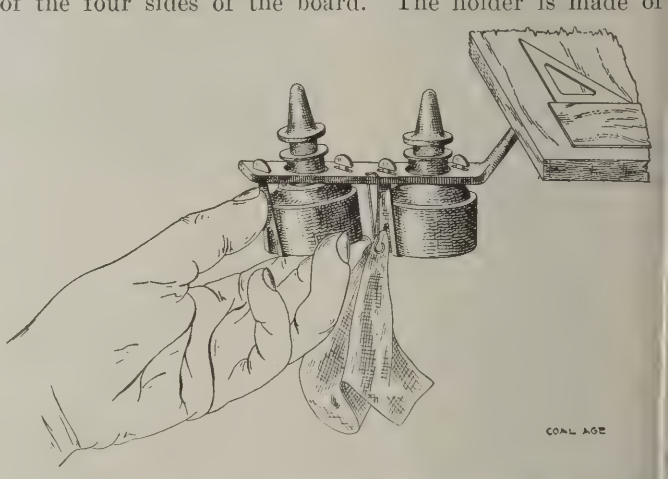
This is the well known Dodge system of coal storage and is the most successful application of engineering practice to the storing of anthracite coal.

As usually arranged for open-air storage, two trimming machines and one reloading machine between them constitute a group. A storage plant comprises a number of these groups which may be of equal or varied capacities. It is, therefore, capable of extension by the addition of one or any number of groups.

"The Dodge System" is also adapted to storage under cover, and to modifications of the open-air storage, in which the trimming machine may be stationary or movable, and the reloading machine a traversing instead of a pivoted conveyor.

A New Bottle Holder

The device illustrated below is a safe and convenient bottle holder for attachment to the underside of a drafting board. When not in use it can be swung out of the way for which purpose a pivot screw is provided. It does not interfere with the use of a tee-square on any of the four sides of the board. The holder is made of steel, ribbed to give strength and coated with black enamel. The bottles are easily inserted and removed and when fastened into place cannot be upset. A holder for a wiping rag is part of the device. The appliance is made by Eugene Dietzgen Co., 218 East Twenty-third St., New York City.



Device for Holding Bottles of Ink

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The December number of The Otto Cycle contains the following table showing the loss of power in gas engines at different altitudes above sea level, expressed in percentage of the power at sea level:

Altitude, feet	Loss in rated horsepower per cent.
1,000	3.55
2,000	6.95
3,000	10.25
4,000	13.45
5,000	16.35
6,000	19.45
7,000	22.35
8,000	25.15
9,000	27.85
10,000	30.45
11,000	32.95
12,000	35.35

EDITORIALS

The Man Who Speaks

There is no merit in taciturnity, in hiding all one's emotions and traveling before the world in a disguise. The successful man is a mixer who has fewest secrets from his working men. The kindly word was the source of all the friendly feeling between capital and labor in the early days and no tricky sociological device can replace it now.

The foreigner needs that word of welcome no less than the native-born. It is our duty to melt the refractory material of southern Europe in the effulgent crucible of our kindness. If we have not learned the loneliness of the alien in a strange land, we have failed to estimate the mainspring of his discontent and of his deplorable penchant for intoxicating liquors.

That place he calls home, you may call a hovel; those folk joys he cherishes may appear to you ignorant follies, but he clings to them nevertheless; the murk of the mining town may not disgust you who have not reveled in the skies of the Mediterranean, but as he recalls the latter, he sings enraptured those plaintive songs of the homeland with a voice which makes the hills ring again. And when he is at his work with his mind ill at ease, a little word of welcome in his own tongue meets with his glad response. "*Buon' giorno*" or "*Buona sera*," pronounced in his vernacular "bon jawn" or "bon-ah sarah," will lighten the morning and the evening of the Italian's discontent.

The foreigner is looking for sympathy and comprehension. Those who have been urged to partake of beer and home-brewed wine by an overurgent Italian host will readily bear witness to the fact that if the stranger long remains a disgruntled alien it is because we have failed to return with a smile the advances he has made to secure our good will, when his heart was aching for the sights and the friends of his homeland.

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The New Mining Law of Colorado

For some time past the mining interests in Colorado have been wrestling with the question of revising the old mining law, which had become well-nigh obsolete, owing to the great development of the coal-mining industry in that state.

It was in November, 1910, that Gov. Shafroth appointed a commission to inquire into the condition of the coal mines, the causes of the many recent serious mine accidents, and to suggest remedial legislation. The commission consisted of Doctor Alderson, president of the State School of Mines; Doctor Ekeley, professor of chemistry, and R. D. George, professor of geology, both of the University of Colorado, the latter being also state geologist; and James Dalrymple, state inspector of coal mines.

The need of a new mining law in Colorado had been recognized for some time, but was emphasized by the recent occurrence of two serious mine explosions; namely, the Starkville explosion, Oct. 8, 1910; and the explosion at Delagua, Nov. 8, 1910; the former costing 56 and the latter 79 lives. The work of the commission extended over a period of two years and has resulted in giving to Colorado a practically new mining code.

Under the new law, a board of examiners is to be chosen, each four years, beginning 1913. Sec. 5 of the new law reads as follows:

> Section 5. Within 30 days after the passage of this act the governor shall notify one judge of each of three judicial districts in which coal mines are operated to make appointments as follows: Two of said judges shall each appoint one reputable coal miner of known experience and practice at the time, from his judicial district. The third judge shall appoint one reputable coal-mine owner, manager or other mine official, and the governor shall appoint a coal-mining engineer of like repute, experience and practice at the time, who shall constitute, together with the chief inspector of coal mines, a board of five examiners, who shall hold office until the third Tuesday of January, 1917. The duty of the examining board so appointed shall be to examine candidates for the position of chief inspector, deputy inspector and mine officials and perform such other duties as are provided for in this act. Provided, when examinations are held to examine candidates for the position of chief or deputy inspectors, the chief inspector shall not act as a member of the examining board, but the other four members of the examining board herein provided for shall select the fifth member to act instead of the chief inspector.
>
> In the year 1917, on or before the third Tuesday of January, and every fourth year thereafter, a new board of examiners shall be appointed as herein provided. The appointment of members on the board of examiners shall be made from the said judicial districts in regular rotational order. Vacancies shall be filled in the same manner.

The section above quoted is unique in respect to the method outlined therein for the selection of the examining board, which board is charged with the duties of examining all candidates for the offices of chief and deputy mine inspectors, company mine examiners, mine foremen, assistant mine foremen and firebosses.

The law provides (Sec. 40) that the board "shall meet at places selected by them, immediately after the taking effect of this act and every two years thereafter, or oftener if necessary." While the new law does not seemingly compel the employment of shotfirers, a clause of the same section reads as follows:

> Shotfirers shall pass an examination to be given by the chief inspector or deputy inspector on occasions when either of these officials shall be present at the mine where the applicant for the position of shotfirer is employed: Provided, that when there is no certificated shotfirer at any mine employing shotfirers, the mine foreman and fireboss may examine any applicant as to his fitness to fill the position of shotfirer, and, having been satisfied of such fitness, may employ him in that capacity until the next visit of the chief or deputy inspector.

As will be observed from the reading of Sec. 5, in the examination of candidates for the office of chief inspector, the incumbent of that office cannot act as a member of the examining board. In that case, the remaining four members are authorized to select a fifth person to act in place of the chief inspector, on the board. The law, however, does not specify, as it should, the qualifications of the person to be so chosen for this place.

The law provides (Sec. 10) that the examining board shall certify to the governor the names and grades of all successful candidates; and (Sec. 11) that, from this list, the governor shall select and appoint as chief inspector of coal mines, "the applicant best qualified for the duties of that office." The wording of this section makes it possible for the governor to appoint the applicant "best qualified" for the position, according to his own judgment and regardless of the rating the applicant received in the examination.

The law further provides (Sec. 12) that the chief inspector shall select his own deputy inspectors from the list of successful candidates. As provided in Sec. 13 a certified list of candidates holds good for five years from the date of certification. There is required (Sec. 16) a rating of 85 per cent. for the office of chief inspector of coal mines, and 75 per cent. for deputy inspector of coal mines.

The law requires (Sec. 17) that each candidate for inspector be a citizen of the United States and of the state of Colorado, of temperate habits, good repute and personal integrity, 30 years of age, and have an experience of 12 years in working coal mines in the United States, at least eight years of which shall be in Colorado and three years immediately preceding his examination. In addition, candidates for chief inspector must show executive ability that would enable them to advise, direct and control the inspection staff. Sec. 41 limits the time of examination of candidates for office other than mine inspectors to 15 days for each two years.

It is to be regretted that Sec. 18 of the law compels the examining board to provide candidates with the mathematical formulas required in the answering of any question given by the board. Instead of giving the formula to be used, the candidate should be given a textbook and required to find his own formula, which would demonstrate his ability to work out such a question without other aid than that afforded by the textbook with which he is or should be familiar, and which he invariably uses in daily practice as a workman uses his tools.

Coal Age has always claimed and still holds that candidates for any practical official position in mining should be granted, in examination, the use of any textbooks with which he is familiar and which he commonly uses in solving technical questions, in daily mine practice, in the office, or at home. The object of the examination should be to show a man's ability to work out such technical questions as the examining board see fit to ask, under the same conditions with which he is surrounded in daily practice.

Examiners should not require candidates to memorize formulas, constants and other data, which they themselves obtain by reference to textbooks. Neither should examiners give a formula in connection with the question asked, as this is a decided help to the candidate and in no way proves his ability to work out the question independently. There are many candidates who could readily answer the question when the formula is given, but who could not find the correct formula in a textbook, and these men have not the ability that should be required to pass the examination.

We do not advocate that textbooks should be used in *all* the sessions of an examination, but only in one or two sessions in which technical questions only should be asked.

Common-Sense Precautions

On page 45 of this issue, Anthony Barrett, an inside foreman employed by the Philadelphia & Reading Coal & Iron Co., has given a series of "Don'ts" which are worthy the attention of all mining men who are employed underground or who oversee those who work in the mines.

There is no doubt but that other experienced mine officials could supply additional precautions which would make this set of rules still more complete in the amount of ground covered. We, therefore, ask that Coal Age readers write us, suggesting further precautions which we can embody in a final set of rules, to be distributed broadcast among mining companies.

⁂

The Pennsylvania State Tax on Anthracite Coal

The new law recently signed by Governor Tener, providing for a tax on all the hard coal mined in the state of Pennsylvania is now in effect, and the large operators will immediately put out a new circular to which this extra cost will be added.

The law provides, in brief, a tax of 2½ per cent. of the value at the mine of all the coal produced. On the basis of the September circular, the maximum quotations on anthracite, the increase on the prepared sizes will amount to between 8¾c. and 10⅜c. per ton On the steam grades the increase will be from 3¾c. to 6¼c. per ton. These increases are to be added to the regular circular by all the large companies, effective July 1. How outlying states will regard the proposition of carrying Pennsylvania's taxes remains to be seen.

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Simultaneous Coal Conventions

During the week beginning July 16, four of the editors of Coal Age were compelled to be away at the same time, attending different coal meetings. The territory covered extended from Alabama to Lake Erie and as far west as Utah, and even though we were compelled to leave the stenographers and the "printer's devil" to get out the paper, we would not have complained had we felt the situation was properly handled. Such is not the case, however. Not only was it a physical impossibility for us to attend all of the meetings but it was also impracticable to devote sufficient space to them.

This latter is probably the most serious feature of all; scarcely any of the coal societies have sufficient means to provide for the publication of the different papers and discussions which take place, and so they are compelled to rely upon the coal press of the country. The coal journals, as a rule, appreciate the high value of these papers and are eager to publish them, but such matter cannot be delayed and must be printed immediately.

Nor are we alone in this complaint. Machinery houses have petitioned the order of Kokoal to request the different state associations to so arrange their dates in the future that demonstrators may cover the ground thoroughly and as economically as possible. Complaints are also general from coal men of all kinds. It is, therefore, to be sincerely hoped that some concerted action will be taken in this respect and that next year will not witness such an absurd congestion of meetings.

SOCIOLOGICAL DEPARTMENT

Sanitation in Mining Towns

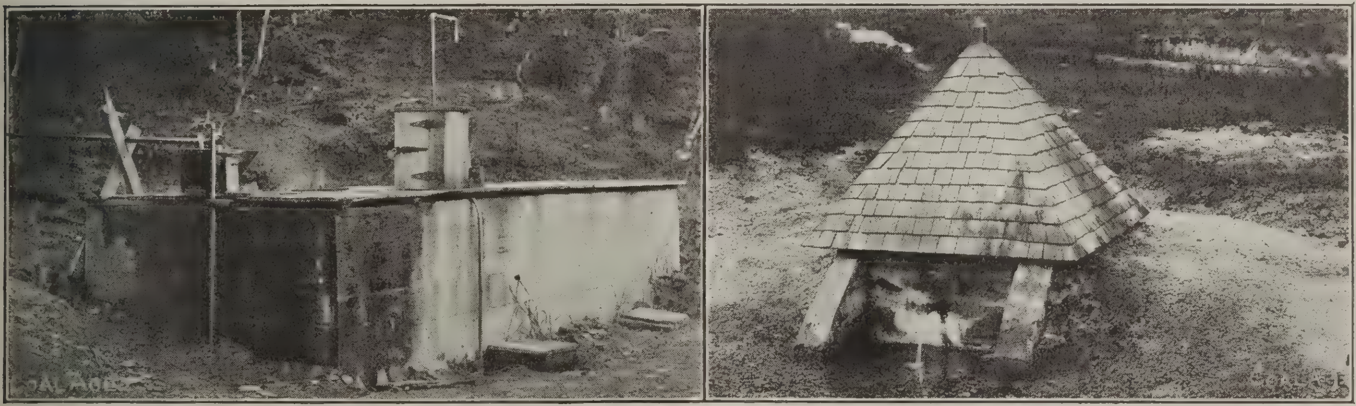
By J. H. White*

SYNOPSIS—Controlled entirely by the operator, with an income absolutely assured, so long as the mines work, the mining town can be made and kept sanitary if the ideal is borne in mind and the necessary expenditures made.

⁂

The U. S. Bureau of Mines has recently incorporated a new section within its organization which is known as the Mine Sanitary Engineering Section, the function of which is to improve sanitary conditions in and about mines.

Perhaps the reason why sanitary improvements are neglected and why people hesitate to spend money on them is because it is difficult to get an accurate measure of the returns on the investment. It is unfortunate that the results are not more tangible. You can install a meter and readily discover the slippage in a pump, or you can put an indicator on the steam chest of the engine and get a graphic presentation of the waste, and the prony brake on the pulleys will measure the loss due to friction, but you cannot calibrate humanity. We do possess an imperfect method, viz., vital statistics, but they are difficult and expensive to obtain, are subject to gross misinterpretation, and even when their story is told in the most graphic way they fail to drive the lesson home. Even epidemics arouse only local interest. The simple practice of learning from the experience of others is theoretical rather than real.



Septic Tank at Edgewater, Ala., Mines — Protected Spring at Ishkooda, Ala.

Tennessee Coal, Iron & Railroad Co.

The Characteristics of the Mining Town

The characteristics of a typical mining town are:

1. Company ownership, the streets, lots, houses, stores, churches, schools, hospitals and the public utilities, such as the water supply and lighting system, are frequently owned and controlled by the operator of the mine. 2. The completion of the town at the time of its inception; it is a "made-to-order" product and is only occasionally the result of growth and development extending over a period of years. 3. The absence of permanency; the life of the average mining town is 20 or 25 years and the idea of abandonment at some time in the future is manifest. Modern mining towns are now being constructed with a longer life in view. 4. The pronounced similarity and sameness of the occupations of all the people residing in the town. 5. The absence of local self-government. 6. The dual capacity of landlord and employer vested in the same party.

These conditions affect the following fundamental sanitary problems, among others:

1. Housing. 2. Water supply and disposal of waste. 3. The establishment and enforcement of sanitary rules and regulations.

As the mining town does not grow but is built at a single stroke, the valuable lessons learned by the "try-out" method and the profit gained by previous mistakes do not exert their powerful influence, so that the errors existing in one house exist in all. If one house is not properly lighted, all will be dark; if a few houses are placed too closely together, all houses will be similarly spaced; if there is congestion in one section, there will be congestion throughout; if one privy is unsanitary, all the privies will be the same. Of course, one could have learned from the experiences of other mining towns already built, but this information was perhaps not readily available and local conditions modify each case.

I believe you can see that the uniformity of occupation of the tenants has its effect upon the housing situation. While no two human beings are the same, none of us can deny that similar means of livelihood have marked effects upon our practices, habits, recreations and dress. This in a way simplifies the housing problem as it eliminates the variety of conditions and conveniences to be provided.

Note—Abstract of address before the senior sanitary engineers, University of Pittsburgh, Pittsburgh, Penn., May 20, 1913. The photographs accompanying this article were kindly furnished by the Tennessee Coal, Iron & R.R. Co. to "Coal Age."

*Sanitary engineer, U. S. Bureau of Mines, Pittsburgh, Penn.

Company Town a Reflection of Operator's Ideals

Company ownership is the most important factor entering into housing conditions. Every house reflects the standard which the operator wishes maintained; comparisons, variations and graduations are absent. It is difficult to stimulate personal pride among the inhabitants and no friendly rivalry exists. However, if improvements are introduced they are far-reaching, and the tone of the entire town is raised, so that one house does not point the finger of scorn at its neighbor. As the employer is also the landlord, the payment of rent is compulsory and the importance of an assured income should be given due weight.

In discussing the water-supply situation it must be kept in mind that the town site is generally determined by the location of the mine shaft which in turn is established by such factors as topographic conditions, formation of coal, economic transportation and similar commercial considerations. The necessity and importance of a satisfactory domestic water supply for the people who were to get out the coal was probably not given much consideration in the past; it is hoped that more thought will be given to this phase of mine development in the future. In some places the men are carried daily to the mine in work trains or by interurban tramroads, and numerous difficulties are thus avoided. In studying conditions with a view of introducing a public water supply into a town the cost of improvements and the age of the town must be carefully balanced. Another factor which may complicate the problem is the relatively large industrial consumption of water compared with the demands for domestic use. This may mean an extra large filter plant to purify all water (both domestic and industrial) or the installation of separate pumping and distribution systems. The possibility of piping water from a neighboring town may furnish a solution at certain places and its feasibility should always be investigated.

Protection of Individual Wells

In many mining towns the domestic water supply is from individual wells, and while this system is far from perfection, it can be brought up to a safe standard. The usual indictment against the system is the susceptibility of the wells to infection, and on account of the inconvenience of drawing water an insufficient amount will be used for household and personal cleanliness. The danger of infection may be minimized by abolishing the unsanitary privies and conditions around a dug well may be improved by lining it with terra-cotta pipe, placing a water-tight covering of concrete over the top and installing a pump.

The nature of the soil plays an important part in the safety of the well, sandy soil furnishing a natural protection. In a limestone region pollution may come from points many miles away, which makes the potential danger of the well in such measures great. In such cases the distribution of drinking water in bottles throughout the town may be necessary, the well water being used for cooking and washing purposes only. The inconveniences due to the difficulty of getting water from the wells may be eliminated by establishing bath houses at the mine shaft so that the men may wash upon coming out of the mine. These bath and change houses are being widely introduced; in a few states they are required by law. A public laundry is a great convenience for the women; lugging in several tubs of water preliminary to doing a week's washing is a severe burden. Bath houses in or near the schools for the women and children are almost necessary accessories to the perfect well system. Wholesome and safe drinking water is essential to existence; its supply is one of the gravest responsibilities accompanying company ownership.

Sanitary Sewerage

There are few mining towns with sanitary sewer systems and some of the statements already made explain their absence. Such a system presupposes a public water supply for flushing purposes, and all that has been said about the difficulties of obtaining water bear indirectly upon the sewerage question. In the second place, the approximate location of the town site is determined by the mine shaft and the topography must be accepted as it is. This is generally rough and hilly and a single gravity system of sewers is almost impossible as the cost of leveling off the hills and grading the streets is prohibitive.

Moore's Spring Pumping Station at the Mines of the T. C., I. & R.R. Co.

Moreover, a suitable stream to take the discharge of the sewers may not be near at hand; and the necessity of installing a sewage-disposal plant looms up. Besides these difficulties the expense of making house connections, installing plumbing fixtures and keeping these in repair means a large expenditure. In the construction of new towns, some of these objections could be avoided by a more careful selection of the town site and arranging streets so that they follow contours. In some cases, also, the experiment has been tried of building the outhouses or privies over the sewers and having a single automatic flush which serves for a number of houses. This obviates expensive plumbing fixtures and cuts down the extravagant use of water.

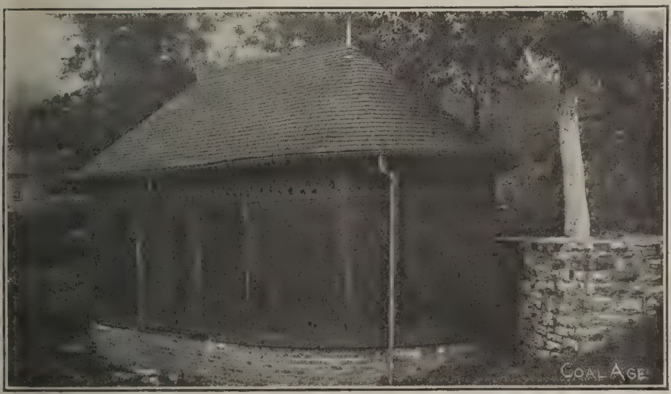
The Dry Closet

At its very best the dry closet is not an institution to be proud of, and one would hesitate to estimate the sickness and loss of life caused by these neglected filth spots that abound in most every mining town.

A privy is sanitary when there are: (1) No nuisances surrounding it. (2) No possibility of ground pollution or infection of water supply. (3) No possibility of the spreading of germs by flies or other insects or animals.

The ground pollution and water infection is eliminated by the water-tight receptacle, but it is difficult to shut out flies. Methods used are darkening the vault, covering each deposit with sand, clay or ashes, placing a strong deodorant in the cans, or possibly partly filling the cans with water so as to cause an immersion of the stools. It is seldom possible to depend on fly-tight construction.

The sanitary collection and disposal of night soil is another important feature and one which has not been satisfactorily solved. It is almost impossible and practically uneconomical to destroy this material by fire. Disinfection by a liquid is not efficient because of the impermeability of the solid matter and the nauseating work of bringing about a thorough mixture by stirring. Burying in the ground is not without its drawbacks because of the pollution of water supplies and because in the development of the fly larvæ, disease germs may be brought up from several feet under the surface. One method which is being tried is placing this material in a septic tank and promoting liquefaction of the solid matters by various agencies in the tank and then applying a liquid disinfectant to the effluent. This method is being tried out by one of the large mining companies of Alabama.



Moore's Spring, Concreted, Bricked and Housed, T. C., I. & R.R. Co.

The collection of garbage, trash and waste of all kinds offers no special difficulties. There is a surprisingly small amount of this and the hens, hogs and dogs usually consume it.

The establishment and enforcement of health laws and regulations in mining towns vary markedly from those in other places. Company ownership expedites the legislation and simplifies the enforcement. The official sanitary inspector is in absolute control and he need be retained, however, only as long as he does his work satisfactorily. It is not necessary for him to cater to any particular parties or show any favoritism or partisanship, as his job does not depend upon his popularity. The dual capacity of landlord and employer commands obedience to the laws as their violation may be punished by discharge and eviction from the town. On account of similarity of occupations the regulations will affect all the inhabitants with the same severity and one class is not discommoded for the benefit of another—as, for instance, in a city where stable regulations and permits bring neighbors into conflicts.

On the Operator Depends the Condition of the Mining Town

These are the advantages that mining towns possess, but the drawback lies in the fact that the initiative in maintaining sanitary and clean conditions throughout the mining town rests entirely with the operator. Indifference on his part may give rise to deplorable sanitary conditions. The residents have no official voice in the government of the town and unofficial aggressiveness is seldom exerted because the total absence of property rights breeds irresponsibility and carelessness. Most of them are blissfully ignorant of the dangers of unsanitary surroundings, and when they protest it is the inconvenience rather than the dangers that bestir them.

Pump at Bayview, a Mining Camp of T. C., I. & R.R. Co., Now under Construction

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Company Schools at Gary, W. Va.

J. F. Drummond, of Huntington, W. Va., has been engaged in starting schools for workingmen at Gary, W. Va. There are night schools at all the mines of the United States Coal and Coke Co., and these schools educated on an average 25 men each. The education is not occupational, but is designed to teach the men to speak, read and write the English language. Text books are lent by the company to the pupils. They can buy them, if they so desire, but unless they spend money in this way, attendance at school is absolutely without expense to those availing themselves of the instruction.

INQUIRIES OF GENERAL INTEREST

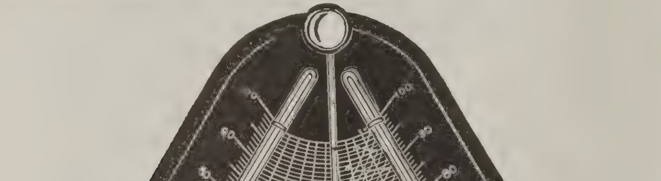
A Humidity Chart

Will you kindly state if there is a chart for determining the percentage of humidity in the air directly, without calculation; and also explain the method of calculating the percentage of humidity from the readings of the dry- and wet-bulb thermometers?

J. S. Watson.

Baxter, W. Va.

In reply to this inquiry, we would say that the only chart of which we have any knowledge is that known as the "hygrodeik chart," prepared some years ago from corrected tables of the U. S. Weather Bureau. The chart has since been used in connection with the hygrodeik instrument shown in the accompanying figure, and designed by the Taylor Instrument Co., Rochester, N. Y.



The Hygrodeik

The operation of the instrument is exceedingly simple. A pointer, or index finger, is arranged to slide up and down on a movable arm. First, the arm is swung to the left and the pointer moved to correspond to the temperature of the wet-bulb thermometer, which, in this case, is 60 deg. F. The arm is then swung to the right until the pointer intersects the curved line terminating in the reading of the dry-bulb thermometer, which, in this case, is 70 deg. F. The lower extremity of the swinging arm then points to the relative humidity of the air, which is read, in percentage, from the lower scale of the chart and is, in this case, 55 per cent.

The lines that curve downward to the right show both the weight of moisture in the air and the dew point or temperature at which that moisture would fully saturate the air. In the present case (wet bulb, 60°; dry bulb, 70° F.) the dew point is 52 deg. F., and the amount of moisture present in the air 4.4 grains per cubic foot. This amount of moisture would fully saturate the air at 52 deg., but gives only 55 per cent., humidity at 70 deg. F.

The principle of the hygrometer is generally well understood. The two thermometers are identical, with the exception that the wet-bulb thermometer, shown on the left, is covered with a fine silk or cotton sack, terminating in a wick, which dips into the small water vessel shown below. The water is drawn up through the wick by capillary attraction and keeps the sack moist. The evaporation of the water from the sack increases with the dryness of the atmosphere. The evaporation is most rapid in a perfectly dry atmosphere and ceases altogether when the air is fully saturated with moisture.

The principle involved is that the evaporation of the water causes an absorption of heat, which cools the wet bulb and reduces the reading of this thermometer. The reading of the dry-bulb thermometer indicates the actual temperature of the air.

The Calculation of Relative Humidity

In order to calculate the relative humidity of the atmosphere from the readings of the dry- and wet-bulb thermometers, it is necessary, first, to obtain from a table, the tension of aqueous vapor, expressed in inches of mercury, for each of the temperatures indicated. Then, divide the difference of the readings of the dry- and wet-bulb thermometers by 88, for all temperatures of the air above 32 deg. F. (For temperatures below 32 deg. F., divide the difference of the readings by 96.) Multiply the result by the observed barometric pressure divided by 30. Subtract this last result from the tension of the aqueous vapor at the lower temperature (wet bulb), and divide the remainder by the tension of the aqueous vapor at the higher temperature (dry bulb). The quotient thus obtained will be the relative humidity of the air expressed as a decimal.

Calling the dry- and wet-bulb readings (Fahr.) t_d and t_w, respectively, the corresponding tensions of the aqueous vapor expressed in inches of mercury P_d and P_w, and the barometric pressure B, the relative humidity of the atmosphere (H) is expressed by the formula:

$$H = \frac{P_w - \frac{B}{30}\left(\frac{t_d - t_w}{88}\right)}{P_d}$$

Making the calculation for the above readings, since $P_d = 0.7335$; and $P_w = 0.5183$, assuming a barometric pressure $B = 30$ in., the humidity of the air is

$$H = \frac{0.5183 - \frac{30}{30}\left(\frac{70 - 60}{88}\right)}{0.7335} = 0.55, \textit{ or } 55 \textit{ per cent.}$$

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 4—That the discussion of the question of the use of mixed lights in coal mining is one of great interest to both miners and officials alike, cannot be doubted. The question, however, will appeal differently to men working under different conditions, as they will view it, each, from a different standpoint. A discussion of the question, nevertheless, will develop many practical points that will be of benefit to all classes and help to safeguard human life and property in and about the mines.

In deep coal mines, where the coal is giving off large quantities of gas, there is no question but that safety lamps should be used exclusively, for the reason that a slight accident or derangement of the ventilating system would soon reduce the mine air to a point where it would be highly explosive; and such an occurrence would not be anticipated in time to avert an accident. In working mines of less depth, or generating less gas, however, it is not generally considered necessary to use safety lamps, especially if the ventilation in the mine is good and there is but a small percentage of gas in the return current.

In the class of mines last mentioned, it frequently occurs that a single heading or an isolated working place that has been driven up a considerable distance, becomes difficult to ventilate; and the lamp may show a slight cap in a cavity of the roof or close to the face of the coal. In working such a place, it would be agreed quite generally that safety lamps should be used. It does not seem necessary, however, that a whole section of the mine should be put on safety lamps, because one or two working places in it require their use. In my opinion, it s out of all reason to demand that such a section shall be worked exclusively on safety lamps. It must be remembered that both miners and mine laborers are more liable o injury where safety lamps are used than where they re allowed to use open lights; provided, of course, that he conditions are such as to make open lights safe.

In closing, permit me to say that I believe it is a detriment to all concerned to oblige the use of safety lamps hroughout a section where the conditions requiring their se are not general; or, in any case where their use can e avoided with reasonable safety.

W. J.

Ladysmith, B. C., Canada.

Letter No. 5—I do not consider it good practice to use mixed lights in a mine that is making gas in sufficient uantity to render an explosion possible. This conclu- on, I believe, is justified from the fact that all persons, oremen, company hands and miners alike are careless nd forgetful, or absent-minded, as the case may be. Many instances can be given that demonstrate the truth of this fact.

Suppose, for example, that gas is reported in one or ore chambers on a gangway, in a certain mine, and a bratticeman is sent in to remove the danger. He will generally take a safety lamp and a naked light with him; and, setting his naked light down on the bottom rock in the intake, he proceeds to erect a brattice for the purpose of driving the gas from the face of the pitch. Everything goes well until some unforeseen occurrence drives the gas down on the open light, and there is an explosion in which the bratticeman is badly burned and sometimes others suffer with him.

I recall several small explosions that occurred in about this way. In one case, I was driving a mule and running cars to make up the trip. It was our custom to use naked lights to a certain point; but it was necessary to use safety lamps when gathering the cars for the trip. When the trip was made up ready to run to the foot of the shaft, we would put our naked lights on our heads, so as to be ready to sprag the trip. It frequently happened that we would forget we had a light on our head and step back past the danger point. In this manner, I had two mules burned and was myself nearly suffocated with the afterdamp. The night driver and several others were badly burned, in this way, at the same place.

In another instance, I recall, the mine officials were watching the removal of a body of gas. About an hour later, when it was supposed that all the gas had been driven out and the place was safe, a man was badly burned. In this case, also, mixed lights were used.

When we consider that these and similar accidents are happening frequently, we are forced to conclude that, although it is more convenient to work with an open light than with a safety lamp, yet for the good of all concerned, the use of open lights should be prohibited in a mine generating gas in sufficient quantity to cause an explosion.

A mine laid out and equipped in the best manner possible and having an efficient system of ventilation is not exempt from danger, even when safety lamps are used, if a few men are allowed to carry open lights. A moment's absent-mindedness or the carelessness of a single man with an open light may be the innocent cause of untold suffering; and to avoid this, no mixed lights should be used in any mine generating gas in dangerous quantity.

A Miner.

Scranton, Penn.

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Safety Lamp and the Eyesight

I do not think it wise to allow Mr. Sutton's letter on the effect of safety lamps on the eyesight, Coal Age, June 28, p. 1008, to pass without comment. The letter as it stands is liable to mislead many persons who are not better informed. I may say, at the outset, that I have known miners who have had over 30 years' experience with safety lamps and whose eyesight was not apparently affected in the least degree. This, however, does not warrant the conclusion that the continued use of such lamps **does not affect** the eyesight of others.

Anyone who doubts the harmful effect of safety lamps on some eyes should visit a mining locality where safety lamps have been used almost exclusively for a number of years. In such a locality, it will soon appear to an unprejudiced mind that the disease known as "nystagmus" is uncommonly prevalent. That its cause is directly traceable to the continuous use of the safety lamp has been claimed by eminent oculists (COAL AGE, Vol. 1, p. 1215). The observant visitor, in such localities, will notice that many whom they meet, habitually tilt their heads backward in order to obtain a better vision of objects or to enable them to recognize persons better. The reason for this is that the disease produces a rapid oscillation in the eyeball that blurs the sight. The effect is more noticeable at twilight when a person so affected has greater difficulty to recognize objects clearly, than at midday.

As showing the generally defective eyesight of firebosses I may quote an item from COAL AGE, Vol. 1, p. 352, which reads as follows:

> The necessity of periodical medical examination of the eyes of firebosses is shown by the results of such examinations conducted at the Globe colliery, Wales, England. After a disastrous explosion caused by shortfiring in a gassy chamber, it was found there was 3 to 3½ per cent. of firedamp present, which was not detected by the fireboss because of his defective eyesight: the examinations clearly showed that out of 41 firebosses inspected by a government inspector, 31 were found to have defective eyesight.

This is truly a large percentage of defective eyes, among men who were charged with the duty of examining the safety lamps of miners and detecting gas by observing the scarcely visible flame cap in a lamp. The peculiar conditions to which the eyes of all firebosses are exposed have convinced me that the continued use of the safety lamp is not without injury to the eyes of a large class of miners.

I am not writing this for the purpose of condemning the use of safety lamps. In many mines, the use of safeties is a necessary evil and will continue as such until something is found to take its place. Even where electric lamps are used a safety lamp must be employed to test the air. I think that everyone using safety lamps should know that the use of the lamp is liable to affect his eyesight, in time, so that he can use every precaution to avoid this danger. Having this knowledge, the careful miner will hang his lamp where its light will not fall directly on his eyes. He will also avoid the bad practice of holding the lamp in his teeth while driving a wedge or doing similar work. Not only are the eyes exposed to the fumes of the lamp when so held, but its position causes a squint.

W. L. MORGAN,
Mine Inspector, 8th District.

East St. Louis, Ill.

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Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

ESTIMATION OF COAL LANDS

It is common to estimate the value of coal land on a basis of the weight of coal underlying an acre. To determine this with any degree of accuracy, the land must first be thoroughly prospected with a diamond core drill to determine the average thickness of the seam.

The burning or coking quality of the coal can only be determined by actual practical test when the coal is mined, although the core samples taken from the drill holes enable a fair judgment to be formed in respect to the probable value of the underlying coal.

The records of the prospect holes must also show the condition and character of the various strata overlying and underlying the coal, the thickness and inclination of the seams, the amount of water that may be expected when sinking shaft or slope, the position and general direction of any fault lines that may be present and other data of interest in mining.

A common rule for estimating the ton-acre value of a level seam of coal, allowing about one-third for screenings and waste was formerly,

Anthracite, 100 tons per inch-acre;
Bituminous, 1000 tons per foot-acre.

Owing, however, to improved methods of mining, and to changes in the relative amount and value of the screenings, these rules are practically obsolete. The present custom is to calculate the cubic contents of the seam, and the corresponding weight of coal, knowing its specific gravity. The following table has been computed for anthracite coal of 1.5 specific gravity.

TABLE I - TONS OF COAL UNDER ONE ACRE OF SURFACE
Calculated for a Specific Gravity of 1.50 or 93.7 lb. per cubic foot

INCHES	LONG TONS	ONE FT.	TWO FT.	THREE FT.	FOUR FT.	FIVE FT.	SIX FT.	SEVEN FT.	EIGHT FT.	NINE FT.	TEN FT.
		1823.00	3646.00	5469.00	7292.00	9115.00	10938.00	12761.00	14584.00	16407.00	18230.00
1.0	151.91	1974.91	3797.91	5620.91	7443.91	9266.91	11089.91	12912.91	14735.91	16558.91	18381.91
2.0	303.82	2126.82	3949.82	5772.82	7595.82	9418.82	11241.82	13064.82	14887.91	16710.82	18533.82
3.0	455.73	2278.73	4101.73	5924.73	7747.73	9570.73	11393.73	13216.73	15039.73	16862.73	18685.73
4.0	607.64	2430.64	4253.64	6076.64	7899.64	9722.64	11545.64	13368.64	15191.64	17014.64	18837.64
5.0	759.55	2582.55	4405.55	6228.55	8051.55	9874.55	11697.55	13520.55	15343.55	17166.55	18989.55
6.0	911.46	2734.46	4557.46	6380.46	8203.46	10026.46	11849.46	13672.46	15495.46	17318.46	19141.46
7.0	1063.37	2886.37	4709.37	6532.37	8355.37	10178.37	12001.37	13824.37	15647.37	17470.37	19293.37
8.0	1215.28	3038.28	4861.28	6684.28	8507.28	10330.28	12153.28	13976.28	15799.28	17622.28	19445.28
9.0	1367.19	3190.19	5013.19	6836.19	8659.19	10482.19	12305.19	14128.19	15951.19	17774.19	19597.19
10.0	1519.10	3342.10	5165.10	6988.10	8811.10	10634.10	12457.10	14280.10	16103.10	17926.10	19749.10
11.0	1671.01	3494.01	5317.01	7140.01	8963.01	10786.01	12609.01	14432.01	16255.01	18078.01	19901.01

The top horizontal column of TABLE I, gives the thickness of coal seam up to ten feet. The extreme left-hand column shows inches. For example: to find the number of tons of coal in a 10-acre tract, where the seam has a thickness of 2 ft. 6 in. run down the 2 ft. column until opposite 6 in. and you will find 4557.46 Multiply by 10 and the result is 45,574.60 long tons

To find the weight in long tons for a coal of any specific gravity other than 1.5 it is only necessary to multiply the figures shown in these tables by the ratio of the given specific gravity to 1.50

For Example: The weight of coal underlying a 10-acre tract, when the seam is flat, 2 ft. 6 in. thick, and the specific gravity of the coal 1.30 (Bituminous) is $\frac{1.30}{1.50} \times 45{,}574.6 = 39{,}498$ *lg. tons*

On a pitch of 60 deg. this seam would contain double this amount or practically 79,000 long tons

Expressed in short tons, these amounts should be $\frac{2240}{2000} = 1.12$, *or say* $\frac{1}{8}$ *greater.*

COAL AGE

For inclined seams, it is necessary to divide the values in this table by the cosine of the angle of inclination of the seam.

The Coal Age Pocket Book

To Calculate the Lower Inflammable Limit—In order to calculate the proportion of gas (methane) and air when the firedamp mixture first becomes inflammable, it must be assumed that all the heat generated by the combustion of the gas is absorbed by the products of the combustion and the remaining unburned air. Owing, however, to there being a certain amount of heat lost by radiation or otherwise that cannot be estimated or accounted for, the calculated inflammable limit will only approach the actual, to the extent that the conditions are fully realized in the calculation. The process is as follows:

The weight of oxygen necessary to burn 1 lb. CH_4 is shown by the relative weights of these gases in the reaction:

$$CH_4 + 2\,O_2 = CO_2 + 2\,H_2O$$

	CH_4	$2\,O_2$	CO_2	$2\,H_2O$
Molecular weights,	16	64	44	36
Relative weights,	1	4	2¾	2¼

But oxygen forms 23 per cent., by weight, of the air, the remaining 77 per cent. being practically all nitrogen. The weight of nitrogen concerned in burning 1 lb. CH_4 in air is then calculated as follows:

$$23 : 77 :: 4 : N$$

and

$$N = \frac{77 \times 4}{23} = 13.39 \text{ lb.}$$

From a table giving the heat of combustion of differen substances, it is found that 1 lb. CH_4, burned in air or oxygen gives out 23,513 heat units (B.t.u.). The temperature of ignition of this gas (CH_4) is 1200° F.

Now, since the specific heat of a substance is the hea (B.t.u.) absorbed by 1 lb. of that substance, during a rise o 1 deg. F. in its temperature, the heat absorbed by the products of combustion of 1 lb. CH_4, for each degree rise in temperature, is found by multiplying the specific heat of each of the products, including the nitrogen of the air, by the relative weight of each product, respectively. The total heat i then found by multiplying that result by the number of degrees rise in temperature; and adding the latent heat in th steam or water vapor, as follows:

The specific heats of the several products of combustion referred to water as unity (1), are carbon dioxide, 0.2163 nitrogen, 0.2438; water vapor, 0.4805; and air, 0.2374. Th latent heat of the water vapor (steam) or the heat absorbe when 1 lb. H_2O becomes steam at 212° F. is 966 B.t.u. Th heat absorbed by the products of combustion, for a rise o 1200 — 32 = 1168° F., is therefore

Carbon dioxide,	0.2163 × 2.75 × 1168 =	694.7264	
Nitrogen,	0.2438 × 13.39 × 1168 =	3812.9360	4507.6624 B.t.u.
Water,	1.0000 × 2.25 × 180 =	405.0000	
Latent heat,	966.0000 × 2.25 =	2173.5000	
Water vapor,	0.4805 × 2.25 × 988 =	1068.1515	3646.6515 B.t.u.
Total heat absorbed by products	....		8154.3139 B.t.u.

EXAMINATION QUESTIONS

British Columbia, First-Class Candidates, May 27, 1913

(*Selected Questions*)

Ques.—(a) State the conditions under which mine explosions are most frequently produced. (b) In what way do various kinds of coal dust influence the character of an explosion?

Ans.—(a) Mine explosions most frequently occur in a dry and dusty mine generating gas in small quantities, so that it is not considered necessary to use safety lamps except in a few places in the mine where the gas is more troublesome than elsewhere. Under these circumstances, a good ventilating current is commonly maintained in quantities that is deemed sufficient to make the working places safe.

Too much reliance is often placed on the proper arrangement of brattices and the enforcement of mine regulations with respect to gas, dust and lamps. A brief derangement of the ventilating current from any cause, or an unexpected fall of roof in an unused chamber where gas has accumulated, or the failure on the part of any workman to comply with the regulations, or the carelessness or absent-mindedness of an employee may cause the ignition of gas and produce disaster.

(b) The degree of inflammability of coal dust and its fineness increases both the liability to explosion and the energy developed when the dust is ignited by a flame of sufficient volume and intensity. The suspension of the fine dust in the air current or in the atmosphere of the mine workings renders it more susceptible to ignition. The dust of soft coal, bituminous or semibituminous, is generally more inflammable than that of harder coal. The dust of anthracite coal is not inflammable under ordinary conditions, but may add to and intensify what would otherwise be only a gas explosion.

Ques.—If the specific gravity of marsh gas is 0.559, what will 100 cu.ft. of this gas weigh, at a temperature of 60 deg. F., barometer 30 in.?

Ans.—The weight of this gas is calculated thus:

$$W = 100 \times 0.559 \frac{1.3273 \times 30}{460 + 60} = 4.28 \ lb.$$

Ques.—Explain the law of diffusion of gases and its effect on their behavior in mines. Give rule and example, showing how to find the comparative velocity of the diffusion of the different gases.

Ans.—The molecules of all gases and air are in a state of constant vibration. The amplitude of the vibration or the distance through which the molecules vibrate depends largely on the density of the gas. When two gases, or a gas and air of different densities are in contact, the vibratory motion of the molecules at the plane of contact is not equal for the two mediums; and, as a result, there is a constant progression of the molecules of one of the gases into those of the other, causing them to mix or intermingle. The action is called "diffusion" and is very rapid. The effect of the diffusion of gases, in mines, is to cause them to mix with the air and with each other, in varying proportions.

The velocity, or rate of diffusion, of air and gases into each other varies inversely as the square root of their densities. For example, calling the density or specific gravity of air 1 and that of methane or marsh gas (CH_4) 0.559, the ratio of their velocities of diffusion is

$$\frac{V_{air}}{V_{gas}} = \sqrt{\frac{0.559}{1}} = \frac{0.7476}{1}; \ or, \ say \ \tfrac{3}{4}$$

This shows that in the diffusion of marsh gas into air, the relative velocities of the air and the gas are as 3:4. That is to say, for every three volumes of air passing into the gas, there are four volumes of gas passing into the air.

Ques.—(a) How many cubic feet of air should be mixed with 1 cu.ft. of firedamp to render it harmless? (b) What percentage of firedamp is the most dangerous?

Ans.—(a) The proportion of gas and air that may be considered as the safe limit will depend primarily on the nature of the gas or gases present, the quantity, fineness, and inflammability of the dust suspended in the air; and the character of the coal, size of openings and method of working. In the working of bituminous coal, under ordinary mining conditions, there should be from 100 to 150 cu.ft. of air for every cubic foot of explosive gas. In the working of anthracite coal, under ordinary mining conditions, from 40 to 65 cu.ft. of air for every cubic foot of explosive gas is sufficient to render the mine air safe for working.

(b) When marsh gas (CH_4) is present in any proportion in excess of the upper or higher explosive or inflammable limit, the mixture may be considered as more dangerous than where the proportion of gas to air is less. The reason for this is that any addition of air, which is liable to occur at any time or place in the operation of the mine, may render the mixture highly explosive. The less dangerous mixtures are those in which the proportion of gas to air is less than that required for the maximum explosive force, or one volume of gas to 9.57 volumes of air. In this case, any addition of air renders the mixture less explosive.

Ques.—In a mine giving off 2500 cu.ft. of marsh gas per minute, the volume of air entering the intake opening is 4,500,000 cu.ft. per hr.; what is the percentage of gas in the return current? Would you consider this percentage of gas dangerous?

Ans.—In this case, the volume of air passing is 4,500,000 ÷ 60 = 75,000 cu.ft. per min. Assuming there is no increase of the volume of air on the return, due to a rise of temperature or a fall of ventilating pressure, the volume of the return current is 75,000 + 2500 = 77,500 cu.ft. per min. The percentage of gas in the return current, under many conditions, would be dangerous; it is

$$\frac{2500 \times 100}{77,500} = 2.3 \ per \ cent.$$

COAL AND COKE NEWS

Harrisburg, Penn.

The Kline bill which provides for the coöperation of the state of Pennsylvania in the establishment of a Mining Experiment Station for investigations with a view of better safeguarding the lives of miners and greater efficiency in the mining and mineral industries and making an appropriation for the same has passed both houses of the legislature and is now in the hands of the governor for his signature.

The bill gives the governor the authority to appoint a commission of three, one of whom shall be the dean of the school of mines of the Pennsylvania State College, one the chief of the Department of Mines of Pennsylvania and one a practical miner. It shall be the duty of the Commission to coöperate with the director or other representative of the U. S. Bureau of Mines in the establishment in the state of Pennsylvania of a mining experiment station for the purpose of conducting investigations and making tests to better safeguard the lives of miners and to bring about greater efficiency in the mining and mineral industries. The members of the commission are to serve without compensation, but their actual expenses are to be paid.

For the prosecution of this work the sum of $50,000 or as much thereof as may be necessary is appropriated.

The Commission is to submit to the governor as he may require reports giving the results of its work and shall arrange for the prompt transmission to the Department of Mines and to the Topographic and Geological Survey of the state copies of all reports, circulars, bulletins and other publications issued from time to time embodying the results of the tests and investigations conducted.

PENNSYLVANIA

Anthracite

Lykens—A. F. Hanna announces that he has discovered a new vein of coal in Broad Mountain after drilling 60 ft.

Hazleton—The abandoned workings on the outskirts of West Hazleton, which were formerly owned by James G. Harvey, are to be reopened. The projectors are the Nazareth Coal Co., a subsidiary of a cement company of the same name. Arrangements are now being made to sink a shaft.

Pottsville—Concerted antagonism of the legal advisers of the big coal companies to the enforcement of the bill placing a tax on anthracite is expected in the near future. The coal company officials claim that this measure is special legislation and has other unconstitutional features which will cause the higher courts to nullify the statute.

Lansford—The Lehigh Coal & Navigation Co. has offered to continue the wages of any of its employees who may enlist in the National Guard during such time as they are absent on duty and has also set aside a fund to encourage enlistments.

Wilkes-Barre—Eighteen hundred men went on strike July 1 at the Stanton colliery of the Lehigh & Wilkes-Barre Coal Co., when a number of employees reported without their Union buttons and failed to bring their dues to the locals of the miners' organization.

Brockton—On July 15, at 1:30 p.m., William S. Leib will sell at public auction in Brockton, Schuylkill County, Penn., the lease given and executed by Benjamin Smith Lyman and Frank Lyman to the Schuylkill-Lehigh Coal Co., dated Apr. 18, 1911; also the lease given and executed by the Philadelphia & Reading Coal & Iron Co., to the Schuylkill-Lehigh Coal Co., dated Apr. 18, 1911, together with the locomotives, steel and wood cars, hoisting engines, boilers, mine fans, jigs, coal breaker, machinery, tools, and all other personal property of the said Schuylkill-Lehigh Coal Co. now in the possession of the said receiver. This sale will be made subject to the mortgage given and executed by the Schuylkill-Lehigh Coal Co. to the Newark Trust Co. dated Oct. 17, 1911.

Bituminous

Clearfield—The Pennsylvania Supreme Court has sustained the Clearfield County Court in what are known as the discrimination cases brought by coal operators to recover damages from the Pennsylvania R.R. Co., on account of illegal favoritism shown to competitors of the complaining operators in matters of coal car distribution. Verdicts against the railroad company were recorded in large aggregate amounts.

Kaylor—With new officers in charge, financial assistance assured and no debts, the property of the Great Lakes Coal Co. will hereafter be known as the North Penn Coal Co. The Great Lakes Coal Co. was bought at foreclosure sale last month by a committee representing the bond holders, practically all of whom have deposited their certificates. The property owned includes 20,000 acres of coal land in Butler and Armstrong counties, on which there are four mines one of which is being operated on a six months' lease.

New Bethlehem—A deal whereby the Pine Run Coal Co., of New Bethlehem, takes over the Cobaugh collieries property has been consummated, and the Pine Run Co. will begin at once to rebuild the railroad from Hawthorne and develop three mines on their property. The new territory has several cannel coal seams and three beds of soft coal already opened, all of which are on the Armstrong county side of Red Bank.

Cookport—Property owners in and about Cookport have, within the past few days, received notices of the acceptance of options taken some time ago. With these notices it is known for the first time definitely who the real purchaser is. The money is being paid out by the Manor Real Estate & Trust Co., which has opened offices in Indiana.

Connellsville—A mine fall, which caused the surface to drop nearly 4 ft., not only cut off the gas supply of Connellsville for more than an hour on July 1, but temporarily crippled the Possum Run branch of the Pennsylvania R.R. The fall occurred in the Limestone Hill neighborhood at about 4 o'clock in the afternoon. Both the Davidson and Trotter workings are in this vicinity, and the main pipe line of the Fayette County Gas Co. from the West Virginia field was broken, cutting off the town's supply.

Indiana—While celebrating the nation's birthday by exploding dynamite caps in a shanty in which was stored 175 sticks of dynamite, two miners, both of whom recently became naturalized, were instantly killed at McIntyre when the dynamite exploded. Both men were Austrians employed by the Coal Run Mine Co., and were celebrating their naturalization and the Fourth of July at the expense of the company.

WEST VIRGINIA

Beckley—B. T. Phillips and L. C. Lilly have leased the Worley mine from the Raleigh Coal Co., and will shortly be ready for the operation of the same. This mine was formerly operated by M. G. Quesenberry, but has for some time been idle.

Parkersburg—After ten years' contest in various tribunals, the Supreme Court has awarded Edward Grinnell, a mining engineer, between $100,000 and $200,000 as his net share of the proceeds of a sale of 60,000 acres of coal land in West Virginia.

Fayetteville—Following the purchase of the Manufacturers and Consumers Coal Co. lease at Fayette, by his agent, D. A. Thomas, the Welsh coal magnate, has been in Fayette county and gone over many of the properties on which these agents hold option. It is understood that several of these options may be closed within the next few days or weeks. It is also stated that additional options have been taken and cash forfeits put up to some of the Fayette operators.

Charleston—Civil actions which total $40,000 will be claimed from the Paint Creek Collieries Co. by miners who were evicted from their homes on that company's property, under the term of what the miners call "the yellow dog contract." It is alleged that the evictions were made without due process of law and that the household effects of the miners were damaged when they were "dumped" on the ground.

An agreement has been reached between the New River miners and operators, and a strike thus avoided. By the terms of this contract, the miners are to have the privilege of organization, to receive semi-monthly pay, have a check weighman, have the privilege of dealing at independent stores, and work a nine-hour day. A conciliation board composed of two miners and two operators who choose a fifth party to act as umpire, has been agreed upon and no Baldwin-Feltz guards are to be employed but such employees are to be replaced by a limited number of mine watchmen. Furthermore, all miners discharged for union activities may return to work and shall not be discriminated against.

KENTUCKY

Pineville—W. T. Caton, Edward Dunkin and Lester Lock, members of a first aid team of the Continental Coal Corporation, have each received from Major Chas. Lynch, U. S. A., a letter and check for heroic work in saving the life of Thaddeus Idol, a fellow workman in the mine. These prizes were the award of the American Red Cross Society and came from a donation made by former President Taft for the benefit of coal miners showing the greatest proficiency in first aid work. The men named are the first to receive a prize for actual first aid, in a mine in Kentucky. Teams from this company have won prizes in contests at Lexington and Pineville, and it would seem that they are equally efficient when the real emergency for which they are trained comes in the course of their everyday work.

The Elk Coal Co., operating on Greasy Creek, near Pineville, has leased its properties to the Corum-Parker Coal Co., of Pineville, which was recently organized for the purpose of taking over and operating the mines.

OHIO

Columbus—The first meeting of the Ohio Mining Commission appointed by Governor Cox to investigate the conditions surrounding the payment for coal mined in Ohio will be held in the State Chamber soon. An effort will be made to have the operators and miners state their side of the case and it will then be determined what trips will be necessary to gather information by the commission. It is expected that every mining district in the state will be visited.

Martinsburg—The Fairpoint Coal & Coke Co. owned by Wheeling parties, has leased its mine at Fairpoint to the Forest City Coal Co., which is operating a mine at Barnesville. F. L. Head, general manager of the Forest City Co., is now in charge of the Fairpoint property and is said to be planning improvements that will result in an increased production which means an increase in the number of employees.

Lancaster—Four Pittsburgh capitalists have secured a lease from the Zanesville Coal Co. on a 22-acre tract near the No. 3 mine in Perry County.

INDIANA

Petersburg—It is announced that Rootzell & Mackey, of Evansville, will reopen the Hartwell coal mines in the vicinity of Petersburg. For many years these mines were the largest in the vicinity, employing 300 to 400 men, and the new owners hope to bring them to their former productiveness.

Representatives of the Vandalia Coal Co. have been taking leases on hundreds of acres of coal land southwest of this city on a line with the projected route from Bicknell to Evansville. Five thousand acres near Wheatland has been leased to the American Coal Co. said to be closely affiliated with the former firm.

Jasonville—A sample of coal from the farm of Julius Marvel has been tested by Edward Barrett, state geologist and pronounced a good grade of cannel coal. A survey will be made of the deposits.

Linton—A new shaft will be sunk at once one mile north of this city by a mining company headed by John Tempelton, of Terre Haute.

ILLINOIS

Duquoin—On July 1 a fire originating the coal chutes of the Paradise Coal Co., spanning the Illinois Central tracks, completely destroyed the company's buildings in the vicinity of the shaft mouth. An alarm was immediately sounded to the 300 or 400 miners below ground and the hoisting engineer, Charles Mathias, stood by his engine in spite of the intense heat until he had hoisted every man out of the mine. By this time his hands were blistered and his hair and eyebrows singed. At last accounts, although still alive, he was in a critical condition. Five other employees were seriously injured, but it is believed that they will recover. The estimated damages were $50,000. The upper works will be rebuilt at once, the entire loss being covered by insurance.

Marion—The Illinois Hocking Washed Coal Co. took the bankruptcy act on account of the fire which is still burning in the mine it had leased from the Carterville District Coal Co. J. C. Mitchell, cashier at the First National Bank of Marion, was appointed receiver. It is understood that some of the former officers and stockholders have organized another company known as the General Fuel and Power Co. to take over and handle the business formerly conducted by the Illinois Hocking Co.

Zeigler—The Interstate Commerce Commission has ruled that the allowance or division of rates which the Chicago, Zeigler & Gulf has been receiving from the Iron Mountain, Burlington and Illinois Central roads is unjust, discriminatory and unduly prejudiced against other coal mines served by the respondent. This is a case where the mining company owns about a mile of switching tracks connecting its mines with the three above mentioned railroads. These switching tracks are incorporated as Chicago, Zeigler & Gulf, and the mining company, since its incorporation, has been receiving a switching charge and other privileges which other mining companies have not been able to secure.

Hallidayboro—The Hallidayboro mine, which shut down May 1, will resume operations before the 15th of July. The mine is to be repaired and as soon as the repairs are complete, operation will begin. Nearly 300 men will be employed.

IOWA

Des Moines—Johnson Bros. mines near Clayworks will soon be running on electricity furnished by the Central Electrical Co. The Norwood White Coal Co., of Des Moines, have also let a contract to the same electrical company for the partial electrification of mines Nos. 4 and 9 near Yadres.

Prescott—Work at the prospect pit near here was stopped recently when a depth of 140 ft. was reached without finding coal. People who have examined the rocks in and near this pit have the opinion that a fault has been struck. Some are in favor of raising more money and drifting a few feet upon either side of the hole in the hope of reaching the coal.

ARKANSAS

Clarksville—All the mines in the Spadra anthracite coalfield were supposed to be in operation July 1. During the last season this field mined 90 per cent. more coal than the season preceding, and all indications point to a big run this year.

OKLAHOMA

Adamson—The Union Coal Co. has commenced opening mine No. 6 located one mile east of here, which, when completed, will be the largest in the Adamson territory. This company is building a large water reservoir, and a hundred houses to be occupied by the miners will be constructed in a few months.

WASHINGTON

Seattle—A struggle of almost a year to obtain from the Denny-Renton Co., better wages and conditions, as well as recognition of the union has recently resulted in a victory for the United Mine Workers. The above named company has leased its mine to the Pacific Coast Coal Co., which has been operating under a contract with the miners' organization in its several mines in this state. This lease is understood to be a withdrawal of opposition to the miners' organization on the part of the Denny-Renton Co.

FOREIGN NEWS

Brussels, Belgium—It has been announced by the Belgian Coke Syndicate that a reduction of 2 francs (39c.) per ton to all consumers who purchase during the rest of the current year will be made on coke July 1. This decision, upon the part of the manufacturers, is probably due to the comparatively poor condition of the iron market and to the stronger competition of German independent coke makers.

Vancouver, B. C.—Declaring that they have been induced under false pretensions to leave their native land, about 50 English coal miners have taken their case before Sir Wilfred Laurier, of Ottawa, asking that he request the Canadian Parliament to make an investigation. The men left England with the promise of better wages and also the assurance that there was no labor trouble ahead. Upon their arrival in Canada, they learned that the men in these collieries were on a strike, and many of them are absolutely destitute. The coal operators have evidently been put to a large expense with no apparent reward for their efforts.

Lima, Peru—Pressure is being brought to bear upon the Government in the hope of securing a subvention sufficiently large to make possible the extension of the railroad from Sayan to the Oyon coalfield. It is understood that the Government is willing to bind itself to a certain amount of financial aid to a railroad or other private enterprise providing such company develops a stated tonnage of coal. This fuel would have to be mined at a price that would enable successful competition with foreign coal in the open markets on the Peruvian and Chilean coast. With the increasing use of fuel oil in the nitrate fields of Chile and the uncertainty of being able to compete with American coal after the Panama Canal is in operation, it is certain that great difficulties will be experienced in getting capital to invest at Oyon. On the other hand, it is claimed that the Peruvian navy must have a coaling station in the north of the republic and with the completion of the line to Oyon, plenty of coal could be furnished at Huacho. Regardless of the question of coal, it is said that a railroad to Goyllarisquisga would be a paying institution, as it would furnish a more direct outlet for the Cerro de Pasco production and would develop a rich territory.

PERSONALS

Fletcher W. Cunningham, of Charleroi, has succeeded Richard Maze as mine inspector of the 20th Bituminous District of Pennsylvania, with headquarters at Somerset.

Ramie S. Curtiss has been made manager of the offices of the Morgan Run Coal Co., which have been opened in the Boyd Building at Coshocton, Ohio, and are a branch of the Cleveland offices of the same company.

F. V. Nedden, of London, has recently taken a position as engineer in charge of the centrifugal pump department with the Goulds Manufacturing Co., of Seneca Falls, N. Y. Mr. Nedden has had a large and varied experience principally in Germany.

D. C. Botting, chief of the Washington state Coal Mine Inspection Department, has resigned and accepted a better position with the Government. He will take charge of the practical mining operations in the Matanuska coal fields of Alaska. His expedition will take out 800 tons of coal and test it upon a battleship.

A. S. Biesecker, who has been connected with the electrical department of the Delaware, Lackawanna & Western R.R. for the past eight years has accepted a position as electrical engineer for the Scranton Electric Construction Co. He will be succeeded by E. J. Powell, who, for some time past, has been his assistant.

Wm. B. Crawford has resigned as chief engineer of the Carter Coal Co. operating in West Virginia and Kentucky and will organize a firm of consulting and contracting engineers with headquarters in Bluefield, W. Va., and Chicago, Ill. The new firm will act as consulting engineers for several of the large coal corporations and will also do a general business as consulting engineers along civil, mining, mechanical and electrical lines.

W. L. Schmick, general manager of the Consbolidated Coal Co., of St. Louis has resigned his position to accept a similar place with the Big Muddy Coal & Iron Co. It is understood that W. J. Jenkins, president of the Western Coal & Mining Co., will assume Mr. Schmick's duties with the Consolidated Coal Co. The Big Muddy Coal & Iron Co. is closely affiliated with the Gould interests which control the Western Coal & Mining Co., and the Consolidated Coal Co.

CONSTRUCTION NEWS

Pomeroy, Ohio—At an approximate cost of $25,000 the Peacock Coal Co. has awarded a contract to the Roberts & Shaffer Co. for the building of a large steel tipple. In this structure the Marcus screen and picking conveyors will be employed.

Big Four, W. Va.—The Lake Superior Coal Co., successors to the Dixon-Pocahontas Coal Co., has a large force of carpenters at work erecting tenement houses for the miners. This operation is located near Big Four, just east of Welch.

Bluefield, W. Va.—Two miles of street car line connecting the towns of Northfork and Keystone, are said to be under construction. This is believed to be the first link of the long proposed electric railway between Bluefield and Welch.

Connellsville, Penn.—The Juniata Coal Co., of Bens Creek, is making a new opening near the old mine and building a tramroad to deliver the coal to the railway. More surface has been leased preparatory to increasing the operations to a large scale.

Steubenville, Ohio—The Steubenville Coal & Mining Co. expects to have a new tipple in operation by the first of September. The structure will be of steel and will mechanically screen and grade all coal as it is dumped from a platform above the shaft.

Piedmont, W. Va.—The Consolidation Coal Co. is reopening the old Consolidation mine. A modern outfit for hauling, dumping and trackage is being installed. The branch railway, abandoned over thirty years ago, will be rebuilt. There are a number of coal beds still undeveloped within easy reach of three openings.

Grafton, W. Va.—S. A. Shackelford, Son & Co. have recently closed a contract with the Winona Coal & Coke Co., situated at Coffman, for the construction of 12 five-room dwelling houses. These will be two stories high and will be built in a row facing the railroad on a piece of level land just north of the old coke ovens and west of the present tipple.

Keeferton, W. Va.—The Roberts & Shaffer Co. have just closed a contract with W. W. Keefer, president of the Pittsburgh Terminal Railway and Coal Co., also of the Milburn Coal & Coke Co., for the building of a large steel tipple at Keeferton. The cost of this structure will be about $30,000, and it will be equipped with the new Marcus combination screen and picking conveyor.

Joplin, Mo.—The Moka Coal Co. has commenced the stripping of the dirt and rock from a 160-acre tract of coal land near Mulberry. Prospecting has shown that it will be necessary to go to a depth of from 18 to 30 ft. to remove the coal. The railroad company will not be able to have a track built before the middle of July, but the coal company will proceed to uncover the coal and prepare it for shipment by that time.

Whitesburg, Ky.—It is reported that fine progress is being made on the Beaver Creek branch of the Chesapeake & Ohio R.R., from the mouth of Beaver to Steel's Creek, 22 miles distant. Hundreds of men and teams are employed on the work, and double shifts are being used. The Baltimore & Ohio is making preparations for the construction of its branch line in the same vicinity and will probably begin active work in a short time.

Whitesburg, Ky.—The Kentucky Coal & Timber Co., of which T. S. McGrath, of Chicago is the head, is taking steps to make good its recent announcement that it will develop its 30,000-acre holdings in Leslie, Perry and Letcher counties. Locations are being selected convenient to the railroad and grades prepared for the necessary sidings and switches. It will not be long before the company is ready to get out coal as the amount of construction work necessary is relatively small.

Wilkes-Barre, Penn.—The Delaware, Lackawanna and Western R.R. Co. are pushing the work on the elevated road to carry the coal from the Peach Orchard tract which is situated on the east side of the Susquehanna River to the Pettebone Colliery which is on the west side of the river.

From the Pettebone breaker an elevated track about 2000 ft. long and supported by 112 concrete piers and steel bents will connect with the old abandoned Wilkes-Barre and Eastern trestle (now owned by the Erie R.R. Co.) which crosses the river. The average height of the new trestle will be about 35 to 40 ft.

NEW INCORPORATIONS

Kansas City, Mo.—The Grey-Bryan Coal Co. has increased its capital from $10,000 to $30,000.

Indianapolis, Ind.—The Deep Vein Coal Co. of Terre Haute, has issued $25,000 additional preferred stock.

Baltimore, Md.—The Hagan Coal & Coke Co., of Bristol, Va., has incorporated with a capital stock of $100,000.

Indianapolis, Ind.—The Riverside Coal Co. has been incorporated here with a capital of $10,000 by J. L. Hogan, F. G. Owen and F. Hollingsworth.

Louisville, Ky.—The Nebo Coal Co., of Louisville, has been organized with a capital stock of $250,000. The company will handle properties in western Kentucky.

Briggs, Okla.—A charter has been granted to the Sequichie Mining Co. with a capital stock of $1000. The incorporators are Geo. Pidgeon, Chas. Young and Coleman Dick.

Hazard, Ky.—The Ross-Petrey Coal Co. has been organ- zed with a capital stock of $5000. The incorporators are lexander Ross, Lewis E. Petrey and W. J. Combs.

Wilmington, Del.—The Day Lumber and Coal Co. has been ncorporated with a capital of $1,000,000. The incorporators re S. E .Robertson, D. J. Jacobs, H. W. Davis, all of Wil- nington.

Harrisburg, Penn.—The Dominion Coal Co. has been or- anized at Pittsburgh, with a capital stock of $30,000. The ncorporators are R. C. Mosten, B. A. Height, Herman F. Lin- enbrink and R. S. McLean.

Little Rock, Ark.—The West Spadra Coal Co. has been ranted a charter. The capital stock is $25,000, of which 4000 has been subscribed. The incorporators are R. D. unlap, E. W. Dunlap, C. Langford and W. R. Eustice.

Connellsville, Penn.—A charter of incorporation has been ecured for the Rices' Landing Coal & Coke Co. by J. H. rice, Jr., C. C. Morrison and T. W. Stephens, all of Pitts- urgh. The company will formally take over the property ately owned by the Dillworth Coal Co. at Rices' Landing.

Dover, Del.—Articles of incorporation were filed June 27 r the Yankee Development Co. of Pittsburgh, to acquire ineral lands of all kinds and prepare the same for market. he capital stock is $100,000 and the incorporators are W. J. ammond, Thos. G. Shields and C. M. Patterson; all of Pitts- urgh, Penn.

Charleston, W. Va.—The Middle Fork Coal and Land Co. as been organized with a capital of $20,000, principal office Elkins and chief works in Randolph County, Middle Fork istrict. The incorporators are Howard Sutherland, Effie H. utherland, J. F. Strader, Beryl H. Strader, all of Elkins, umboldt Yokum and Hattie M. Yokum, of Beverly.

INDUSTRIAL NEWS

Petersburg, Ind.—The Evansville Utilities Co. is prepar- g to furnish electricity to the Ayrshire mine, south of this ty, for lighting and to operate the mining motors.

Sprankle's Mills, Penn.—The Knoxdale Coal Co. has leased veral farms in this vicinity and expects to begin testing the nd in the near future. The upper Freeport vein is being ught.

Morgantown, W. Va.—Coke is being shipped from the Po- nd Coke Co.'s plant on Dunkard creek. Forty of the one ndred ovens which have been completed are now in op- ation.

Bluefield, W. Va.—E. T. Boswell, president of the Big Vein al Co., is going over some undeveloped coal land near chland, Va., with the view of opening up a new opera- n in the Red Ash vein.

Pittsburgh, Penn.—It has been estimated that in the ighborhood of six thousand carloads of coal have been uled over the Pittsburgh division of the Pennsylvania R.R. ery day during the month of June.

New Orleans, La.—A contract for the supply of coal for government dredges working in Southwest Pass, has en awarded the Monongahela River Consolidated Coal and ke Co. The first delivery will be 12,000 tons.

Greensburg, Penn.—H. C. Davis, of Wilkinsburg, has sed a number of unused coke ovens at the Boyer plant in Pleasant Township, and will develop a small tract of l acquired some time ago from the R. K. Hissem in- ests.

Spokane, Wash.—Judge George Turner, of Spokane, has d his coal railroad in Montana to J. H. Gardiner, of Clark unty, Washington, for $50,000. The road is 13 miles long connects with the Northern Pacific tracks at the town of estnut.

Buffalo, N. Y.—The coal chutes and warehouses of the ples Coal Co., at Williamsville, near Buffalo, burned July nvolving a loss of $10,000. About 200 tons of coal, mostly hracite, were partially destroyed. The cause of the fire unknown.

Philadelphia, Penn.—The Eastern Coal Dock Co., recently arded a contract to the Belmont Iron Works for a one- ry steel machine shop to be erected on the east side Delaware Ave. south of Porter St. The cost will be ap- ximately $1275.

Toledo, Ohio—Railroad companies are warning coal ship- s of the necessity for shipping as early as possible in er to avoid a car shortage later. Indications are that traffic will be heavy during the fall and that the car supply will be taxed to its utmost.

Wheeling, W. Va.—It is reported that a $250,000 coal land deal has been made in Belmont County and that the Huffman & Rice interests of Waynesburg, Penn., are the purchasers. The coal land is reported to have been sold at an average price of approximately $30 per acre.

Bedford, Ind.—Fire recently destroyed the coal chutes of the Monon R.R., together with a large quantity of coal and two steel and two wooden coal cars. The loss of the chutes alone was $2500, wholly covered by insurance, the total loss reaching $8000. The origin of the fire is unknown.

Pittsburgh, Penn.—The Epping-Carpenter Pump Co. has recently placed contracts for doubling the capacity of its extensive foundry. One of this company's recent orders is for a compound pot-valve wood lined pump for the H. C. Frick Coke Co. This pump is built to handle 3500 gal. of water per minute.

Washington, D. C.—An American consular officer in France has transmitted the name of a large manufacturer of creosote oil and similar products, who desires to get in communication with American manufacturers of pitch for coal briquettes and who is willing and able to maintain a permanent export trade in this line.

Harrisburg, Penn.—The Hamburg Vitrified Brick Co. of Hamburg has complained to the Pennsylvania State Railroad Commission that the Reading Railroad Co. has a rate of 90 cents a ton on coal from Landingville and Auburn to Hamburg where the Pennsylvania Railroad Co. charges but 50 cents for practically the same haul.

Rio de Janeiro, Brazil—The American consul general at Rio de Janeire reports that the Estrado de Ferro Central do Brazil, the largest Brazilian government railway, has purchased 40,000 tons of American coal by tender through a local firm and it is reported that a steamship company will use 20,000 tons of American coal to bunker steamers calling at this port.

New Orleans, La.—Owing to the closing of the government locks in the Tombigbee River for slight repairs, the opening of the regular coal carrying barge service to the Alabama fields has been delayed. Two more power barges for this trade are nearing completion. Each is fitted with two 150-hp. gas-driven engines, and a small 7-hp. auxiliary engine for starting. The gas producer is of the improved type, generating the gas only as needed.

Detroit, Mich.—The southern division of the Detroit, Toledo and Ironton R.R. was sold at public auction at Delray by E. S. Vorheis recently. Otto T. Bannard and M. M. Buckner acted on behalf of the purchasing committee and bought the road for $1,650,000. The Ohio division of the same road was recently sold at Springfield to parties said to represent the first-mortgage bond holders. The bonded indebtedness of the road amounts to about $14,000,000.

Pittsburgh, Penn.—The sanitation of mines and mining camps throughout the United States is to be made the subject of an exhaustive study by the U. S. Bureau of Mines, and the first work in this direction is to be done from the different stations. J. H. White has been placed in charge of this new department and has become identified with the general offices of the Bureau of Mines here. For years he was with the Tennessee Coal & Iron Co. and has made sanitation a specialty.

Hazleton, Penn.—A. Pardee & Co., operators of the Cranberry and Crystal Ridge collieries, which employ about 1000 hands, locked out their employees on July 5. There had been strike talk among the men for the previous two weeks and the mines are now at a standstill.

Nearly 3000 mine workers are on strike in the Hazleton regions. At Audenreid No. 4 colliery of the Lehigh and Wilkes-Barre Coal Co. the breaker boys struck over dissatisfaction due to wages, tying up the whole colliery. The breaker boys at the Black Ridge mine of the Hazle Mountain Coal Co. have also gone on strike on account of a cut in their wages.

Pittsburgh, Penn.—A receiver for the Monongahela River Consolidated Coal & Coke Co., a $30,000,000 corpration, has been asked for by Alexander Dempser, its former president, in a bill in equity, filed in Common Pleas Court, June 30, against the Monongahela River Co., the Pittsburgh Coal Co. of New Jersey, the Pittsburgh Coal Co. of Pennsylvania and the Union Trust Co. of Pittsburgh, trustee. The Court is also asked to set aside an election of directors for the Monongahela Co., held last January, and to grant an injunction restraining the Pittsburgh Coal Co. of New Jersey from controlling the Monongahela River Co. Dempster is the only individual holding Monongahela River Coal & Coke Co. stock.

COAL TRADE REVIEWS

GENERAL REVIEW

The most interesting development in the national hard coal market for some time was the recent announcement of the new Pennsylvania state tax on anthracite. What the effects of this will be are problematical. The operators have, of course, been forced to shift the burden onto the public, and whether the outside states will object to sharing a portion of the Pennsylvania taxation remains to be seen. Aside from this, the trade is quiet and moderately dull, but there is a fair amount of business on hand for July.

The Eastern bituminous market has weakened slightly, under the influence of the strike settlement in the New River field. It is now easy to buy at circular prices, in the New England states, but on the other hand there is no shading and quotations are being firmly maintained; there is some slight tendency to sag on the lower grades only. It is believed by some that the soft coal market will ease off into the customary summer dullness, but on the other hand the West Virginia trouble was not of sufficient proportions to have materially affected the situation in any event. Buyers who expected to obtain their coal cheap through the summer are still being disappointed, there being little prompt tonnage available, even in the lower grades.

Mines in the Pittsburgh district are still operating up to a high rate, the demand on contract continuing heavy and a fair amount of business being done in the prompt market. There does not seem to be any possibility of a slump, while on the other hand there are good prospects for a further advance, should there be the slightest provocation for same. Many producers are refusing absolutely to enter into further contracts.

In Ohio, the only disturbing feature is the car shortage, which is tending to curtail production; the output last week was also restricted by the holiday. Most of the producers have announced an advance of ten cents in the circular and there is an increased domestic demand for stocking, while the lake movement to the Northwest is still heavy. Tonnage at the Hampton Roads piers has accumulated fast and vessels are compelled to wait almost indefinitely for cargoes; some high spot prices are being paid at rare intervals, in order to clear vessels. In fact, the demand there has seldom ever been so heavy. Shipments from the Pocohontas field are about normal but there has been a heavy decrease from the New River district; men are returning to work in this latter field, but it will be some time before the full production is restored.

Requests for future shipments in the Middle West are now generally being refused by operators, who fear that they are not going to have sufficient coal in the fall. While the market generally is showing a tendency to tighten somewhat, the situation is in some respects uncertain. Indications generally are for an improvement, but buyers claim that the dealers are all overbought and the operators oversold. The opening of the big Keokuk Dam has displaced a large tonnage of Middle Western steam coal.

BOSTON, MASS.

Bituminous—All anxiety over labor troubles in Pocahontas and New River is now apparently a thing of the past. While a suspension was effective through most parts of the New River field July 1, yet all the reports were coupled with assurances that the operators would grant concessions enough to make any prolonged strike unlikely. It is now expected that the threatened "flurry" will slope off into a spell of midsummer dullness such as this market usually goes through at this season.

Mining of anything like the normal output will hardly begin, however, until about July 10 or 15, and meanwhile the loading at Hampton Roads will be slow. Tonnage accumulated fast the last fortnight and at this writing not only barges and sailing vessels but steamers as well have been detained three and four times as long as usual. For spot coal, high prices are still being paid to clear vessels but the volume of such business is small and now with the absence of strike talk it will probably amount to little, if indeed there is any at all. There is still a quantity of coal to be bought in New England and the outlook is that for a month or so anyway it will be easy from the buyer's standpoint to cover on Southern coals on the $2.85 f.o.b. basis. The contract figure is expected to be firmly maintained, however, and the New England trade is pretty sure to be steady the balance of the season.

On Georges Creek and the Pennsylvania grades there is little that is new. The better coals from Somerset and Cambria Counties are holding strong in price but inferior grades have sagged off a little. Just as a broader market was opening for Pennsylvania coals and the trade was getting to the point of buying with not so much regard to quality the news came from New River and the demand from this territory has swung back to more nearly normal. The market all-rail is without special change. Sales agents have been cautious about selling ahead, but they have taken care of current business at not more than 5@10c. over the figures set for yearly contracts. Just at present it is a kind of mark-time situation.

Anthracite—The big news this week is the announced intention of the anthracite companies to charge on their invoices the Pennsylvania state tax of 2½% of the market value of coal at the mines under the law which went into effect June 27, and so make dealers, and ultimately the consumer, pay the tax beginning July 1. It amounts to an extra advance in July of 8¾c. on stove and egg and 9c. plus on chestnut and it remains to be seen how it will be received by the trade. Meanwhile there is ample business in sight for July and unless there are still other unusual features the market is likely to maintain its present condition throughout the month. Stove size seems in a little better supply than earlier in the season.

Current wholesale prices on bituminous rule about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.45	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.30@2.70	2.60@2.90	2.92@3.02	
New York*	2.60@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.00
Providence†				3.90@4.00
Boston†				4.00@4.15

*F.o.b. †On cars.

NEW YORK

Bituminous—The holiday toward the close of last week caused a suspension of about two days at the mines, some operations even being affected for the last three working days of the week. As a result, there has been a further tightening in the soft-coal market, although it is temporary in this case and will probably be relieved shortly.

Stocks at tidewater continues about normal, the same as they have been for some time. Occasional contracts are still being made; it has been difficult to convince many of the consumers, who refused flatly to concede the increased quotations demanded by the operators, that such was justified.

It is doubtful if the labor agreement in the New River Field will have any effect on the local situation. The trouble has not become of sufficient proportions to be felt in the market, and because of the labor scarcity it will be some time before the production becomes very large. The car supply on the Pennsylvania R.R. is still short, while that on the New York Central likewise continues good. We continue to quote the New York soft-coal market unchanged on the following basis:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.65@2.70; good grades of Pennsylvania, $2.75@2.80; best Miller Pennsylvania, $3.05@3.15; George's Creek, $3.25@3.30.

Anthracite—The most interesting feature in the hard-coal market during the week was the announcement of a 2½ per cent. state tax on all the anthracite produced in Pennsylvania, which amount, most of the leading hard-coal companies have already stated they will add to the regular circular price. The effects of the change, if any, have not developed at this writing. As usual, the burden has been shifted along until it rests on the public's shoulders, and it now remains to be seen whether outside states propose to carry a share of the Pennsylvania state tax.

While the trade generally, so far this year, has been somewhat above the average, it is now clear that the customary summer lethargy is beginning to develop. Orders are becoming scarcer so that a general restriction in production throughout the mining regions is taking place. None of the sizes can be said to be in particular demand, but stove coal approaches this condition the nearest.

The market promises to be quiet from now on through the remainder of the summer, but indications point to a heavy demand the coming fall. We quote the New York market on the following basis:

	Circular	Individual		
		Lehigh	Scranton	Schuylkill
Broken	$5.00	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.25	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.25	4.90	4.95	4.90 .....
Chestnut	5.50	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.70

PHILADELPHIA, PENN.

The anthracite coal trade in this vicinity is commencing to show marked signs of the summer influence. The dealers are not only bemoaning the lack of trade, but are also confronted with an additional problem in the shape of the new state tax, which imposes a levy of 2½% on the market value of the coal at the mines. This will undoubtedly be saddled on the consumer. There have been considerable comments on this act, and the majority of the Pennsylvania press seem to feel that it is uncalled for as well as unjust. The operators generally are handling the tax in a way of their own, that is, by adding it as a separate item to the invoices for the coal, simply passing the charge that will be imposed upon them on to the dealers, who will undoubtedly add it on to the retail price.

Beginning the first full week of July, it is understood that many of the large operators will commence curtailing operations. While up to the present time the market has been absorbing practically all of the prepared sizes, the outlook now is such that it was probably deemed advisable to institute partial suspensions. The work at the mines will probably be limited to four days a week, which it is felt will be sufficient to meet the requirements of the trade for the next two months or longer.

Outside of stove, there is no active demand for any particular size. Individual operators are now offering their output of egg and chestnut at considerably less than the socalled circular prices and the steam sizes are a drug in the market, the only movement being on contracts already entered. The Tidewater business to the New England market still continues in a fairly active condition, but the demand from this direction is slowly but surely growing less as the summer season advances.

Encouraging reports still continue to emanate from the bituminous market. Conditions in the West and Northwest have resulted in a marked strengthening of this branch of the trade, and a stiffening in prices. Contractors who are still holding out for better figures are buying on the open market now for their current needs at advances over the figures at which they could have secured their season's supply. Altogether the trade looks good from this standpoint, and confirms the prediction made months ago, that the summer would see a much improved condition of affairs as far as bituminous is concerned, and indications are that it will continue so until the fall demand opens up.

PITTSBURGH, PENN.

Bituminous—There is no material change in the situation. Mines continue to operate at a high rate, barring last week's nterruption through the holiday, while demand is good on contract, and there is a fair demand for prompt lots. Some additional contracts for coal have been made, for delivery up to Apr. 1. Despite the fact that slack always sells off in he summer, some of these contracts have been for slack at the full price of 90c., which prevails without question outside the lake-shipping season. There is little of this grade offered at special prices, except that on the Pan Handle there are a few operators selling prompt at 70@75c. in small lots. We quote regular prices as follows, with premiums sometimes paid on prompt lots: Slack, 90c.; nut and slack, $1.05; nut, 1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., steam, $1.50; 1¼-n. domestic, $1.55 per ton at mine, Pittsburgh district.

Connellsville Coke—The operators have traversed most f the distance, apparently toward winning the long contest or $2.50 for furnac coke for second half. Buyers having contracts expiring June 30, involving about 175,000 tons a month, continued to hold aloof until within the past few ays when operators sold for July only at the $2.50 price, to the extent of about 90,000 tons; by far the major part of this tonnage was sold by a group of operators who had definitely announced their adherence to a $2.50 price. Last Saturday there was urgent inquiry for spot-furnace coke, and some buyers seemed ready to pay up to $3, but little was secured. Afterward they changed their attitude and declared they would run their furnaces slow, or bank altogether, rather than pay a fancy price. This week the market is extremely quiet on the surface, there being practically no inquiry. Consumers not yet covered are probably conferring together and hoping to break the market by keeping out entirely. The operators, on the other hand, consider their contest practically won, and expect the remaining consumers eventually to come into the market and pay $2.50. Most of the sales made for July were guaranteed against the sellers' declines, which, instead of proving a weakness seems to have strengthened the operators' position. Production last week was light on account of the holiday, practically two days being lost, and coke shipments are light. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

BALTIMORE, MD.

With no possibilities now of a strike in West Virginia, the trade has settled down to a summer basis, but considerably better than a year ago, when contracts were being made at from 10c. to 25c. off what is demanded at present. Except for slack, which has recently taken another slump down to around 55@60c., very little coal, even of the least desirable grades, can be had on a mine basis of less than 90@95 cents.

While there is now no rush for fuel, there is enough demand to continue a healthy warm-weather market. Quite a number of small manufactories throughout the state that have been purchasing in the open market have recently come under cover for either short- or long-term contracts. Many concerns that had hoped to go through the summer buying at the low figures which prevailed for spot fuels last summer, have been sadly disappointed, and are now contracting at less advantage than if they had done so early in the spring.

The coal record at this port the month of June was rather remarkable, 25 large steamships being loaded in the export trade. The tonnage ran to 110,000 tons, an increase of approximately 22,000 over the previous month, and the largest single month in the history of the port.

The first of July ushered in a real dull period for the anthracite dealers. During April, May and June the low circular resulted in considerable purchasing for delivery during that time. The rail movement both from the anthracite and bituminous fields has been good; while there has been some spasmodic complaint from some regions, especially in the West Virginia gas-coal districts for movement to the Northwest, the main situation has been easy.

BUFFALO, N. Y.

The bituminous coal market has seldom ever been as active at the end of June as this year, and all members of the trade are searching for a reason to expect a falling off before long. On the contrary, however, all indications point to a still stronger market by September, and perhaps sooner; the reason for this is that the consumption is so heavy, while the production cannot possibly be urged to a higher point. Operators and shippers are doing their utmost to get more coal, but the miners are indifferent. They are not very numerous and do not care to work full time during this period of the year.

It is said that there is not a car anywhere in the country under demurrage if the holder is at all up to his business; equipment is none too plenty, and it is felt that with a little larger output the supply would run short. If crops are as large as they promise to be, and the consumption holds up the outlook for the fall is serious. For this reason there is a general refusal on the part of sellers to make any more contracts unless they can get full going prices, and some of them do not dare to contract even on that basis.

There is every prospect of a further advance in bituminous prices as soon as the smallest farther reason for it appears. Some shippers are calling present figures too low, but the trade generally is satisfied with $2.90 for Pittsburgh select lump, $2.75 for three-quarter, $2.65 for mine-run and $2.15 for slack, although the latter is hardly as strong as the sizes. Allegheny Valley prices are strong at about 25c. lower than Pittsburgh. There is no stir in coke, as consumers still think it too high for the rest of the market. Quotations are $4.75 for best Connellsville foundry.

Anthracite is quiet except with the jobber with independent mines behind him. He is always on the watch to make sure that they do not get away from him, as they have done in former years. There is not much danger of it now, for the consumer is not going to buy much till cool weather is here with a reminder of the return of winter. At the same time the lake shippers are making every effort to crowd coal Westward. Shipments by lake for the week were 136,000 tons, the total for June being 642,110 tons and for the season, 1,785,574 tons. With the late start last season, on account of mining suspension, the amount was only 551,693 tons to July 1.

COLUMBUS, OHIO

The interposition of a holiday on Friday of last week, which was followed by a partial holiday on Saturday, curtailed production in all of the mining districts of the state. But notwithstanding that fact the output has been good and the tone of the market satisfactory in every respect. All mining concerns announced new circulars for July 1 which makes an advance of about 10c. per ton.

One of the best factors of the trade is the activity displayed in domestic grades. Retailers are placing orders both for immediate delivery and shipment later in the month. They believe that the stocking up period will arrive sooner than usual and want to be prepared for the demand when it appears. Dealers stocks are not heavy in any territory tributary to Ohio and the approach of the threshing season also has a stimulating effect upon the trade. The docks of the Northwest are taking the coal as fast as it comes to them and no congestion of consequence is reported. Boats are still being chartered for the latter part of the season.

Production in Ohio fields was interfered with by the two holidays of the week and also by a growing car shortage, particularly in eastern Ohio. Notwithstanding these conditions the output in the Hocking Valley is estimated at 85 per cent. of the average and in the Pomeroy Bend field about 75 per cent. In eastern Ohio the output is about 70 per cent. of the average, considerable trouble from lack of cars being reported from this latter district.

Iron and steel plants are taking a good tonnage despite the usual dullness which overtakes manufacturing during the summer months. Factories show no disposition to stock up to guard against a shortage but this will probably come later in the season. The only disturbing factor noted by coal men is the possibility of a car shortage which is expected to be more acute this year than ever before.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump........	$1.60		$1.60	$1.60
¾ inch..............	1.45	$1.20	1.40	1.40
Nut................	1.25		1.35	
Mine-run............	1.25	1.10	1.15	1.20
Nut, pea and slack....	0.65		0.65	0.65
Coarse slack..........	0.55	0.65	0.50	0.55

TOLEDO, OHIO

The coal business in Toledo is unusually strong for this season of the year. Lake shipping began early and would have been still sooner but for a shortage of coal at the docks due to the fact that so much was required to make up the deficit caused by the Ohio floods.

The present season gives every evidence of proving a banner year in coal shipments, but the next one will be even much better for the Toledo docks. The new $2,000,000 Hocking Valley docks will be completed and open for use next June and Toledo will hold the enviable position of being the first port in the world so far as coal and ore is concerned, being equipped with more loading machinery than any port on the lakes. The enormous Lake Shore track and yard improvements being made here at an expense of $3,000,000 will also have considerable effect on the coal market. The lake this season is considerably higher than usual, which is, of course, of benefit to coal and ore shippers and will result in much heavier loading than is possible when the water is lower.

The coal movement, according to the figures at the Customs office here, show that the shipments at this port for this season amount to 2,165,802 tons as against 1,762,139 tons for the same period in 1912, an increase of 403,653 tons. The general demand for coal has been extraordinary throughout the season and is strong from every source for both steam and domestic fuels. The call is coming from all sections of the state and orders for present and thirty-day delivery are coming in freely. The traffic situation here is highly satisfactory thus far and no congestion has been noted. Prices have been holding firm and there have been no concessions from the list. Quotations on the local market follow:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump....	$2.25	$1.50	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.25		2.50	1.50	2.50		
Nut	1.80	1.15	2.25	1.50	2.50		
¾ lump...........		1.35				1.20	1.20
Mine-run	1.50	1.15				1.10	1.10
Slack		0.45				0.65	

HAMPTON ROADS, VA.

While the dumpings at Hampton Roads during the week have been fairly good as a whole, Lamberts Point alone has probably handled more coal than both Sewalls Point and Newport News. The demand has seldom ever been so heavy at this port while shipments are only about normal from the Pocahontas District with a considerable decrease in the output from the New River fields. The strikes in the latter district are causing considerable uneasiness among buyers and shippers and while it is reported that the men were to return to work about July 7, it will take some time to get a normal quantity of coal to tidewater.

Considerable tonnage is in the stream at Sewalls Point awaiting coal and vessels are experiencing some delay at Newport News as well. There is also a large fleet anchored off Lamberts Point; some of the boats are awaiting turn at the docks and others are short of cargo. Suppliers are practically all short of coal but such few as have any on hand will not quote a price as they are holding off to take care of contract vessels which are expected at any moment.

Coal shipments over Hampton Roads piers for the month of June were heavy although they did not come up to the dumpings for May. During June there was dumped over the Lamberts Point piers 476,122 tons, at Sewalls Point 254,758 and at Newport News piers 263,231 tons, a total of 994,111 tons.

LOUISVILLE, KY.

The long continued spell of hot weather appears to be having a depressing effect upon the coal market. Campaigning for orders for the winter business should now be well under way, but the unusually warm weather has taken all the snap out of the trade, and it is difficult to do business. The holidays over the Fourth of July did not have any effect on the situation, as producers were more than willing to close down, because of the difficulty in disposing of tonnages.

The orders for screenings still continue light, with production far in excess of the demand; steam consumption generally throughout the state is light. The circular prices for July delivery are being maintained, with only occasional discounts being offered on screenings at some of the large distributing centers; these are for the most part being well maintained in spite of the over-supply.

INDIANAPOLIS, IND.

Local dealers have increased anthracite prices 25c. a ton, and Pocahontas 50c., the former following the various smaller monthly advances made at the mines. One of the largest retailers says it is the first time for many years that he has not been able to name prices for coal to be delivered to his customers in the fall. Dealers can get some spot-shipment coal from the smokeless field but cannot make any contracts for deferred shipment. Under such circumstances they are not able to say what future quotations on Pocahontas will be or whether they will have much coal on hand when the winter buying opens in the fall. In Indiana and other states conditions and prices have not changed.

DETROIT, MICH.

Bituminous—Business in this vicinity continues good for this period of the year, especially on domestic coal there being plenty of orders for the current month, and some being placed ahead into August; Pocahontas is particularly strong. Most of the local dealers appear to be well sold up on this latter coal, and there are rumors that some have received more than the regular circular price. The Lake movement remains active, and there is some indication of a car shortage, although it has not reached serious proportions as yet. The local soft coal market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.60	....	....	....	....	$2.00	$2.0
Egg...........	1.60	....	....	....	....	2.00	2.0
Steam lump....	1.50	....	....	....	....	....	...
¾-in. lump......	1.25	$1.25	$1.10	$1.15	$1.10	....	...
Mine-run.......	1.10	1.10	1.10	1.10	0.90	1.50	...
Slack..........	0.85	0.85	0.45	0.50	0.60	....	...

CHICAGO

The Chicago market has been influenced by the possibility of a general strike in the West Virginia district and as a result there was a shortage in smokeless coal. At the start of the coal year efforts were made to place the price of this fuel at $4.25 but during last week, some of the more prominent dealers fixed the spot price for wagon delivery at $4.60.

The jobbing interests claim that instead of an increase in price there will be a decrease because operators are over-sold and consumers over-bought. They back these statements up with the fact that shipments to the lake districts are 25 per cent. above what they usually are at this period. The market is said to be tightening up slightly on other grades of coal owing to heavier harvest and mid-summer storage buying but prices remain the same. Anthracite seems to be now taking the place of smokeless owing to the shortage of the latter. The situation is just the reverse of what is was last year

Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$1.97@2.07	$2.55	$2.27	
Egg		2.55		$3.94@4.20
Steam lump	1.82@1.87		2.07	
Mine-run	1.77@1.82	$2.20@2.30	1.87	3.30
Screenings	1.62@1.67	1.90@1.95	$1.62@1.67	

Coke—Connellsville and Wise County, $5.25@5.50; byproduct egg and stove, $4.85; byproduct nut, $4.75@4.85; gas house, $4.50@4.60.

ST. LOUIS, MO.

There is no change in market conditions so far this month, although indications a few weeks ago were that the first of the month would see a general increase in prices; however, this is bound to come within the next week or two on the Standard coals and possibly on Carterville. Standard is still being sold below the cost of production, and on the first of the month St. Louis received the first electricity from the Keokuk Dam. It is estimated that this has, up to the present time, already displaced between fifty and seventy-five cars per day of screenings, which have been used at the different power houses of the United Railways Co. and the Union Electric Light & Power Company.

Coke still remains firm with indications of a slight advance and a fairly good demand.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.80
3-in. lump	....	....	....	....
6-in. lump	$1.15 @ 1.30	....	....	0.90
Lump and egg	....	$2.10	$1.30	....
No. 1 nut	1.15 @ 1.30	....	1.15	0.90
Screenings	0.85 @ 0.90	....	....	0.80
Mine-run	1.05 @ 1.15	....	....	0.75
No. 1 washed nut	1.50	....	....	....
No. 2 washed nut	1.35	....	....	....
No. 3 washed nut	1.30	....	....	....
No. 4 washed nut	1.20	....	....	....
No. 5 washed nut	1.00	....	....	....

St. Louis prices on July anthracite are: Chestnut, $7.25; stove and egg, $7; grate, $6.75; smokeless lump and egg are $4.65; byproduct coke, $5.10, and gas-house coke, $4.85.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

Total shipments of coal over this road for May of the urrent year were 318,720 tons as compared with 311,247 tons or the same month last year. For the five months to May 1 of the current year, the shipments were 1,897,003 tons as ompared with 1,406,847 tons for the same period last year.

IMPORTS AND EXPORTS

The following is a preliminary statement of the coal imorts and exports in the United States for May and the leven months ending May 31.

Imports—Bituminous imports for May of the current year ere 97,993 tons as compared with 132,959 tons for the same onth last year. For the eleven months ending May 31 of he current year, bituminous imports were 1,487,498 tons as ompared with 1,167,147 tons for the same month last year, nd 1,685,049 tons during 1911.

Exports—Exports for May of the current year were 2,09,215 tons as compared with 1,504,233 tons for the same onth last year. For the eleven months ending May 31, otal exports of coal for the current year were 18,396,346 ons as compared with 16,026,491 tons for the same period ast year and 13,333,726 tons in 1911.

COAL MOVEMENT

The following is a summary of the movement of coal and oke over 13 principal railroads during April and the first four months of this year in comparison to last year, in short tons:

Classes and Railroads	April 1912	April 1913	4 Months Ending April 1912	4 Months Ending April 1913
Anthracite:				
B. & O. (a)	10,902	123,602	582,656	557,994
C. & O. (a)	3,215	2,176	14,442	4,343
Erie (c)	122,725	753,072	2,302,666	2,711,120
Penna. (a-c)	290,865	930,592	3,579,602	3,674,096
Virginia (a-b)	....	45	....	356
Total 5 roads	427,707	1,809,467	6,479,366	6,947,909
Bituminous:				
B. & O. (a)	2,297,135	2,660,702	11,058,713	11,191,866
B. R. & P. (a-b)	401,581	661,519	2,701,410	2,955,146
B. & Susq. (a-b)	22,269	152,537	490,368	602,601
C. & O. (a)	1,609,054	964,104	5,915,640	4,925,334
Erie (c)	20,988	70,970	134,325	255,822
H. & BTM (a-b)	99,953	93,376	502,023	474,976
N. Y. C. & H. R. (a-b)	443,327	675,175	2,835,523	3,119,160
N. & W. (a-b)	1,863,555	1,543,220	7,121,563	7,237,796
Penna. (a-c)	3,291,985	3,796,432	15,461,920	15,914,179
P. & L. E. (a-b)	214,665	1,133,744	3,090,960	4,043,395
P. S. & N. (a-b)	55,020	227,003	618,792	908,985
Virginia (a-b)	280,995	345,039	1,184,961	1,578,283
W. Md.	254,591	245,564	977,366	1,006,549
Total 13 roads	10,855,138	12,569,385	52,093,562	54,214,112
Coke:				
B. & O. (a)	390,228	400,317	1,470,655	1,286,512
B. R. & P. (a-b)	20,500	45,436	133,978	209,443
B. & Susq. (a-b)	115	26,448	82,086	104,211
C. & O. (a)	19,992	28,471	79,943	121,085
N. Y. C. & H. R. (a-b)	6,396	7,723	29,644	25,152
N. & W. (a-b)	116,345	129,625	535,066	578,453
Penna. (a-c.)	1,079,046	1,230,979	4,190,832	4,987,304
P. & L. E. (a-b)	507,858	594,863	1,996,288	2,454,710
.. S. & N. (a-b)	338	91	5,155	9,383
W. Md.	5,704	7,865	24,987	26,903
Total 10 roads	2,146,522	2,471,818	8,548,634	9,803,156
Total Coal and Coke 13 roads:				
January			16,421,839	18,936,646
February			17,787,331	17,546,496
March			19,483,025	17,631,345
April			13,429,367	16,850,690

(a) Includes coal from connecting lines. (b) Includes Company's coal. (c) Does not include company coal hauled free. * Includes company coal for fueling.

FOREIGN MARKETS

GREAT BRITAIN

June 27—The demand for all kinds of coal is more active. and prices have a firmer tendency.

Quotations are as follows:

Best Welsh steam	$4.68@4.92	Best Monmouthshires	$4.20@4.26
Best seconds	4.44@4.56	Seconds	4.03@4.14
Seconds	4.20@4.32	Best Cardiff smalls	2.52@2.58
Best dry coals	4.44@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

The "Iron and Coal Trades Review" makes the following statement in its editorial columns under date of June 13:

> There can be no doubt that the demand for coal has been taxing the resources of the principal producing countries of the world, with the exception, perhaps, of the United States, and the result has been a general advance in prices. In the United Kingdom many circumstances have combined to accentuate this movement, including the new burdens of industrial legislation which have to be borne by the coal-mining industry, increased wages, the irregular working of the miners, difficulties in Wales over the non-Unionist question, and the strikes in Belgium and Silesia. Average f.o.b. prices at British ports are now more than 25c. per ton higher than they were a year ago, and in the inland market collieries are asking advances of from 25c. to 50c. per ton on all contract renewals, according to the class and quality of coal in question. As compared with 1911, a minimum advance of 75c. per ton is being obtained, and in many cases it is considerably more.

SPANISH IMPORTS

Coal imports into Spain for the four months to Apr. 30 of the current year were 949,199 metric tons, as compared with 664,733 tons for the same period last year. Coke imports for this period of the current year were 125,304 tons as compared with 137,150 tons for the same period last year.

GERMANY

Coal production of the German Empire for the first four months of this year and last year was as follows:

	1912.	1913.
Coal	56,083,431	63,379,455
Lignite	26,769,972	28,176,021
Coke	9,061,330	10,660,315
Coal briquettes	1,629,265	1,937,511
Lignite briquettes	6,226,447	6,866,452

FINANCIAL DEPARTMENT

The Elk Horn Fuel Co.

The newly organized Elk Horn Fuel Co. has issued the following statement concerning the 5%, 5-year convertible gold notes they are now offering:

The issue of these notes is limited to $4,000,000. They are dated May 1, 1913, mature May 1, 1918, but are subject to redemption at the option of the company (in whole, or in part by lot) on any interest day upon sixty days' notice at 105 and accrued interest. The notes are in denominations of $1000 and $500, may be registered as to principal, and are in coupon form with interest payable May 1 and Nov. 1.

Both principal and interest are payable at the office of the Guaranty Trust Co. of New York, without any deduction for any tax or taxes which the company may be required to pay thereon or deduct therefrom; the 0.004 state tax in Pennsylvania will be refunded as provided in the mortgage. At the option of the holder, the notes may be converted at their face value at any time after Nov. 1, 1913, and until Feb. 1, 1918; or if before the latter date they are called for redemption, then up to and including the thirtieth day preceding the date fixed for redemption (but in no event after Feb. 1, 1918) into shares of the capital stock of the Consolidation Coal Co. at $105 per share of $100 par value, with a cash adjustment for fractional shares and of interest and dividends.

Organization and Capitalization—The Elk Horn Fuel Co. is incorporated under the laws of the state of West Virginia, and is capitalized as follows:

5% cumulative preferred stock	$7,000,000
Common stock	19,000,000
First mortgage 5-year 5% convertible notes (closed issue)	4,000,000
Total	$30,000,000

all of which are outstanding.

The books of the company show a surplus of over $1,000,000 applicable to the payment of interest and dividends, of which over $500,000 is in cash.

Property and Security—The notes are a direct obligation of the company and are secured by a mortgage dated May 1, 1913, to the Guaranty Trust Co. of New York, which is a first lien on the following properties and on all property hereafter acquired by the Elk Horn Fuel Co., subject, however, to purchase money liens thereon:

(a) Direct first mortgage on 199,479.09 acres of land, in fee, and mineral rights of which 184,829.09 acres are in the Elkhorn region in eastern Kentucky, practically all of which lies in what is known as "The Elkhorn Coking Coal Field"; and 14,650 acres in Randolph and Upshur Counties, West Virginia (known as the Rich Mountain properties), now under operation.

(b) Upon 15,758 shares of the capital stock of the Beaver Creek Consolidated Coal Co., out of a total authorized and outstanding issue of 55,150 shares. This company owns, free from all liens and encumbrances, approximately 50,000 acres of land in fee or mineral and mineral rights, in "The Elkhorn Coking Coal Field." These lands and mineral rights are subject to an option in favor of the Elk Horn Fuel Co., under the terms of which the latter has the right to purchase all of these lands and mining rights at $60 per acre, at any time prior to Apr. 30, 1918, free of taxes or other expenses in the meantime.

(c) Upon 12,000 shares, being the entire issue of the capital stock of the Mineral Fuel Co., owning 4500 acres in "The Elkhorn Coking Coal Field." This company has an outstanding bond issue of $1,200,000, of which $800,000, or the proceeds thereof, are reserved for development purposes upon its property; this is an operating company.

(d) Forty-four thousand shares of the par value of $4,400,000 stock of the Consolidation Coal Co., at present market value of about $4,400,000, paying dividends at the rate of 6% per annum.

In addition to the foregoing properties, which are subject to the mortgage, the Elk Horn Fuel Co. also owns 1800 shares of a total outstanding issue of 1936 shares of the Tennis Coal Coal Co., which owns approximately 49,200 acres of land in fee or mineral and mineral rights in the counties of Leslie, Perry, Harlan and Knott, Kentucky; these lands represent a market value of over $700,000.

Revenue—The income of the company for the first year of its operation is estimated at $303,000. This includes $264,000 dividends at the rate of 6% per annum on Consolidation Coal Co. stock, pledged as part security for the notes, and in addition earnings which will accrue to this company from the Mineral Fuel Co., the Rich Mountain properties, and certain leases now in force upon other properties of the company subject to the mortgage.

Except as to the property of the Mineral Fuel Co., which will be operated by it the present plan of the Elk Horn Fuel Co. is to lease its property to reputable lessees, instead of operating itself: thus obviating the necessity of providing for large capital expenditures, which direct operation by the company itself would entail. Applications are already in hand, and negotiations in progress for leases, on terms advantageous to the company, and as railway construction is now under way, no difficulty will be encountered in securing leases upon satisfactory terms and profitable basis.

There will be procured for the Elk Horn Fuel Co., leases to responsible operators, satisfactory to the trustee of the mortgage, covering not less than 20,000 acres of coal land out of a total of 200,000 acres, requiring a minimum annual production of not less than 2,000,000 net tons and a minimum royalty of 10c. per ton, beginning not later than Apr. 1, 1915; thus providing an additional income to the Elk Horn Fuel Co., from operation of not less than $200,000 per annum from Apr. 1, 1915, to the maturity of the notes. There will, however, be considerable income from these leases during the year of 1914.

The Consolidation Coal Co.—This company is one of the largest and most important producers of bituminous coal in the United States. It owns and operates approximately 300,000 acres of coal lands in Maryland, Pennsylvania, West Virginia and Kentucky, and last year produced more than 10,000,000 tons. It is now producing at the rate of upward of 12,000,000 tons per annum, and last year earned over 10% on its outstanding $25,000,000 of stock. The company was incorporated in 1864 and has been paying dividends for 26 years, and at the rate of 6% since 1905. It has offices and direct selling connections in New York, Boston, Portsmouth, Philadelphia, Baltimore, Washington, Cincinnati, Louisville, Detroit, Cleveland, Chicago, London and Genoa, with well established connections in Mexico and Canada.

The Consolidation Coal Co. owns a majority of the stock of Metropolitan Coal Co. of Massachusetts, which sells about a million tons of coal annually in Boston. It also owns a majority of the stock of the Northwestern Fuel Co., of Wisconsin, which company has extensive docking and handling facilities on the Great Lakes, and distributes more than three million tons of coal annually. The Consolidation company operates its own fleet of barges, tugs and steamers on the Atlantic coast, and successfully exports its coal to Europe, Africa and South America.

Management—The company is managed by men of long experience in the successful development and operation of coal properties, and its officers and directors are heavily interested in the property.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending July 5:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	87	87	87	87	87
American Coal Products Pref.	109¼	109¼	109¼	109¼	109¼
Colorado Fuel & Iron	28	26⅞	26⅞	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	200	180	190	....	....
Island Creek Coal Com.	48	48¾	48¾	....	....
Island Creek Coal Pref.	85	84	84	....	....
Pittsburgh Coal	15⅞	15¼	15⅞	24⅜	14½
Pittsburgh Coal Pref.	76¼	76	76¼	95	73
Pond Creek	16½	17	16½	23¾	16½
Reading	158⅞	156⅜	157⅞	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	86	86	86	95	84
Virginia Iron, Coal & Coke	40	39	40	54	37¼

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93	95½	93⅝	June '13	93⅝	99⅛
Colo. F. & I. gen. 6s	..	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.	79¼	Sale	79¼	79¼	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	June '13	86	87⅛
St. L. Rky. Mt. & Pac. 1st 5s	70	73	76	June '13	76	80
Tenn. Coal gen. 5s	99¼	100	99⅞	100	99¾	103
Birm. Div. 1st consol. 6s	100	102¼	101	April '13	101	103
Tenn. Div. 1st g 6s	100	102	102	Feb. '13	102	102
Cah. C. M. Co. 1st g 6s	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	97	92	June '14	92	98

No Important Dividends were announced during the week.

* * *

The Monongahela River Consolidated Coal & Coke Co.—A receivership for this company has been demanded by Ex-President Dempster, who owns 8481 shares of the common stock and 100 shares of the preferred. The company's equipment is valued at $5,000,000. It is alleged that the company consummated a contract with the United States Steel Corporation to furnish coal for a period of 25 years at less than cost and also that it sold to the H. C. Frick Co. 8500 acres of coal land at $88.50 per acre when same was worth not less than $1000 per acre, and in addition, threw in lands worth $300,000.

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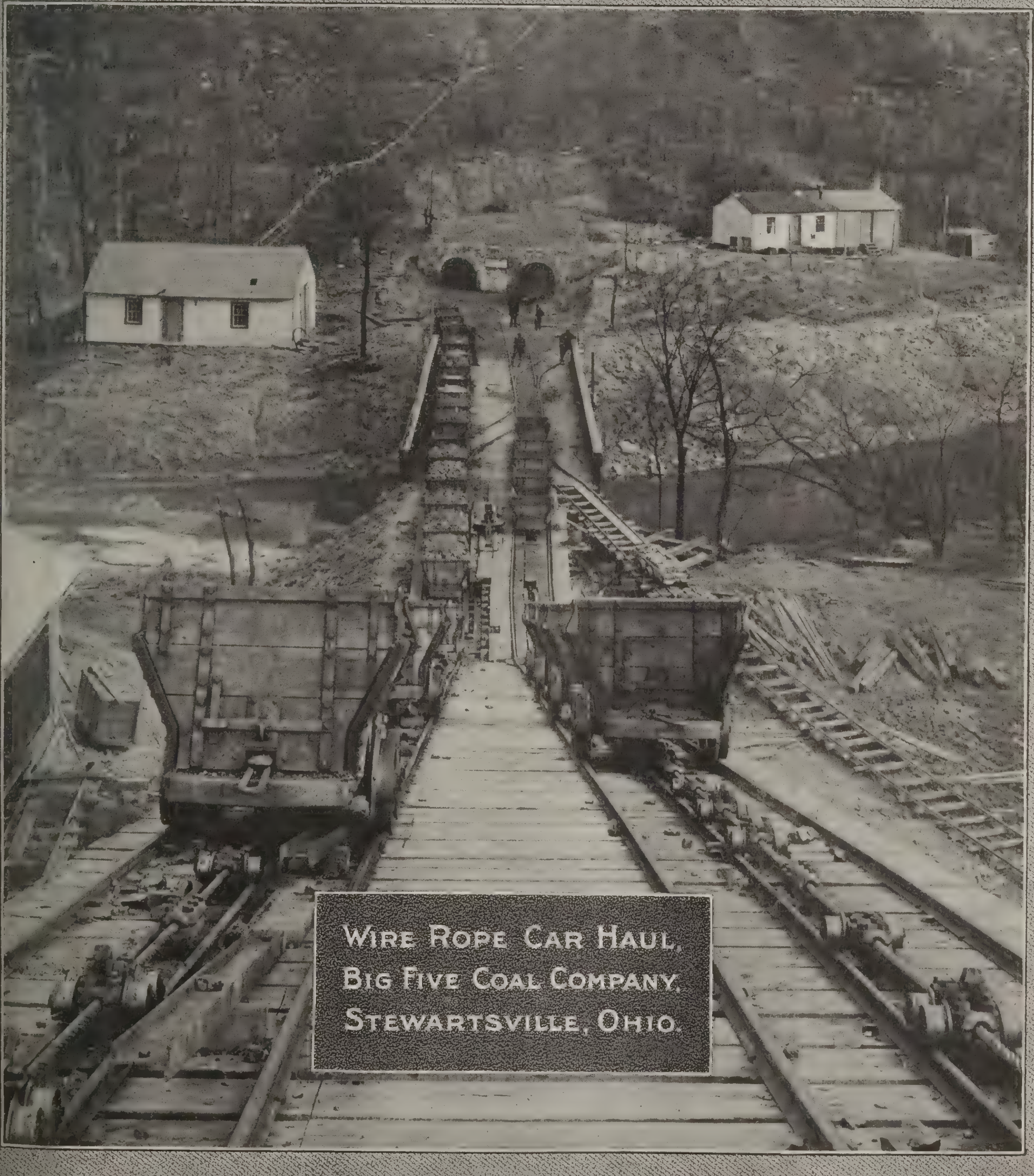

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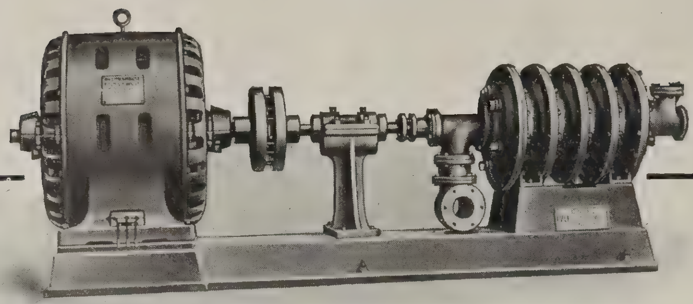

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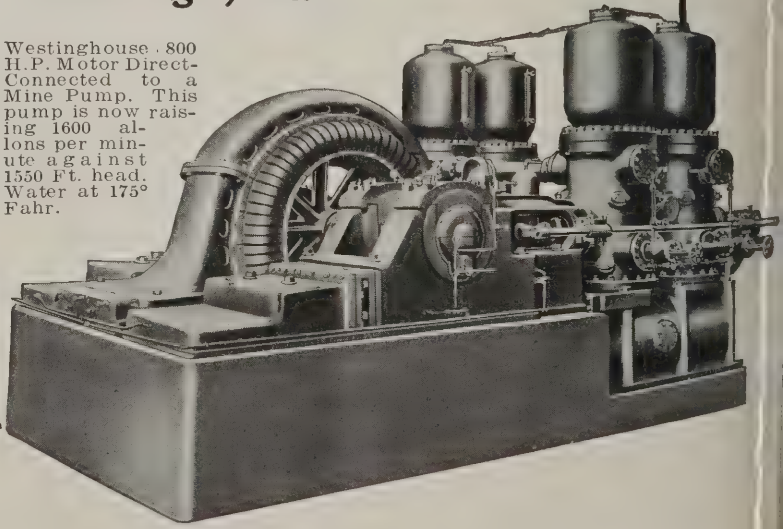

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COAL AGE

FLOYD W. PARSONS, *Editor.*

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Producing And Selling

The Weekly Ad-Talk Page

R. O. Eastman, of the Kellogg Toasted Corn Flake Co., Battle Creek, Mich., recently had this to say about the cost of selling:

"Our magazine advertising cost last year about two-thirds of a cent a package. If we are to include our sampling and display, cost of salesmen, etc., which in a sense are just as much 'cost of advertising' as the money we spent with the magazines, the figure might possibly be raised to two cents a package or even more.

"But there is an important fact to be taken into consideration and that is *that it costs more to sell almost any kind of merchandise than it does to produce it.* The farmer gets 35 or 40 cents a bushel for his potatoes, the consumer probably pays from 80 cents to a dollar—the difference between what the farmer got and what the consumer paid was the cost of selling. There is a great hue and cry being raised about this cost being exorbitant and about 'eliminating the middleman,' but there are a number of middlemen in this transaction and all of the Government commissions and political economists that have been on the job have thus far failed to discover the particular middleman who could be conveniently eliminated. Reduced to first principles, it is very plain that whether any of these middlemen receive an exorbitant price for their services or not, they are doing the work cheaper than the farmer could do it himself, for if he had to take his crop of potatoes and deliver them himself to each of his ultimate consumers, the potatoes would just about be worth their weight in gold.

"The 'cost of advertising' is merely one of the items of the cost of selling, and it is the cheapest method that a large producer can employ to sell his goods. Advertising is a wonderful force, the economics of which are not yet clearly understood. It has created entirely new channels of merchandising. It has made it possible for the manufacturer to carry his story—his selling argument—direct to the consumer and thus eliminate in actual selling of the goods, as distinguished from distribution, all middlemen. The national advertiser, who advertises judiciously, sells his goods before they are made by creating the consumer demand. His own sales force, so termed, the jobber and the retailer, cannot then be considered as merchants but as distributors whose function is not to create a demand but to supply a demand already created.

"There are two classes of goods really, those that are made first and sold afterwards according to the old order of things, and those that are sold first and made afterwards, of which our own product is a typical example. We create the demand by advertising and have the means of determining with reasonable accuracy the exact volume of that demand so that we may gage our production accordingly. The result is that we produce only sufficient quantity of goods to supply the normal demand which results in a constant fresh stock. We have no warehouse, our goods go direct from our ovens into our cars, and neither we nor our jobbers, nor our retailers have to take any risk of overproduction with the disastrous results of overstocks and spoiled goods. These are the risks which always attend the production of goods which are 'made first and sold afterwards' and in the very nature of things the public—the consumer—pays for all these risks.

"If the question, 'Who pays for the advertising?' comes up for consideration, we need only point out that some six years ago we were making a package one-third smaller and selling it for fifteen cents. To-day, after spending two or three million dollars in advertising the product, we are selling a package fifty per cent. larger than the original package at a third less, or if you will figure it out, giving the consumer just twice as much for his money. Who pays for the advertising? One big advertiser says, 'Mr. Overhead Expense pays for the advertising,' and this is largely true. Perhaps a better answer is that advertising pays for itself. It is merely the intelligent use of a cheaper and more effective means of selling and the consumer gets the benefit."

COAL AGE

Vol. 4 NEW YORK, JULY 19, 1913 No. 3

Mr. Mine Owner and Mr. Mine Manager.

Do you give your employees all to which they are justly entitled? By this is not meant the actual dollars and cents they draw on payday, but do you give them value received for the rent they pay? Are their houses shacks built from mill culls, without paint, without a fence, without a garden or yard, without any sanitation, with a leaky roof and a chimney that will not draw? Or are your houses neat little cottages, painted, with a fence, a garden, a bath and water?

Perhaps you say that the average miner will not appreciate the little cottage, and that the bathtub would soon become the storage place for all kinds of rubbish. Perhaps in a way you are right, but if you can elevate the average miner to the point of appreciating his home, with its pleasant surroundings, you will surely find that you have a better employee; and as you raise the standard of life for one miner, you have thereby raised the standard of your camp.

Do you make 50 per cent. profit in the company store, or are you satisfied with 10? Are you like the mine manager who remarked—"We will do all right his year, as we are getting the coal on the railroad ars for the same money at which it is sold, and we can declare a good dividend from the profits of the store nd the rents." The houses of this company were mere shacks, yet they rented for $5 per month per room; the nearest competitor of the company store was four miles away over practically impassable wagon ads.

Do your employees respect you as an individual, or ecause you are the boss? Are you and your men roud of your camp and mine? Do you put dollars, safety first? As the mine owner or manager, you e a personage in your community and this gives ou many privileges, as well as many duties. Do you use the privileges? Do you recognize your duties?

r. Employee:—

Do you give the company full value for your pay? o you aid them to the best of your ability? Do u obey all rules and regulations that are made for ur safety? Do you appreciate the trim little cottage, with its garden and bright surroundings? Do you help the company to make the camp and the mine the best in the field?

Are you loyal to the company? Do you protect its interests? Do you ever try to aid its owners even though this means a little extra work for you? Or do you scheme to get a 15-min. delay in reaching the parting with your loads, so you will not have to make the last trip? Do you kill time when the boss is not around, or do you work at the same rate as when he is standing over you?

Do you only look forward to payday, and the sound of the whistle, or are you proud of your work and anxious and willing to earn your pay? Do you save the extra spikes and bolts, or do you throw them away because there are plenty more in the supply house? Do you bring out the extra timber, or do you hide it behind the gob?

Have you always been square in your dealings with the company? Or, are you like this miner: He had an entry under contract; it was in low coal and the rock was paid for at $2 per yd. The bank boss left his paint at the mouth of the entry and did not put up any yardage stamp; the next month the entryman devoted all his time to pushing his rooms while he only drove the entry 8 ft. A new bank boss came on, and when he measured up the yardage he used the last stamp of the previous boss and gave the entryman 69 ft. Did the miner correct this mistake? No sir, he took the $46 with a grin, and as an excuse said—"It was the company's fault, and anyway they have beat me out of more than that in the store."

To Both Employer and Employee:—

It is probable that ideal relations between you two will never be fully realized. However, is it not possible to better the conditions that now exist? The company by taking more interest in the individual will cause him to realize that his efforts are appreciated, while the employee on his part can be more loyal to the company, and by carefully obeying its rules can help preserve the employer's property. Let us revert to first principles—"Do unto others as you would be done by," instead of doing others before they do you

Ash- and Coal-Handling Equipments

By Henry J. Edsall*

SYNOPSIS—Although the pivoted bucket carrier is higher in first cost, the operating and maintenance charges are so low that this style of conveyor shows the best results through a long period of service. For storage, a "Dodge" system is best for sized anthracite, and a locomotive crane or a traveling-bridge tramway is best for run-of-mine bituminous. The second and concluding article on the subject.

⁂

A coal-handling equipment supplied with a pivoted bucket carrier system is, of course, designed only for a small plant. As a rule, a first-class pivoted bucket carrier for handling both the coal and ashes is the simplest and best arrangement, and works out to be the cheapest in the end. While it may be somewhat more expensive in first cost, the operating and maintenance costs are so low and there are so few delays that run into expense so quickly, that the carrier shows the best results when followed through a long period of service. There is, however, a great difference in pivoted bucket carriers, as there is in all machinery, and to get good results, it is necessary to select a carrier that is carefully designed and one in which the materials and construction are of the best.

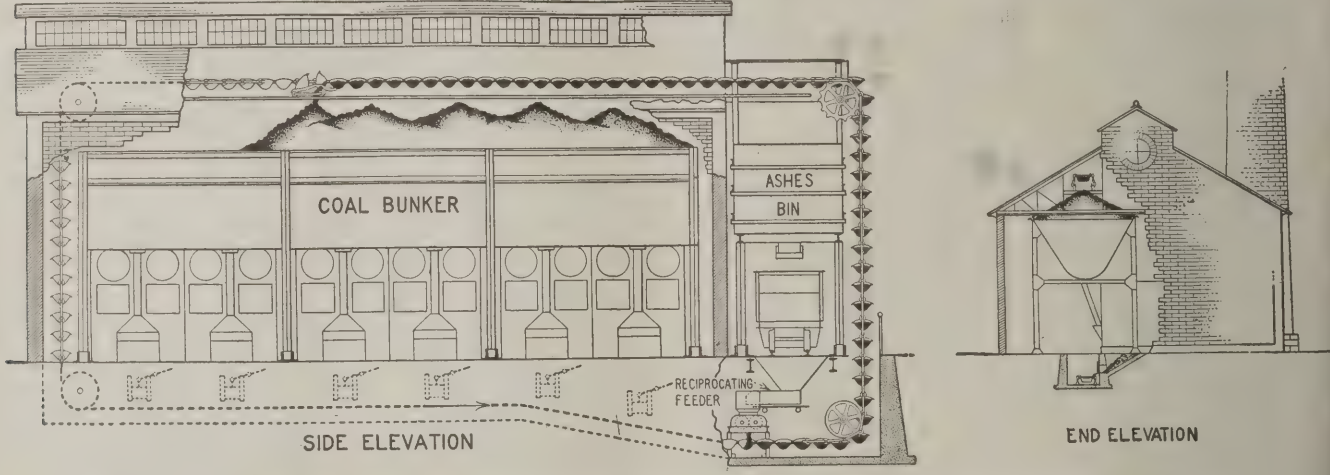

Fig. 1. Boiler Room Equipped with Conveyor Handling Coal and Ashes Fig. 2.

Figs. 1 and 2 show a boiler room equipped with mechanical stokers and overhead coal and ash bins and with a pivoted bucket carrier for handling the coal and ashes. The coal is fed from the track hopper to a crusher by means of a reciprocating feeder. After passing through the crusher it goes directly into the carrier buckets which elevate it and convey it to the bin where a movable dumper can be set to dump the coal from the buckets at any point. The coal then feeds by gravity from the bin through the stoker spouts to the mechanical stokers. The ashes go into hoppers underneath the furnaces and are then fed by gravity or raked out into the carrier buckets, which take them up and deliver them to the ashes bin for discharging to railroad cars or carts.

Fig. 7 shows a bin in a boiler room with spouts direct to stokers, and Fig. 4 shows a bin with a traveling weighing hopper underneath so that the coal can be weighed before it is delivered to the stokers. Fig. 5 shows an elevated ashes bin built with concrete columns and floor, brick walls, and corrugated-iron roof. This makes a practically permanent construction, whereas a steel bin is subject to more or less corrosion from the sulphuric acid formed by the action of the water used in quenching the ashes. This corrosive action is also quite serious where steel is used for the buckets and chain in the carrier. Malleable iron, however, is much less subject to corrosion and stands up remarkably well, and by using case-hardened steel pins and bushings with large bearing surfaces at the chain joints and large well oiled rollers, a very durable carrier can be obtained.

Comparison between Belts and Elevators

The earlier carriers for handling coal and ashes, like first designs in most kinds of machinery, were not very satisfactory because the ashes and acid quenching-water cut and corroded them so rapidly. This has prejudiced many people against handling coal and ashes in one carrier, and as a result, separate systems for each are very popular with many engineers. This means two systems to install, operate and maintain, and the cost for each of these three items is usually higher than with the best modern carriers. The coal handling usually consists of a chain and bucket elevator or inclined flight conveyor or belt conveyor for elevating the coal, and a flight or belt conveyor for distributing. For ordinary capacities, flight conveyors are cheaper to install and, contrary to the ideas of many engineers, cheaper to maintain than belt conveyors. Distributing with a flight conveyor also requires only simple slide gates, whereas the belt conveyor requires the more expensive tripper and a track for it to run on. For long conveyors or very large capacities, the belts show a considerable saving in power and, on account of the higher speed, the handling capacity is much higher for a similar width. For moderate lengths and capacities, however, the saving in power is a very small item, and, as stated before, the flight conveyor is cheaper in first cost and cheaper to maintain. There is also some danger with a belt conveyor of having the belt badly torn by a sharp piece of steel or other foreign substance in the coal. When his happens, it is expensive, as the belt itself forms the principal item of cost in a belt conveyor.

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*Engineer with Link-Belt Co., Philadelphia, Penn.

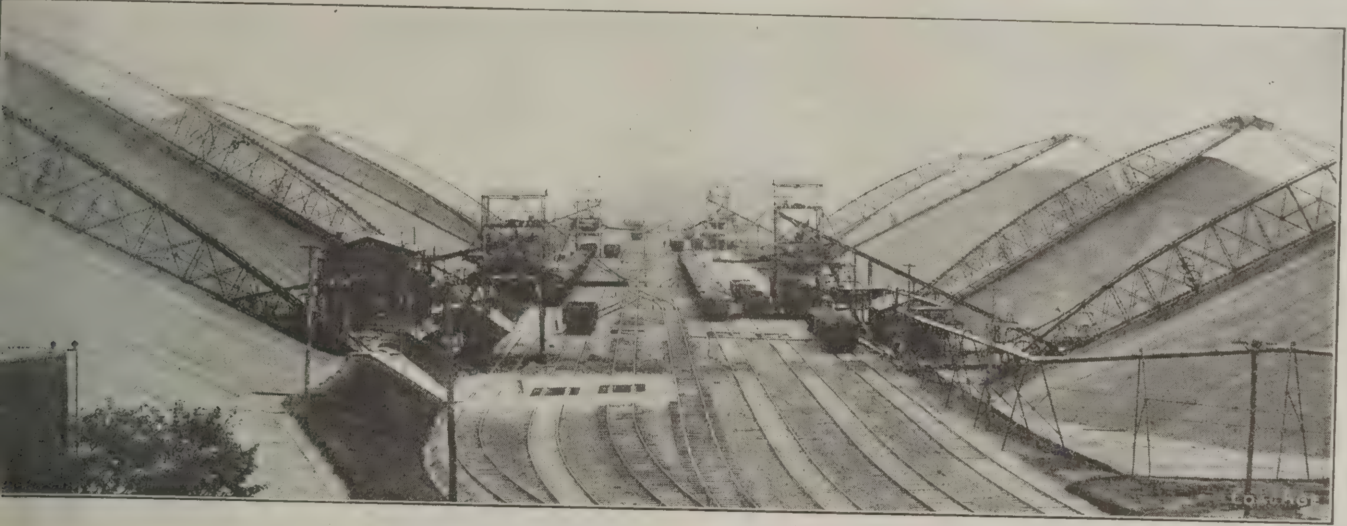
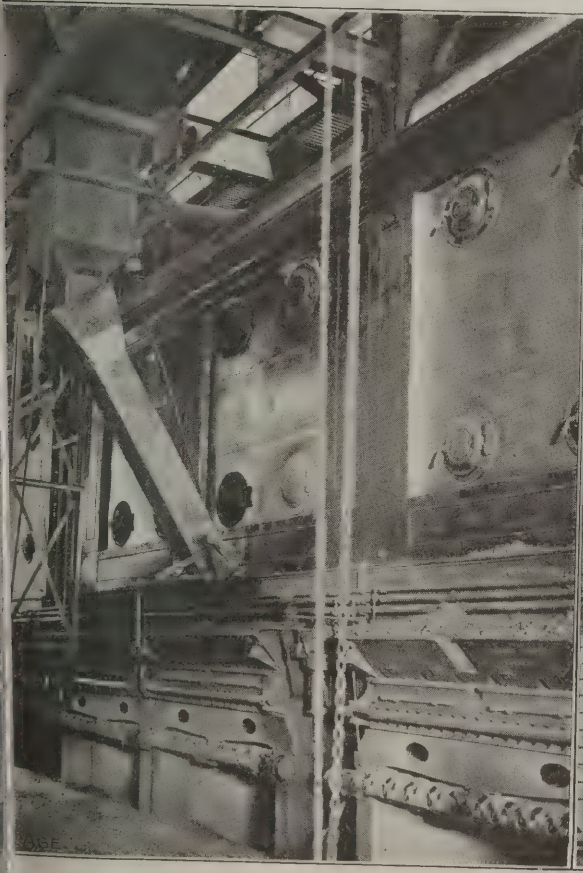


Fig. 3. A Large Storage Plant Using the Dodge System



4. Traveling Weighing Hopper Delivering Coal to Stokers

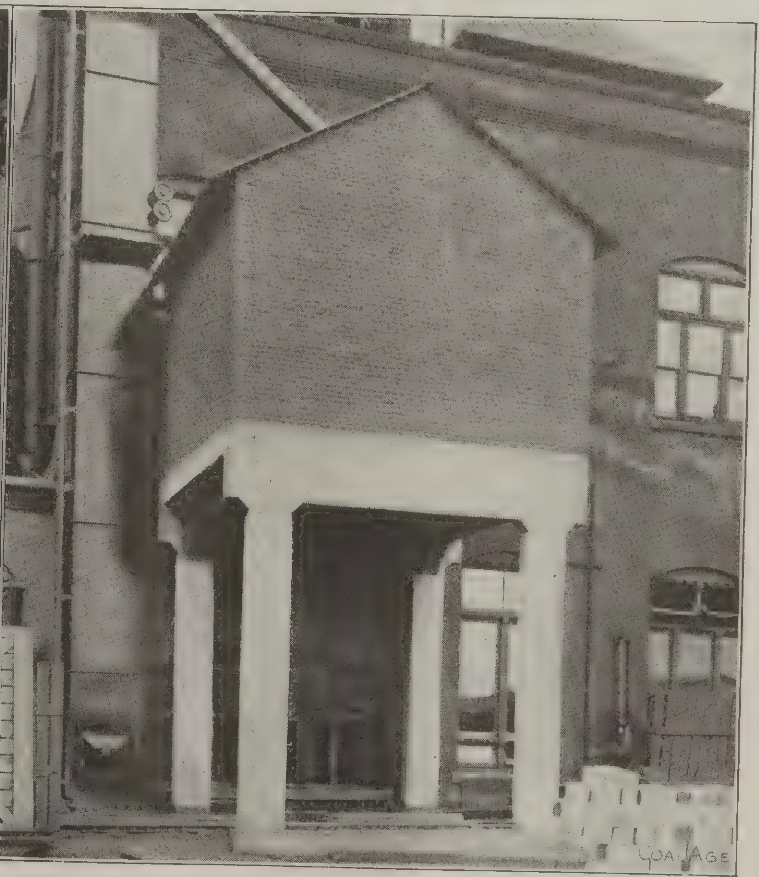


Fig. 5. Elevated Brick Ash Bin Built Outside of Main Plant

For handling ashes in a small plant, the usual equipment is a wheelbarrow or industrial car for moving them ontally, and a chain and bucket elevator or skip and hoist for elevating them. They can be either de- d to an overhead bin for gravity loading to wagons rs, or delivered direct to the wagons or cars, or to a d storage pile. The vertical chain and bucket ele- is a satisfactory type of machine for moderate ca- ies and moderate heights, if properly designed and constructed, but for large capacities or greater lifts, the skip hoist shows a lower maintenance cost. A pivoted bucket carrier will, of course, do the horizontal conveying and also the elevating with one machine, and will do this with a minimum amount of repairs, but the first cost is too great for small plants. Another type of conveyor that has proved economical for conveying ashes horizontally, or at an incline, is a block chain conveyor. This type of machine consists of a block chain, 8 or 12 in. wide, that slides along and pushes the ashes forward in a cast-iron trough. The only wearing parts are the chain, wheels, trough and return guides. The trough and return guides can be made quite thick so that they will wear for a long time, and the chain and wheels can be renewed without great expense even if they do not last for such a great length of time.

Pneumatic System for Handling Ashes

Recently, pneumatic systems have been developed for handling ashes and have even been used for handling both coal and ashes. One of the heaviest items of expense with such a system is the power cost, for a great deal of power is required in any blowing system. In handling a small amount of ashes per day, this is not a serious matter, but where a large amount of coal and considerable ashes also are to be handled, it becomes quite an important factor. It is also necessary to feed them slowly and regularly, and the coal or ashes must be quite dry or they will stick in the pipes. In feeding ashes they are usually raked out to openings in the floor, or fed from hoppers underneath the boilers, and the operation is much slower than with a pivoted bucket carrier that ordinarily handles 40 or 50 tons per hour or more. The pneumatic system therefore requires not only a larger motor, but a longer period of operation to handle the same amount of material. Where a pivoted bucket carrier would require a 7½-hp. motor for operation, a pneumatic system would require about a 40- or 50-hp. motor. This means much higher cost of operation. The principal claim for pneumatic systems is low maintenance costs, but this does not seem to be borne out by actual results. Certain parts wear out quite rapidly, especially the pipe elbows at bends, even though special steel wearing faces are provided. In handling coal there is also trouble caused by its being pulverized by striking the bends at high velocity, and this causes it to fall through the grates and work badly in the furnaces, thereby reducing the efficiency.

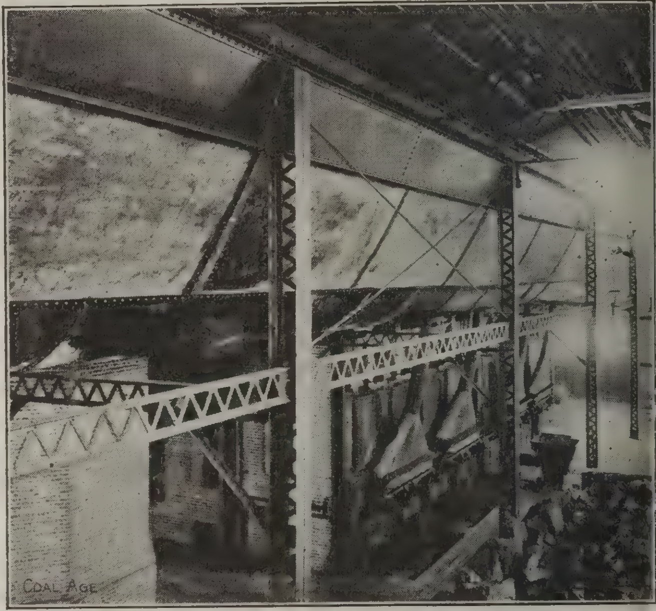


Fig. 7. Overhead Bin for Mechanical Stokers

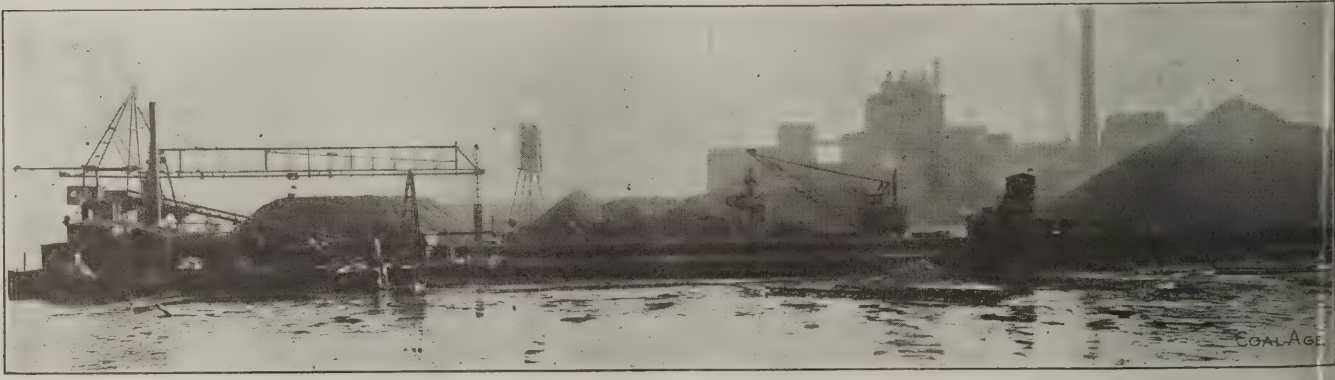


Fig. 6. A Coal-Storage Plant Using Three Types of Equipment

In very large power houses, electric ash cars are sometimes run in under the ash hoppers below the furnaces and the ashes delivered to them to be taken out and elevated to an overhead bin or disposed of in some other manner.

Reserve Coal Storage

Reserve storage plants are sometimes placed adjacent to a boiler room so that the coal can be reclaimed by mechanical means and delivered to a bin in the boiler room, or under the boiler-room floor. In other cases the storage plant is placed at some distance from the boiler room and the coal transferred by cars or other means. Attention has already been called to the scheme of using a simple chain and bucket elevator, inclined flight conveyor, or elevator and conveyor for unloading the cars, and piling on the ground and also to the use of the tub hoist or clamshell-bucket hoist for unloading boats, and the automatic or cable railway for distributing in a ground storage pile. A more flexible arrangement is a locomotive crane equipped with a clamshell bucket. With such a machine operating on a track on the wharf, coal can be taken from the boat and piled in a long pile directly back of the track, or it can be handled from the boat or the storage pile to a car or cars which can be pushed with the crane to the boiler room, and then handled with a conveyor equipment, or in some cases the coal can be delivered direct to a conveyor system, whic extends down to the wharf. In many cases locomoti cranes can also be used to advantage for handling ashe from pits or a pile on the ground to cars or carts. In man instances locomotive cranes are used to transfer coal fro boats either to a storage pile along the wharf, or to a ho per which feeds an inclined flight conveyor extending t the boiler room. An 8-ton car is also used for handlin the coal from the pile to the conveyor when taking from some distance from the conveyor-feeding hoppe

The Dodge System of Storing Coal

For very large reserve storage plants, the "Dodg system is usually by far the best for sized anthracite co and for run-of-mine soft coal either a locomotive cra with a long boom or a rotating or traveling bridge tramway.

The "Dodge" system has two inclined trusses attached together at the peak and having a flight conveyor running up one of them. The coal is fed from the railroad cars through a track hopper to the inclined conveyor which piles it on the ground in a conical pile of usually from 30,000 to 60,000 tons. Two of these piles and a reloader form a unit. The reloader is a flight conveyor which swings around on circular tracks at the ground level so as to cover practically all the area of the two conical coal piles. This reloader is swung against the side of the pile so that the flights can get hold of the coal and push it back and up an incline to the railroad cars. At the plant shown in Fig. 3, 14,400 tons of coal can be handled from the cars to the pile, and 10,000 tons back again from the pile to the cars in 10 hours, at a total cost of less than three cents per ton.

In storing soft coal it is necessary to spread it out over a large area and pile it not over 20 or 25 ft. deep on account of the danger of spontaneous combustion. A clamshell bucket traveling back and forth on a bridge tramway will form a pile over the whole area covered by the bridge, and the bucket can be used for handling to the pile or taking out of storage. If the bridge revolves around a central pivot point, it forms a circular pile, or rather two semicircular piles, for it is necessary to leave a cut through the center for the railroad cars to reach the central unloading pit. If the bridge travels engthwise, a rectangular pile is formed. The trolleys hat run back and forth on the bridge and carry the uckets, are either operated by wire ropes from one end f the bridge, or else the trolley has its own motor and the perator rides along with it in a cab. The first arrangenent usually works out best, unless the length of the ridge is too great for satisfactory control and operation.

A large-radius locomotive crane can be used to form ircular piles similar to the revolving bridge tramway, r it can be used for almost any shape of pile which fits nto the conditions. It is the most flexible and cheapst machine in first cost, and by extending the tracks for t to run on, the amount of storage obtainable can be xtended indefinitely. A 100-ft. radius crane with a fiveon bucket will handle over 200 tons per hour with ease.

Fig. 6 shows a modern reserve storage plant belongng to a large electric company. In this plant the "Dodge" ystem for storing anthracite is used and there are also locomotive crane and a bridge tramway for loading and nloading soft coal, three types being shown.

⁂

Miner Receives $37,500

What is said to be the largest verdict ever given in a ersonal-injury case in the United States Circuit Court as handed down by Judge Chalfield, in New York, rently, when Stanislaw Yensavage, a miner, was awarded 37,500 for injuries suffered while in the employ of the ehigh Coal Co., at Shenandoah, Penn.

On June 10, 1911, Yensavage was working as a helper the company's mines. While carrying percussion caps s oil lamp ignited one of them. An explosion followed, using the loss of both eyes, his right arm and all but e index finger and thumb on his left hand. He was in e hospital five months. He sued for $50,000. The jury as out only three minutes.

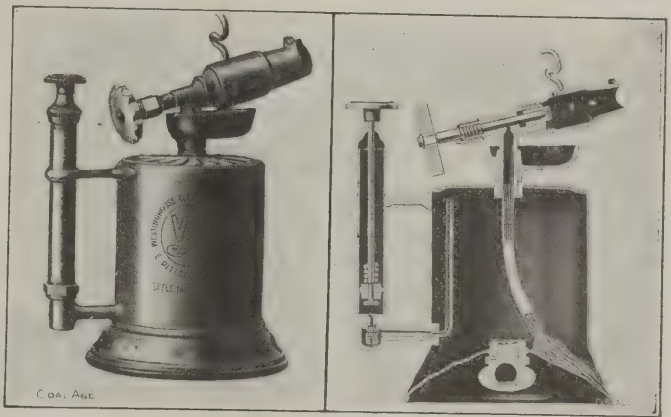
A Universal Blow Torch

A new gasoline blow torch has recently been placed on the market by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., which embodies a number of novel features and improvements. These, it is claimed, adapt the instrument for all conditions of service and it is, therefore, called a "Universal" blow torch.

The burner is made particularly heavy so that it will retain its heat and keep the torch burning in cold or windy weather. The drip cup is made especially deep so that it will start operation under bad weather conditions. These features, however, do not detract from the use of the tool for indoor work.

Another feature of the torch is the self-cleaning burner valve. The needle at the end of the valve stem cleans the hole automatically when the handle is turned. The valve seat need, therefore, never be injured by picking at the opening to clean it. The valve seat, furthermore, is a separate replaceable plug.

The handle of the valve is of fiber and does not get hot nor does it need a long valve stem for cooling as does one made of iron. On the other hand, it will not crack, loosen and come off as does a wooden handle nor does it char or burn.



General and Sectional View of Universal Torch

The tank, it is claimed, is of the heaviest gage brass ever used for such a purpose and is reinforced with an extra corrugated brass disk covering the entire inner surface of the tank pot. This insures the receptacle keeping its shape under rough handling.

The pump valve works in a cylindrical guide which assures perfect seating. It can be taken down and any part replaced separately.

COMING SOCIETY MEETINGS

Alabama Coal Operators' Association—This association will hold its annual meeting at Pine Tank, on July 26.

American Institute of Mining Engineers—This institute holds its next annual meeting at Butte, Mont., on Aug. 18 to 21, inclusive. Bradley Stoughton, 29 W. 39th St., New York City, is secretary.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremens Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

The History of the Gasoline Mine Motor

By R. O. Hodges*

SYNOPSIS—The gasoline mine motor was designed to fill particular needs of the coal industry. The author shows what these are and gives a description of the early attempts to produce a locomotive to meet the requirements. An article next week will answer some of the objections hitherto brought against the gasoline motor.

⁂

There are many places today where the mule still furnishes the most economical form of haulage. The original investment is not large; the system possesses great flexibility, and is, perhaps, more widely understood than any other. I have often been astonished at the ability shown by the mine mule to haul, for short distances, enormous loads, over any kind of track, despite improper treatment. But the mine mule's average pace is not greatly in excess of three miles per hour, and the mileage which he can cover in the course of a day is decidedly limited. The mule is also constantly liable to injury and is a menace to everyone in the mine.

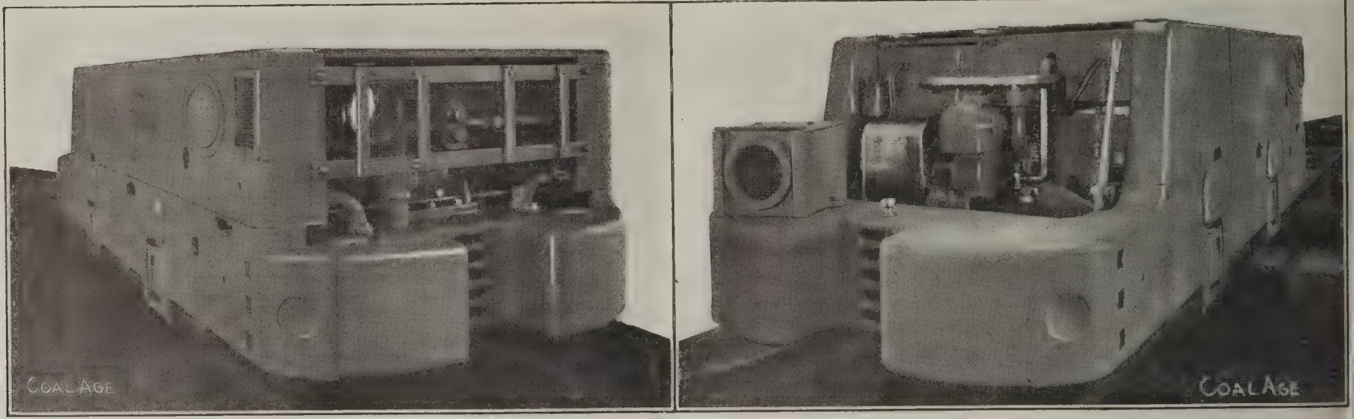
Steam Locomotives

Underground steam locomotives were much in vogue at one time in the anthracite region, and also to some extent in Virginia and West Virginia. They were also used to some extent in Europe. They could not be used without a tremendous amount of ventilation in the entry through which they worked, both on account of the steam which made the heading hot and the lights obscure and because of the immense volume of smoke and the incompleteness of the combustion. The large quantity of carbon monoxide and carbon dioxide given off by the combustion of a ton of coal, readily explains why the mining departments in most of the states have strenuously objected to steam locomotives being introduced into mines, although for cheapness of running and flexibility they leave nothing to be desired.

Compressed-Air Haulage

Compressed air holds a field today, from which I believe it will never be displaced. In deep and gassy mines, compressed-air must of necessity always be the preferred haulage. It operates entirely without sparks or flame of any kind and instead of detracting from the ventilation, it adds to the air-current a perceptible quota of clean and cool air. On the other hand, compressed-air motors are exceedingly bulky and require wide and high entries in which to operate. Their flexibility is strictly limited by the fact that they can, comparatively speaking, proceed but a short distance away from the charging station. The first cost of the compressed-air haulage plant is equal to, or probably in excess of the first cost of an electric installation.

While it is perfectly true that the efficiency of a compressed-air plant can be made nearly, if not quite, equal to the efficiency of the electric plant, mining conditions are such that this efficiency is rarely, if ever, realized, and as at present installed, it is probably the most expensive in fuel of any system of mechanical haulage. The difficulties in keeping pipe lines absolutely tight when the air pressure is 1000 lb. are very great. Unless pipe lines, the piston rings in compressors, and pistons in the air motors are kept in excellent condition, the air which has cost so much coal to compress will escape in abnormal quantities.



Front and Rear Views of Whitcomb Gasoline Locomotive

The Electric Motor

I once saw a statement, made by Mr. Edison, I think, in regard to electricity, which I believe largely accounts for its popularity in many lines. He stated that to produce mechanical power with an electrical current only one single, simple, rotating member was necessary. This is strictly true, and mechanically considered the electric motor is the simplest machine of which we know. There is nothing needed except one drum with its windings rotating at a greater or less speed between the poles of two or more magnets, and we only have to introduce some gearing of the simplest possible form between this rotating drum and the wheels of a mine motor to obtain the power necessary to pull the mine cars. Mechanically there is nothing to get out of order, and as long as we can keep electricity passing and nothing burns out, the motor is bound to keep on pulling coal.

---

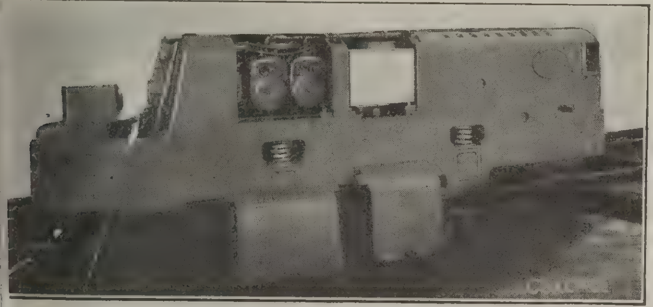
*Mechanical engineer, Geo. D. Whitcomb Co., Rochelle, Ill.

Note—Article read before West Virginia Coal Mining Institute, June 24, 1913, at Morgantown, W. Va.

It is a little hard to criticize a system of haulage which has proved, by long experience, to be such a monumental success, but it is not without its disadvantages. Methane is lighter than air, and a trolley wheel moving along a conductor is about the most perfect means for the ignition of gas. If we could get one-half as good a spark or flame in the cylinders of our motors as is obtained from the ordinary mine trolley, what few ignition troubles we have would entirely cease. These sparks from the trolley wire seem to me to exclude the electric motor from any place in which there is the least danger of gas being present in explosive quantities.

Excessive Starting Torque

Some years ago I was frequently in the granite quarries of New England and I noted numerous attempts made o install electricity as a hoisting power on the large dericks by which the stones were lifted. The system never vas a success for this one reason: In starting the big locks of stone out of their beds it was necessary to put a train on the rope and then loosen the rock with wedges nd crowbars until finally it would break away and swing ut. The electric motor, if it cannot move, must either low a fuse or else burn up. Much the same difficulty found in its application to mining conditions. If it over-loaded, it gets very hot and either blows a fuse or rns out; and as you all doubtless know, when the elecc motor is finally burned out, it is an expensive job put it in condition for further service.



de View with Doors Removed for Inspection of Engine and Refilling of Gasoline Tank

Large First Cost of Electric Haulage

The initial investment for a properly installed elec- plant is heavy. Not only the electric motor, but trolley l feeder wires have to be furnished and erected at no ll cost. Moreover the rails have to be bonded to carry return current. All these items are by no means to be pised. The cost of preparing track for electric use is erally more than for any other systems, as in addition trolley wire, rail bonding, etc., the track itself has to carefully lined up with the conductor if the trolley o be kept on the wire. Also in mines with a bad roof cost of erecting and maintaining trolley hangers is siderable. I have not spoken of the initial expense nstalling an electric plant, of the necessity for dyna-, engines and boilers but these are a very real part of expense of an electric installation and even if the tricity is used for cutting coal we must not forget that rtain proportionate part of the expense of the power it must be borne by the electric motors which are ving their current from it.

Besides the danger of explosion from the ignition of combustible gas there is the danger of electric shock. We can reduce the voltage to a point where shocks while disagreeable are not dangerous or we can so protect the bare wires that there is little possibility that men passing to and fro underneath them will be shocked. Either means adds enormously to the original cost of installation.

The same objection applies to both electricity and compressed air, that the theoretical efficiency of the system is high but electricity is even more apt to leak than air. Mining conditions make an absolute prevention of these leakages almost prohibitive in expense. The ordinary mine operator therefore satisfies himself that the leakages cannot be avoided and gets an efficiency which is far below that theoretically obtained.

Early History of Gasoline Mine Motors

So far as I have been able to discover, the gasoline mine motor was in general use in Europe before it was even considered in this country, its development on that continent being nearly coincident with the evolution of the automobile. The motors had single or twin cylinders of low power and speed. They were not to be compared for a moment with the motors which have been developed on this side of the water. Yet, even under these conditions, they furnished what was considered the most economical means of haulage.

In this country some motors were built in Chicago and probably in St. Louis also, some seven or eight years ago; and I have heard a rumor that motors were built in Pennsylvania about the same time. The Geo. D. Whitcomb Co. also built a motor about the year 1900, which a year ago was still running. Besides these, I believe one or two other companies built motors for use in mines at quite an early date. The St. Louis motors were built by a concern which was unfamiliar with mining conditions. They consisted essentially of a slow-speed, single-cylinder, stationary type of engine, mounted on a mine car. The firm built about a dozen of them, shipped them out to the mines in the adjacent territory and they were all promptly returned, as they cost more money in repairs than the value of the coal they hauled.

The Mascoutah Experiment

We built one motor for a firm operating in Illinois. It was placed at first in a mine in which the grades were so excessive that the motor could not pull itself over them at all. This motor was slightly changed and shipped to the Kolb Coal Co., Mascoutah, Ill., and so far as we know is still in running condition and at work. This coal company now operates four of our motors of later model. The motor at Mascoutah had extremely light work to do so it kept on running despite its faults and we thought we had the whole problem of gasoline-motor haulage solved then and there. It was not until we built one or two more motors that we discovered that the work to which the machine was put had so much to do with its durability.

The company which I represent was originally formed to manufacture and sell the Harrison mining machines, which were the original compressed-air punchers. We have, therefore, been familiar with mining conditions for a great many years, and it seemed to us, about eight or ten years ago, that the gasoline mine motor offered us a field for increasing our business and would also put a check on the increasing use of electric mining machines. Many companies were installing electricity for coal cutting at that time simply because of the convenience which it offered as a means of haulage. Therefore, we started to build gasoline mine motors so as to give those who wished to use compressed-air punchers a suitable method of haulage.

Need of Great Strength

As I have said, the first motor which we built and sent to Illinois was put on such light work that we heard nothing from it. The second motor was sent down into Kentucky, I believe, and was an eight-ton machine. It was expected to haul about 800 tons of coal over a rolling grade some 2500 to 3000 ft. long; and except for the increase in size, we built this motor very much as we had erected the one we placed in Illinois. In other words, we took an automobile engine, transmission and clutches and put them on a frame and fully expected that the combination would haul coal. And it did most successfully, so long as we could make it stay together.

I have no record of the number of times this motor was rebuilt, but I do know that for three or four years about all I heard from the factory in regard to the gasoline motor was that it was being rebuilt. The owners of the mine showed exemplary patience, but at last even this was finally exhausted, and our motor was thrown out. In the meantime, however, we had tried many different engines, from the lightest to the heaviest type, from the automobile motor to that constructed for heavy marin work; from the cheap engines to the most expensive. W had experimented with many different forms of clutche and gears made in all shapes and of all materials, an at last we felt sure that we knew in the main what fea tures would work and could avoid those devices whic were unsuited.

The next motor that we built was sent down to th Roane Iron Co. at Rockwood, Tenn. In this machine w incorporated an enormous factor of safety, which we ha found necessary from our experience with the Kentuck motor. It was on this particular machine that we evolve the clutch which has since proved so successful. We use an engine of our own design made extremely heavy an of high-grade material, with the idea that we might po sibly get an engine that would hold together. Up to th time we had been driving direct from the transmission the front axle with gears and chaining back from t front to the rear axle, and the unequal strain from t gear-drive caused us endless trouble through broke axles. This machine was rebuilt and given the mode transmission and chain drive and ceased to give an trouble. The second machine which we sent into th mine had the chain drive, the present form of clutch, an of transmission, and it gave success from the first. was practically of the same design as we are using toda We have changed some of the smaller features and ha brought out other sizes of the same motor, but in t main, our later motors have been like the second loc motive installed in the Roane mines.

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Lining the Flush Pipe

SYNOPSIS—In flushing granular material into the worked-out sections of mines, unprotected pipes soon fail through the abrasive action of the material handled. Experiments with various pipe linings are here described and the results given.

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There seems to be no question but that flushing, or hydraulic stowage, in the worked-out portions of a mine is the best means of preventing surface subsidence. This method, however, involves many difficulties and considerable expense.

One of the chief sources of annoyance in this operation is the destructive action of both water and material handled upon the flush pipes. This, of course, varies with the nature of the filling, some substances being much more rapid in their action than others. Any material, however, that is fit to form an adequate filling will cut out an iron or steel pipeline in a surprisingly short time.

In order to overcome the corroding and abrasive action of the liquid and material handled, various pipe linings have been tried with more or less success. Wood has been, and is still used to a considerable extent for this purpose. This material, however, requires frequent renewal, and is, therefore, rather expensive for the service rendered. One or two installations have been made recently with cement-lined pipe, but these have been in service for so short a time, that no accurate conclusions may be drawn.

The Germans have, perhaps, had more experience along this line than any other people engaged in coal mining. In the Westphalian district, along the lower waters of the Rhine, the coal measures which are encountered at a co siderable depth are covered by strata which are decide soft and yielding. The surface, moreover, is comparati ly level and low so that any considerable subsidence wou render the land subject to inundation.

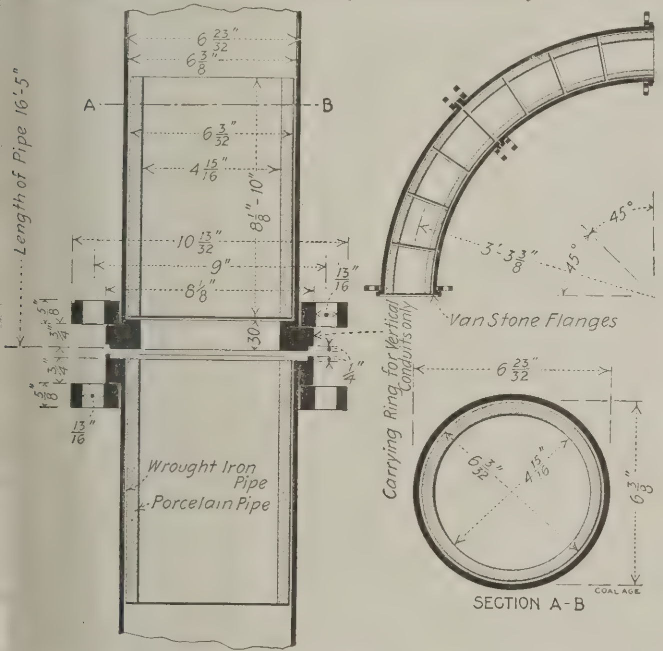
Extra precautions must, therefore, be observed to p vent, so far as possible, any settlement whatever of t surface. Careful experiment has shown that where ha packing is employed in the old workings, a surface su sidence equal to 40 per cent. of the thickness of the se may be expected, while with hydraulic stowage the grou only settles about 10 per cent. of the same thickness.

Due to its geographical location and the severe restr tions imposed by the mining authorities, the Gewerksch Deutscher Kaiser was one of the first German mines adopt hydraulic stowage upon a large scale. The st age material used was pulverized slag from the blast f naces of which about 2000 tons was available daily. periment showed that wrought-iron or steel pipe 5 m (approximately $\frac{3}{16}$ in.) in thickness wore through af 16,000 tons of this material had been passed. Even turning the tubes three times, each turn being for o third of a revolution, only 48,000 tons could be hand before the failure of the pipe. In some instances, tubes failed before the third turning could be acc plished, and much interruption of work was thus casioned.

To overcome this rapid wear and consequent expe a series of experiments were undertaken by the min engineer, Peter Mommertz. These tests were dire toward finding a practical lining for the pipes w would be more durable than the ordinary wrought iron. From these experiments it was ascertained that porcelain, glass and earthenware were more durable than either wrought or cast iron or steel. As these were laboratory experiments only, and might, therefore, prove deceptive, tests were begun upon a more comprehensive scale.

A number of pipes were accordingly lined with these different materials and put to work conveying the packing material underground. After 47,000 tons of material had been passed through the pipes, those of unlined wrought iron were worn out. Those lined with cast iron showed an abrasion of approximately ½ in.; those lined with glass showed a wear equivalent to from $\frac{1}{16}$ to slightly over ⅛ in., while the porcelain-lined pipes showed no wear at all, the linings being merely polished at the joints.

Experiments conducted on wood-lined pipes using fir, pitch pine and oak, under similar conditions to those above described, were entirely unsatisfactory. At the rst inspection of such pipes, the lining was found to ave entirely disappeared. It was believed that a part f the lining wore through, giving the flowing water a ance to loosen up and carry away the remainder.



ection of Pipe Showing the Lining on Straight Length and a Curve

The iron or steel pipes used in these experiments were rdinarily 5 m. (approximately 16 ft.) long. The porce-in linings, however, were made up in short lengths, ever exceeding 1 m. These linings were firmly held in ace in the manner shown in the accompanying illustra-on. The short lengths of the lining pipes also make em easy of transportation in the ordinary mine car.

One of the principal difficulties encountered with the rcelain linings was the presence of elbows in the pipes. his may be overcome in one of two ways: First, making e bend of long radius, so that the solid material carried es not come sharply in contact with the lining. This so reduces the friction, due to the bend. Second, a ting can be made which is similar in principle to the dinary dead end T. This contains a pocket which fills with the material carried and forms as a "buffer" for e sand to impinge upon.

So satisfactory has been the use of these linings, that they are now employed throughout the entire flushing system of this mine and are giving results in everyday operation which are vastly superior to those afforded by anything else. They have also been introduced extensively in Belgium, France and other regions of Germany. It has been found, furthermore, that on lengths of horizontal pipe a complete lining is unnecessary, as a half or slightly less than half lining will answer all purposes.

Although hydraulic stowage and the disposal of mine refuse is a serious problem at many American collieries, this particular pipe lining has never been tried. The American patents are controlled by the Rhineland Machine Works Co., of 140 West Forty-second St., New York. This company informs us that one firm of American operators has manifested great interest in this invention and contemplates giving it a practical test at no very remote date. This will be watched with great interest by all American mining men.

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Death of Baird Snyder

When an automobile in which they were riding got beyond the control of the chauffeur and plunged over a 75-ft. embankment at Scott's Hill, near Wapwallopen, at 4 o'clock, July 8, Baird Snyder, Jr., of Pottsville, and C. S. Shindle, of Tamaqua, were fatally injured. Mr. Shindle lived only a few minutes and Mr. Snyder died next morning at the Wapwallopen Hotel without regaining consciousness. Mr. Snyder was the president of the Locust Mountain Coal Co., and former general superintendent of the Lehigh Coal & Navigation Co. He was also vice-president of the Hirsch Electric Mine Lamp Co.

The men were on their way from Hazleton to Berwick. Somewhere near Briggsville they got on the wrong road, reaching Scott's Hill, where the fatal accident occurred. The chauffeur, failing to notice a sharp turn about half way down the hill, let the car run rapidly. Sighting the turn when it was too late, he threw on the emergency brake and reversed his engines. The momentum of the car resulted in the stripping of the entire rear gearing and the automobile plunged over the embankment into the ravine below. Snyder was thrown clear of the car. He failed to regain consciousness and died next morning.

Shindle was caught beneath the tonneau and was crushed to death. One of his eyes was torn and every bone in his body broken. It was necessary to use block and tackle to free his body from the wreckage. Lyman, the chauffeur, was found on the mountainside tearing his hair out by the roots and crying convulsively. He is a young man about 19 years of age and comes from New York City. Two of his fingers were torn off.

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International Exposition of Safety and Sanitation

The First International Exposition of Safety and Sanitation ever held in America will take place in New York City, Dec. 11-20, 1913, under the auspices of the American Museum of Safety.

All branches of safety and sanitation work will be represented. Exhibits from foreign countries will by a special act of Congress be admitted free. Much work of like kind has been done abroad, and there are 21 museums of safety in Europe; these will all contribute to the exhibit.

The Economical Use of Anthracite

By Reginald Trautschold*

SYNOPSIS—A detailed analysis of the various costs of the different grades of anthracite coal. Also a study of the economies to be effected by using mixtures of the different sizes. It has been found that operating costs at large plants can be materially reduced by this means without any appreciable loss in efficiency.

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Necessity for husbanding the anthracite-coal deposits of the country has led to many tests and experiments to ascertain the economic value of low-grade coals and has thereby given considerable publicity to the matter of "the rational use of low-grade fuels." These are steps in the right direction, but it would seem that a more important consideration is "the rational use of *lower*-grade fuels." This does not mean that the low-grade fuels should not be utilized as much as possible and that every effort should not be made to perfect grates upon which to burn rice, barley, culm, etc., economically, nor that progress in perfecting the gas producer for operation on these comparatively poor fuels, is not of the utmost importance.

Economies Effected by Mixtures

All such efforts, tending toward the conservation of our fuel deposits, should be strenuously pushed; but of even greater importance (owing to the thousands of power plants which operate on specific grades of coal and which will probably continue to be so operated for years), is the rational use of *lower*-grade fuels. That is, the use of mixtures of standard sizes rather than confining ordinary consumption to some one specific size. For instance, a plant designed to operate on pea coal can, nine times out of ten, burn a mixture of pea and buckwheat as efficiently and with considerable profit to the owner of the plant. Naturally, what is true of anthracite coal is equally true of bituminous coal and other fuels, but the limited scope of this article necessitates confining the discussion to the use of anthracite—which coal is also better standardized as to sizes and heating values, etc.

Considering anthracite coal and its use only from an economic standpoint, it is true that coal from various mines differ in heat-generating value. This has led to the forming of certain companies that sell coal on a B.t.u. basis, instead of entirely by weight. While all mines do not produce coal of equal heating value, nevertheless good anthracite does not vary so much in this respect as to prohibit a fairly accurate average being arrived at as typical of this kind of fuel.

Furthermore, in the standard preparation of anthracite for the market, the amount of slate, bone and other foreign material that may be contained in any standard grade of coal is specified and this allowable proportion of foreign material—reducing the heating value of the coal—increases as the size of the coal decreases. Anthracite coal may then be considered in units of heating value even more logically than by weight. A million B.t.u. may, therefore, be taken as the unit of measure and the economic value of the various sizes of coal based on such classification, the weight of coal containing such heating value growing greater, as the size becomes smaller.

An Analysis of the Cost of Coal

Three distinct charges can be usually credited to the cost of coal at the power house, first, the price of coal at the mines, second, the transportation or freight charge, and third, a burden consisting of the retail dealers' profit, or the cost of transferring the coal from its railroad or barge terminal to the power house. The present average price (April, 1913) of anthracite coal at the mines, at tidewater, New York, and the average price of the coal delivered at the power house (all expressd in cents per million B.t.u. heating value of coal), is graphically depicted in the accompanying chart.

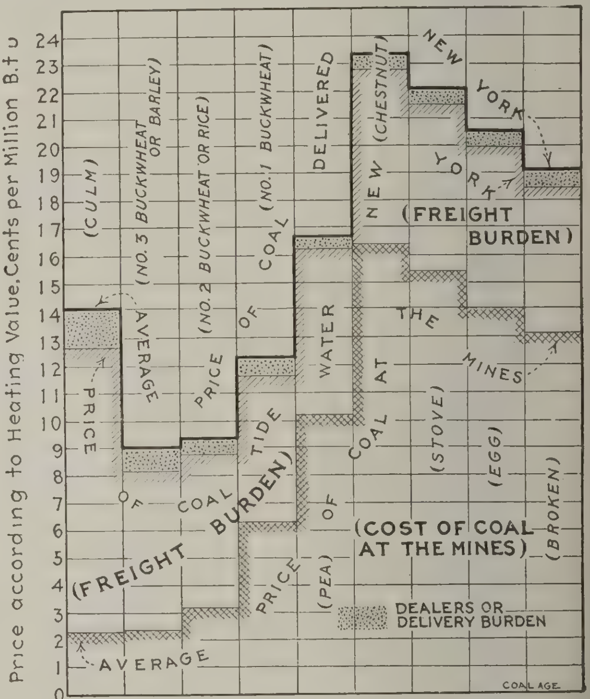

Chart I. Cost Burdens on Coal at New York

The price of coal at the mines varies as would be expected, the prepared sizes, from broken down to pea, increasing as the size of coal decreases, while the price of the washery sizes, from pea down to culm decreases as the sizes of the coal becomes less. The freight burden, on the other hand, is very nearly constant for all sizes of coal, if heating value is made the basis of consideration, though decreasing in rate per ton below pea and being constant (per ton) for the prepared sizes of anthracite. The burden of delivery or dealers' profit, being based entirely on weight, increases as the heating value of the coal decreases; that is, the poorer coal carries a proportionally greater burden.

The conditions governing the economic value of coal at present prices then varies considerably with the location of the power house. At the mines, the most economic fuel, provided it could be efficiently consumed, is culm although its present economic value as a fuel is very little better than that of buckwheat No. 3. At tidewater, New

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*Consulting and contracting engineer, 22 East 10th St., New York City.

York, or delivered New York, culm (provided again it could be economically used) would not be as economical as the much richer fuel, buckwheat No. 1; buckwheat No. 3 is here the most economic anthracite fuel where it can be efficiently burned, but when delivery charges, etc., are taken into consideration, there is little difference between rice, buckwheat No. 2 and barley, buckwheat No. 3.

In fact, changing from the use of the more expensive coal to barley would probably show very little or no saving in the cost of fuel at a New York power house, owing to the greater labor charge, expenses for special rates, increased quantity of ashes to be disposed of, etc., hat would be necessary when operating on the less effiient, though cheaper fuel. In any locality, chestnut is he most expensive fuel among the anthracite coals, and or this reason is principally confined to special uses and omestic consumption. This is also true of stove and egg.

Broken coal is likewise limited to special uses, the prin-iple one of which is the coaling of locomotives. Here he wisdom of the railroads is well illustrated for the uestion of freight is much less a burden to them than o the public. Hence, the economic fuel for a locomotive s also the economic fuel of the mines. At the mines, roken anthracite is relatively about as cheap as pea, nd when the severe conditions under which a locomotive ust operate are taken into consideration—conditions far ore adverse than those existing in any power house— is probably the most economic grade of anthracite coal they could use. Egg, stove and chestnut are too expensive for general use by locomotives, but pea is used with relative economy. The smaller coals are unsuitable for locomotive use unless briquetted, but briquettes of low-grade anthracites, with and without the addition of some bituminous coal, are being successfully used on many locomotives. In fact, certain manufacturers of briquettes turn their entire output over to the railroads.

Mixtures Should Be More Generally Adopted

The best use of the small sizes of anthracite coal would then seem to be in the stationary power house. The advent of the gas producer has made possible the most economic use of these grades of smaller sizes of anthracite. Even culm has been used as fuel in gas producers in Germany since 1903, 2.2 lb. being consumed per horsepower-hour. In this country, though the use of gas producers is rapidly increasing, the general use of coal for the generation of steam in power houses still continues, and the main consideration is, therefore, its most economic use for this purpose. However, the use of coal as fuel, whether burned on grates or used in the generation of a power gas in producers is, of course, directly dependent upon its heating value.

Its economic use provided that the various sizes of coal can be burned or reduced with equal efficiency, is then dependent upon the price paid per heat value and not upon the price per ton of coal. This has naturally led to the almost universal practice of using only the small sizes

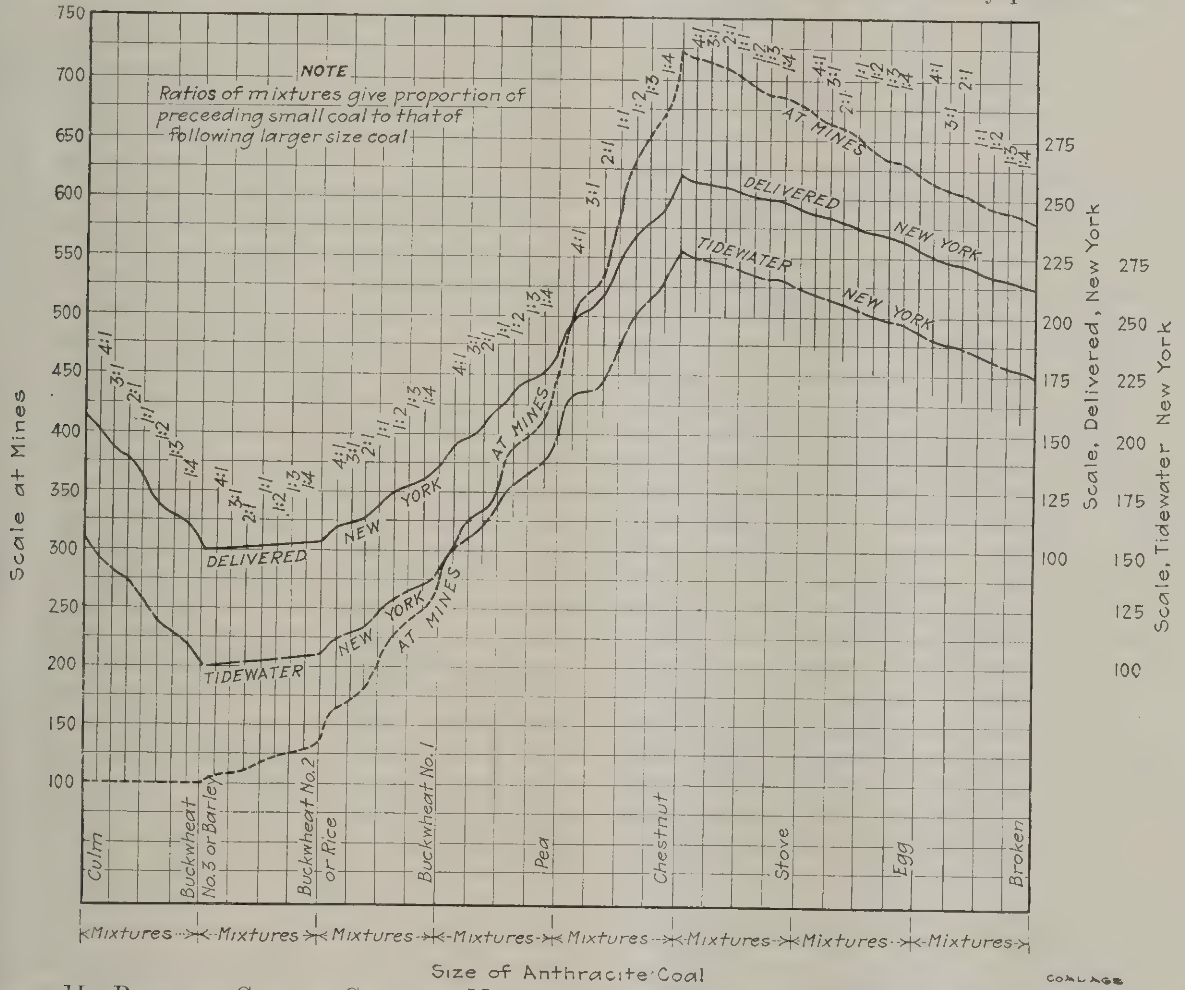


Chart II. Relative Cost of Coal per Million B.T.U. Expressed in Percentage of Most Economic Fuel of anthracite in the power house, and to the building of grates, etc., for the accommodation of specific sizes of coal. The manufacturers of furnaces having done much toward increasing the use of small standard sizes of anthracite, it devolves upon the power-house owner to develop this still further by the use of *lower*-grade fuels. This can be accomplished by using mixtures of standard sizes of coal and gradually remodeling the plant and adapting it to use lower and lower grades.

This is realized at many efficiently managed plants, for the use of mixtures of standard sizes of coal is becoming steadily more general. There are many more plants, however, where the exclusive use of the particular sizes of coal for which their grates were originally built, still continues. Every such plant is not only wasteful of one of the nation's greatest and most valuable natural resources, but is paying much more than necessary for fuel—an economic blunder that can ill be afforded in this day of keen competition and corresponding necessity of waste elimination.

A plant operating on pea coal could probably be operated, with no changes, on a certain mixture of pea and buckwheat No. 1, the proportion of the latter being less than that of the larger coal; or a plant operating on buckwheat No. 1 could be operated with probably greater economy and quite as conveniently if a certain quantity of rice or buckwheat No. 2 was mixed with the regular fuel.

Furthermore, as the grates in any furnace have to be renewed from time to time, advantage might be taken of this fact to substitute a little finer grate with each renewal, so that a larger and larger proportion of the finer coal could be burned efficiently. Each increase in the proportion of the finer coal contained in the fuel fired would mean a reduction in the amount of the fuel bills. A point would undoubtedly be reached in every plant where increased difficulties of burning the fuel fed to the grates, the expense of accessories that might be necessary, etc., would limit the fineness of the coal that could be efficiently used in that particular plant; but in nearly every instance this limiting size of coal or mixture of coals would be less than that used in present practice. Such gradual alteration in the grade of coal used in any plant can be accomplished with no immediate expense and probably with an appreciable gain in economy from the very start.

Based on the assumption that the various standard sizes of anthracite coal can be used with equal efficiency, likewise mixtures of two sizes of coal, Table I gives the average price of the various sizes and mixtures at the present time (April, 1913,) per million B.t.u. heating value of coal at the mines, at tidewater, New York, and delivered New York. Chart II graphically illustrates the relative economic value, as heating mediums, of the various coals and mixtures in percentages of the most economic coal at each of the three points.

As an example of the advantage to be obtained by mixing coals of two standard sizes, a plant ordinarily operating on straight pea coal may be considered. Taking the cost of fuel per heating value of pea as unity, an addition of 20 per cent. of buckwheat No. 1 to the regular fuel would mean a reduction in the fuel bill of nearly 5¼ per cent. The quantity of buckwheat No. 1 added must, of course, be sufficient to replace the actual heating value of the coal it replaces. A mixture of half pea and half buckwheat No. 1—proportions in heating value of the two coals—would show a saving of nearly 13¼ per cent., while the substitution of straight buckwheat No. 1 for the pea would show a reduction of approximately 26½ per cent. in the cost of fuel necessary for developing the same power. These changes in fuel would have to be gradual, of course, and it might never be feasible to substitute straight buckwheat No. 1 as the regular fuel for the plant; still a considerable saving in the cost of fuel could probably be arrived at, and the most economic grade ascertained, by a gradual substitution of a poorer mixture for the regular pea fuel.

SAVINGS EFFECTED

The above savings could not actually be fully realized, it is true, on account of the increases in the amount of coal that would have to be handled, the ashes to be disposed of, and perhaps a slight increase in the labor item, but quite appreciable economies in fuel consumption could be made and this item constitutes from 60 to 90 per cent. of the total cost of power in a steam plant. A saving of but 5 per cent. on 60 per cent. of the cost of power would probably mean a net saving of anywhere from $500 to $1500 per year in a 500-hp. plant.

The development of gas producers has now reached a point where such generators can be economically and efficiently operated on the lowest grades of anthracite, and, unquestionably, the time is not far distant when the general use of anthracite fuel will be much more rational and economic than it is today. The broken coal may still be used, to some extent at least, for locomotive fuel, but even here the lower grades of anthracite will be used more extensively—in the form of briquettes.

The prepared sizes of anthracite will then be used almost entirely for special purposes; pea for domestic heating, etc.; the power house will be operated exclusively on the smaller sizes of anthracite, down to rice or even down to a mixture of rice and barley; mixtures of barley and culm and eventually straight culm will be used as fuel for gas producers, thus realizing the full benefit of "the rational use of the *lower* grades of fuel," as they refer to anthracite coal.

Conservation of the nation's anthracite coal deposits, a question that is rapidly becoming of paramount importance, would thus be taken care of by affecting the purses of the coal-consuming public, the only practical solution of the anthracite-coal question. And this can be done with profit to all, without reducing the revenues of the coal carriers—in fact, increasing the volume of transportation—and to a considerable profit to the mine owners by providing a market for much coal that is now comparatively worthless or of little value.

TABLE I. AVERAGE PRICE OF ANTHRACITE COALS, PER MILLION B.T.U.—APRIL, 1913

	At Mines		At Tidewater, N.Y.		Delivered N.Y.	
Culm	Cents	Per cent.	Cents	Per cent.	Cents	Per cent.
*	2.270	100.00	12.720	155.00	14.100	157.00
4 : 1	2.278	100.36	11.816	144.20	13.080	149.00
3 : 1	2.280	100.44	11.590	141.20	12.825	142.50
2 : 1	2.283	100.57	11.213	136.80	12.400	137.77
1 : 1	2.290	100.88	10.460	127.50	11.550	128.33
1 : 2	2.296	101.14	9.706	118.30	10.700	118.88
1 : 3	2.300	101.32	9.330	113.70	10.275	114. 7
1 : 4	2.302	101.41	9.104	111.00	10.020	111.33
Buckwheat No. 3 or Barley						
*	2.310	101.76	8.200	100.00	9.000	100.00
4 : 1	2.470	108.81	8.294	101.20	9.070	100.77
3 : 1	2.510	110.50	8.320	101.40	9.090	101.00
2 : 1	2.560	112.65	8.360	102.00	9.120	101.33
1 : 1	2.710	119.30	8.435	102.60	9.180	102.00
1 : 2	2.840	125.00	8.513	103.65	9.233	102.60
1 : 3	2.910	128.20	8.550	104.20	9.260	102.90
1 : 4	2.950	129.85	8.580	104.55	9.280	103.10

Buckwheat No. 2 or Rice						
*	3.110	137.00	8.670	105.70	9.350	104.00
4 : 1	3.740	165.00	9.270	113.00	9.940	110.44
3 : 1	3.900	171.50	9.420	115.00	10.090	111.21
2 : 1	4.160	183.00	9.666	117.80	10.333	114.80
1 : 1	4.680	206.00	10.175	124.00	10.830	120.33
1 : 2	5.200	229.00	10.670	130.20	11.320	125.80
1 : 3	5.465	240.05	10.920	133.10	11.560	128.44
1 : 4	5.620	247.50	11.070	135.30	11.710	130.11
Buckwheat No. 3						
*	6.250	275.50	11.666	141.50	12.300	136.66
4 : 1	7.040	310.00	12.570	153.30	13.200	146.66
3 : 1	7.490	329.50	12.800	156.20	13.405	149.00
2 : 1	7.570	333.00	13.180	160.70	13.770	155.22
1 : 1	8.225	362.00	13.940	176.00	14.510	161.22
1 : 2	8.860	390.00	14.700	179.00	15.247	169.41
1 : 3	9.210	397.50	15.080	183.80	15.615	173.50
1 : 4	9.410	414.00	15.310	187.00	15.810	176.00
Pea						
*	10.200	450.00	16.220	197.70	16.720	185.00
4 : 1	11.440	504.50	17.730	216.40	18.036	200.40
3 : 1	11.750	518.00	17.850	217.80	18.365	204.05
2 : 1	12.270	540.00	18.200	221.80	18.913	210.16
1 : 1	13.300	586.00	19.490	237.50	20.010	222.33
1 : 2	14.330	631.50	20.560	250.30	21.110	234.55
1 : 3	14.850	654.00	21.120	257.20	21.660	240.66
1 : 4	15.160	668.50	21.650	264.00	21.984	244.27
Chestnut						
*	16.400	722.50	22.750	277.50	23.300	259.00
4 : 1	16.200	714.00	22.500	274.50	23.056	256.18
3 : 1	16.150	712.00	22.490	273.50	22.995	255.50
2 : 1	16.060	707.00	22.333	272.30	22.890	254.33
1 : 1	15.890	700.00	22.125	270.00	22.690	252.00
1 : 2	15.720	692.50	21.920	267.50	22.486	249.84
1 : 3	15.640	685.00	21.810	266.00	22.385	248.20
1 : 4	15.580	681.50	21.750	265.50	22.324	248.00
Stove						
*	15.380	678.00	21.500	262.30	22.080	245.33
4 : 1	15.110	666.00	21.190	258.30	21.760	241.80
3 : 1	15.020	662.00	21.110	257.30	21.685	240.93
2 : 1	14.920	657.50	20.980	255.80	21.550	239.66
1 : 1	14.690	652.00	20.730	253.00	21.290	236.50
1 : 2	14.460	637.00	20.470	249.50	21.170	235.20
1 : 3	14.345	632.50	20.340	248.00	21.000	233.30
1 : 4	14.276	628.00	20.260	247.00	20.900	232.20
Egg						
*	14.000	616.50	19.950	243.50	20.500	228.00
4 : 1	13.830	610.00	19.650	240.00	20.204	224.50
3 : 1	13.790	607.00	19.575	239.00	20.130	223.70
2 : 1	13.720	604.00	19.450	237.50	20.007	222.30
1 : 1	13.580	597.50	19.200	234.20	19.760	219.55
1 : 2	13.430	591.50	18.950	231.30	19.513	216.70
1 : 3	13.360	588.50	18.825	229.50	19.390	215.44
1 : 4	13.320	586.50	18.750	228.60	19.316	214.62
Broken						
*	13.150	580.00	18.450	225.00	19.020	211.33

* Indicates a straight grade unadulterated.

Note:—First number refers to proportion of grade coal under heading; second number refers to proportion of next larger grade coal. Proportions according to heating value of coals.

⁂

New Element Causes Trouble

The activities of the Industrial Workers of the World in some parts of the anthracite coal regions of northeast-rn Pennsylvania are giving rise to some difficult situa-ions. The I. W. W. has been trying to organize in that section in competition with the United Mine Workers of America for some time past. It is said that it hopes ultimately to absorb the latter organization.

The appointment of local grievance committees, agreed o at the conferences between the mine workers and the operators last year, has proved fruitful of more local strikes than any other cause. One reason for this is hat there is just enough of the foreign element (chiefly Italians, Poles and Slavs, who are more easily cajoled by the promises of the I. W. W.) to have a member of hat organization on many of the grievance committees.

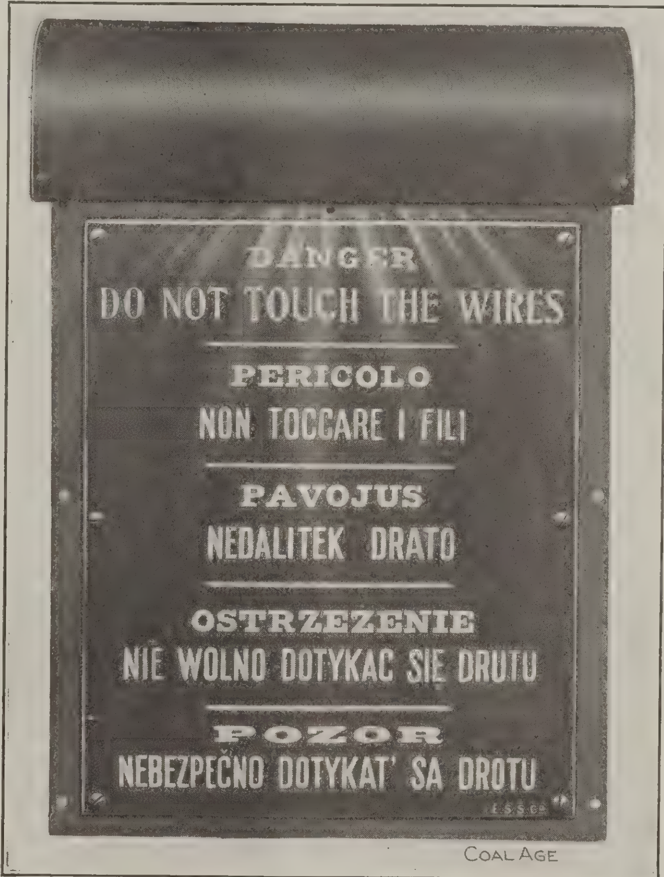
These members find it easy to tell miners, even those who had not thought of presenting any grievances, that hey are suffering abuses. If they tell a miner that he s working in a difficult place, that his is a bad spot and he ought to be getting more money for his coal, he is more than ready to believe them. Many of the local trikes are "button strikes"—efforts on the part of the United Mine Workers to increase their membership—but he presence of the I. W. W. agitators accounts for a fair proportion of the labor troubles.

A New Illuminated Steel Sign

To fulfill the demand for safety appliances and to conform with the many "Safety First" campaigns carried on by railway, mining and power companies, the Electric Service Supplies Co. has placed on the market a new type of illuminated sign like that shown in the accompanying illustration.

These signs consist of a steel frame joined at the top in the shape of a hood under which is placed a weatherproof socket for one incandescent lamp. The hood is given a coat of aluminum paint on the inside and acts as a reflector as well as a protection to the light bulb.

Standard enamel steel signs are attached to this frame by means of six machine screws, the standard size of the sign proper being 10x12 in.



Illuminated Danger Sign in Five Languages

These signs may read in several different languages like the one shown herewith, which portrays the message in English, Italian, Lithuanian, Polish and Slovak. They may be fitted with weatherproof condulets or bushings to protect the leading-in wires which enter the end of the hood, and to insure the proper operation of the sign after a maximum of rough usage.

They are used effectively in mines, power plants and along railways or at any point where human life is endangered by exposed electric wires, switches or third rails. In mines where an illuminated sign is essential they are used extensively to warn the workman of the danger of gases, falling timbers and electric wires. For railway companies their use at stations and cross-overs to inform the public of possible danger is fully recommended.

Our British Coal-Mining Letter

SYNOPSIS—Experiences in the British mercantile marine show that the mining industry of America has saved several steps in the direction of economy by not adopting triple-expansion (or similar) engines but by exchanging noncondensing reciprocators for steam turbines with a condensed exhaust. The "coefficient of volumetric efficiency" in air compression is not really an efficiency factor. Controllers do not produce undesirable strains on hoisting machinery.

⁂

At a meeting of the North-East Coast Institution of Engineers and Shipbuilders, at Newcastle, Eng., C. W. Cairns presented the results of a comparative trial between a cargo steamer fitted with geared turbines and one equipped with triple-expansion engines. The vessels were almost identical in essential characteristics for the purpose of the trial. Instructions had been given that the revolutions of the screw in each case should be as nearly as possible 62 to 63 per min. and that the vessels should be kept within signaling distance of one another. During the journey, the weather freshened, and a strong head wind and sea were encountered; therefore the revolutions were allowed to remain at from 60 to 62, the horsepower under such circumstances when running at 63 r.p.m. being excessive and abnormal.

The coal used during a continuous run of 36 hr. was measured. Owing to the heavy sea no extremely favorable figures were obtained for coal consumption per i.hp. Mr. Cairns declared that it was not safe to accept claims sometimes made that triple-expansion machinery could perform its daily work with from 1.2 to 1.5 lb. of coal per i.hp. The coal used per day by the two ships with triple-expansion engines was 32.7 tons and by that with a geared turbine set 27.8 tons. Thus the turbine showed an economy of 15 per cent. over the triple-expansion engines. Looking at the result from the opposite point of view, the triple-expansion engine demands 17.6 per cent. more fuel than the turbine set.

Air Measurement for Compressors

During discussion of a paper before the Midland Institute of Mining, Civil and Mechanical Engineers on the generation and use of compressed air for mining, P. O. Davis said that when tests with compressors are published the means by which the air is measured should be definitely stated. The result obtained is usually termed a "coefficient of volumetric efficiency." This is a rather misleading term, because it does not truly represent the efficiency of the compressor, and may rise to over 100 per cent. Perhaps the term "delivery coefficient" would meet the requirements better. People are apt to take it for granted that "volumetric efficiency" represents a ratio of work put in to work taken out, which, of course, is obviously not what is intended. This delivery coefficient cannot be accepted as correct unless actual measurements are made of the air delivered and are compared with those shown by the indicator diagram. There are several ways of measuring the air actually delivered. One is to pump out all the receivers. Another valuable method used for turbo-compressors is to force the air through an orifice, measuring the pressure before and after.

Measuring volumetric efficiency from the indicator diagram does not take into consideration the rise in temperature of the air in passing into the cylinder, which may be large, although not shown on the diagram. If the air is warmed up in passing through the inlet ports the temperature inside the cylinder is higher than that of the atmosphere. This increased temperature increases the volume of the air received and makes it appear that there has been a proportionate waste of air. In addition to the increase of temperature caused by warming, there is another loss caused by mixing the incoming air with air that has reëxpanded from the clearance spaces, and any additional high-pressure air which may have leaked past the piston rings or delivery valves.

Hoisting-Engine Controllers

The paper by James Black (see Coal Age, Vol. III, page 453) aroused much interest among Scottish engineers. Even in cases where the hoisting engine is given full steam to within about four revolutions from the end of the hoist when raising the normal load, he considers that complete control is desirable, as the speed which a cage loaded with men will attain, when it reaches that point with full steam on the engine, will be dangerous.

The opinion prevails that the greater the engine speed when the controlling gear comes into operation, the greater are the stresses set up in the machinery. Mr. Black considers this idea is entirely wrong, and says the rate of retardation varies directly as the acting force (the force producing retardation), and inversely as the moving mass, but it is entirely independent of its velocity. In other words, with a given braking force and a given cage load the rate of retardation is a constant, no matter what the engine speed may be when the controlling gear comes into operation.

The kinetic energy possessed by the moving mass varies as the square of the engine speed, and, consequently, when the controlling gear comes into operation the distance traveled by the cage before coming to rest also varies as the square of the speed of the engine. From this Mr. Black considers it is obvious that the stresses set up in the machinery when the controlling gear comes into operation are entirely independent of the engine speed. To show to what extent the Rosehall controller prevents "underwinding," he stated that three hen's eggs were placed on the cage in the bottom of a car. The hoisting engineer was then told to drop the cage in the pit bottom with the greatest speed which the controller would permit. He failed to break an egg, and could only slightly crack one and sometimes two of the shells.

Primeval Erosion of Coal Beds

Professor Kendall, of the University of Leeds, declares that "washes" or washouts in the coal measures are frequent in Yorkshire. The relation of "washes" to "faults" is such that it seems highly probable that either one might have been the cause of the other, or that both arose from a common cause. It is evident that faulting was taking place during the whole of the deposition of the coal beds, as it was indeed during the whole of the carboniferous era. Change of level has been shown to interfere with the normal formation of coal, whether the measures were raised or depressed.

SNAP SHOTS IN COAL MINING

Coal Washer, Tipple, Bins and General Surface Plant, Colorado Fuel & Iron Co., Starkville, Colo.

At the Sunnyside Plant of Utah Fuel Co.

Shows character of coke produced.

A night view at the ovens.

Plant of Western Fuel Co., Nanaimo, B. C., Can.

Shows headframe, tipple, washery and slack-coal conveyor.

Operation of the Carbon Fuel Co., Carbon, W. Va.

During recent strike trouble, camp was under martial law.

The Mine Explosion

By D. G. Thomas

Founded on an incident of the coal-mine explosion at Hanna, Wyo., June 30, 1903.

Ye lovers of the earth and sky,
The air and warm sunshine;
Give heed while I relate a tale
About a deep coal mine;
How death upon a sheet of flame
Rode madly through the pit,
And in his ire consumed with fire
The men who toil'd in it.

Two brothers from a distant land,
Two brothers fond and dear,
Had come from merry England's shores
To live and labor here;
Their wives—two handsome new made brides—
Came with them o'er the foam
To aid and bless with love's caress
The founding of a home.

They settled in a mountain camp
Where nature long had frowned.
So desolate the hills and plains
So barren was the ground
That not a tree nor e'en a flower
Could find a place to grow;
For shifting sand rolled o'er the land
Like winter's drifting snow.

These brothers were inured to work
From childhood in a mine,
Where ever-present dangers lurk
To frustrate man's design;
Where hardship left upon the brow
Its ugly mark of care,
Where all was blight and gloom and night
To those that labored there.

Their names—well, never mind their names—
We called them Bob and Joe;
As such we knew them in the mine,
As such we'll ever know.
When numbers are engulfed in death
By sheets of livid flame,
We note the sum of those o'ercome
And not so much the name.

Poor Mary from her childhood hour
Had known the keenest strife,
And happiness had only come
To her as Bob's sweet wife.
When he was close, her dark-brown eyes
Beamed forth her loving pride,
But when away, the neighbors say
She feared lest woe betide.

She'd talk to them about the mine,
About the deadly damp,
That ever waits to touch the flame
On some poor collier's lamp,
Then burning madly rush along
The channels underground,
Until its breath had stilled in death
All living souls it found.

And talking thus the tears would flow
Like rain adown each cheek,
Convulsive sobs would shake her frame
Till she could scarcely speak.
The neighbors noting well her grief
Declared with tearful sigh
If death should rob her life of Bob
She, too, would surely die.

But Joe's wife was a different lass,
Light hearted all day long;
No sadness seemed to cloud her sky
Nor mar sweet Nellie's song;
She'd laugh at Mary's gloomy moods,
Then say with playful wit:
"It's time enough to cross the bridge
When we have come to it."

Love plays queer pranks with women's hearts,
So masterful his skill,
That smiles and tears and hopes and fears
He causes at his will;
Poor Mary's tears her love bespoke,
For Bob they'd ever flow;
While Nellie's song the whole day long
Spoke equally for Joe.

The men worked on from day to day
Down in that dark, deep pit;
With pick and drill they'd toil until
The hour would come to quit.
Though weary, yet a cheerfulness
Remained to bless their lives
For, would not they in love's sweet way
Be greeted by their wives?

And would not Mary's eyes be wet,
Her tears of gladness flow,
And would not Nellie's joyful song
Give happiness to Joe?
A bath, and after that a meal—
The collier's main repast—
Would drive away the cares of day
Like chaff before a blast.

One morning in the month of June
  The sky was bright and clear,
The whistle sent its dismal sound
  To workmen far and near;
The miners heeding duty's call
  Bade loved ones fond goodbye,
But not a sign came from the mine
  To tell them death was nigh.

The gasmen in their morning round
  Had been from place to place:
Had marked with chalk the day and date
  Upon each working face;
Then out they went to meet the men
  Who waited there in line
To hear them say the word, ere they
  Went down into the mine.

The colliers one by one approached,
  Approached, but dared not pass
The spot where stood those cautious men
  Who watched the deadly gas,
And asked: "How is my place today?"
  A watchman then replied,
"'Tis safe and sound, no gas was found,
  All, all is safe inside."

And thus assured that all was well,
  They entered that black hole,
And every man at once began
  To blast and load his coal.
The engines groaned and shrieked and hissed,
  The trips arose and fell,
The busy hum of rope and drum
  Said all was safe and well.

The wives, engaged in wonted tasks,
  Pursued them with a will;
The little children laughed and played
  Most happily, until—
A shock as of an earthquake came
  With fearful, loud portent;
Then from the mine came forth a sign
  Which told them what it meant.

A terror such as fear provokes
  Held all in its embrace;
A ghastly pallor spread its tinge
  On every person's face.
They saw the angry smoke and flame
  Leap upward from the slope.
And in its glare they felt despair
  Rush in and stifle hope.

Oh! God! it is an awful sight;
  Grim ruin everywhere!
Since this much we can plainly see,
  What must it be down there?

What has become of those brave men
  At work deep underground,
Who stood in line here at the mine,
  When all was safe and sound.

At last the spell that held them all
  Relaxed its fearful hold,
The frenzied women madly rushed
  To where the flames had rolled,
And peering in that dark abyss
  They yet could see a flare,
As though Death sought each open spot
  To see if life were there.

In horror and in wild dismay
  They gathered round that hole,
Imploring God to spare his rod
  And save the collier's soul.
Poor Mary, foremost at the scene
  Wept bitterly and long;
But Nellie's face we could not trace
  Among the widowed throng.

Week after week brave volunteers
  Undaunted by dismay,
Toil'd ceaselessly to find the men
  Who died below that day,
But wreck and ruin filled the mine;
  Obstructions high and wide
Like demons lay to bar the way
  And keep the dead inside.

While Mary lingered near the mine,
  The picture of despair,
Sweet Nellie, broken-hearted, stayed
  At home, quite helpless there;
She knew no face, she heard no voice;
  But plaintively and low
She tried to coo a love song to
  Bring back her dear, dead Joe.

The evening Bob and Joe were found,
  A figure wan and white,
Like lily fair was lying there
  Upon her cot that night.
The stars were vying with the moon
  In lighting heaven's dome,
When through the door an angel bore
  Her gentle spirit home.

The hillside graves have long been filled
  Bob sleeps in one alone,
And zephyrs sigh in passing by
  With many a plaintive moan;
And Mary wandered far away,
  Just where I do not know:
Still neighbors tell how poor, sweet Nell
  Sleeps in the grave with Joe.

Recent Judicial Decisions Affecting The Coal Trade

By A. L. H. Street

Liability for Demurrage Charges—Carload shipments of coal destined to a pier were subject to demurrage charges while standing in yards at the place of destination, though not actually on the pier, awaiting the convenience of the consignee or the arrival of the vessel into which the coal was to be reloaded; the leaving of the coal in the yards not having prejudiced the consignee in any way. (Virginia Supreme Court of Appeals, Bank of Norfolk vs. Norfolk & Western Railway Co., 78 Southeastern Reporter 568.)

Salaries of Corporate Officers—A reëlected officer of a corporation is entitled to salary at the rate previously paid him, if nothing is said about the amount of his compensation in reëlecting him. (New York Supreme Court, First Appellate Division; Eicks vs. Wittemann Company; 142 New York Supplement 190.)

Authority of Agents—Where a business is conducted by the owner's agent, he has implied power to do whatever the nature and needs of the business require, and his employer is bound by such acts. The rights of third persons dealing in good faith with an agent within the apparent scope of his authority are unaffected by secret limitations placed on his authority by the employer. (Alabama Court of Appeals, Wooten vs. Federal Discount Company, 62 Southern Reporter 263.)

⁂

Elastic Corrugated Piping

Recently a process of manufacturing corrugated pipe has been patented, by which either standard, wrought-iron or steel tubes can be corrugated by the Maciejewski process, as it is known. According to the pressure and size required, small- and medium-sized tubes are made from ordinary steel tubing. For large diameters, lap-welded and re-rolled tubes are used, says *Power* of June 10, 1913. The corrugations are made by a method of pressing the material together, a special patented machine being employed. The process shortens the tubes as the corrugations are pressed into them at equal distances apart, but without decreasing the original inside diameter and the thickness remains uniform and is the same as in the original tube. During the process of corrugating any defects in the material at once become apparent. Interesting examples of corrugated tubes and bends are shown in Fig. 1. They can be made in sizes from $1\frac{3}{8}$ in. up to 18 in., including diameters suitable for use in boilers. Here the average length is about 18 ft., although any other length can be manufactured.

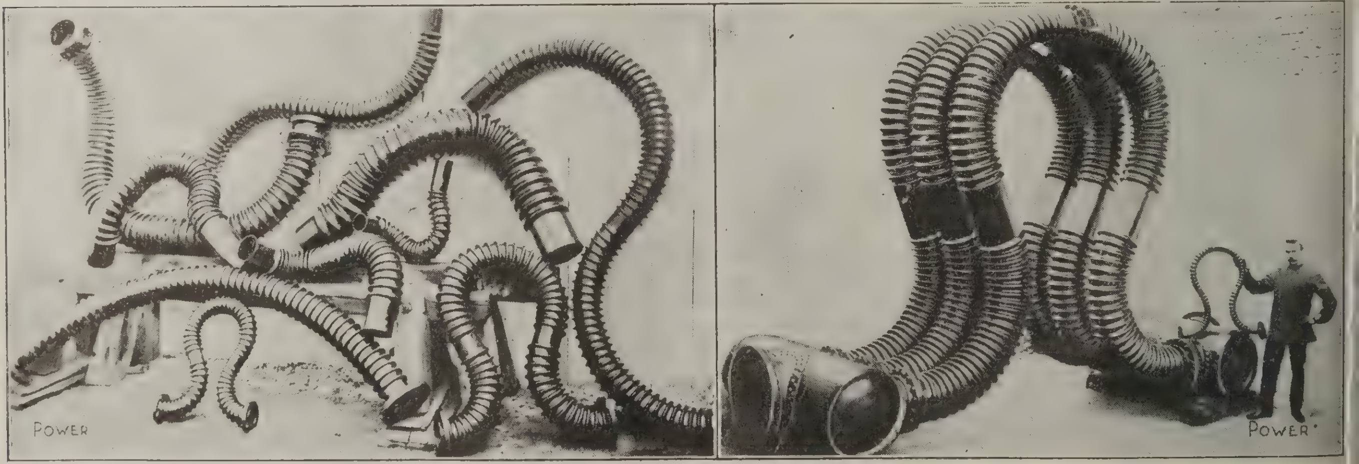


Fig. 1. Examples of Corrugated Tubing

In steam-pipe lines, contraction and expansion caused by the steam, the vibrations from the engines, pumps, or other units are effectively taken care of by the elastic property of the tubes. They may be also used in fire-tube boilers, superheaters and radiators for hot water and steam heating, to excellent advantage.

Another advantage is where the space for expansion and contraction is limited, and large bends cannot be used. When steam is turned on or off there is a wide variation in the temperature; hence a considerable linear movement in the line and its branches to the various units. This movement is easily taken up by a length of this corrugated pipe.

In Fig. 2 an ordinary 6-in. pipe is shown, bent in the shape of a loop, one end being fixed and the other movable. When subjected to a lateral pressure of 1289 lb., the axial movement was $11\frac{1}{2}$ in. A corrugated pipe of the same size and thickness was bent and fastened in like manner, and on applying 330 lb. pressure there was an axial movement of $39\frac{1}{4}$ in., or over three times that of the smooth pipe.

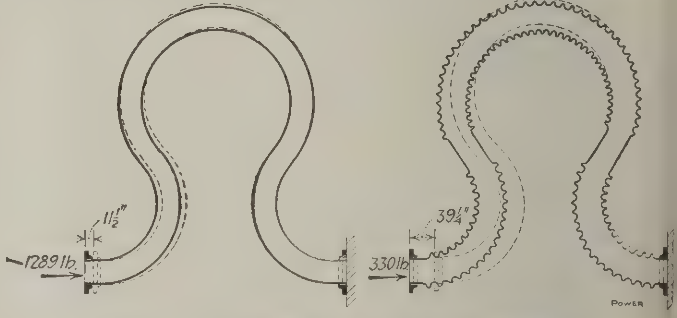


Fig. 2. Difference in Pipe Movement

The process for making this corrugated pipe is patented in Europe and in the United States by N. Maciejewski. The pipe is being made in Russia, Germany, Belguim and France. The United States patents are for sale by Schuchardt & Schütte, 90 West St., New York.

EDITORIALS

The Fireboss and the Union

When a man accepts a position of trust and control,
e must not submit himself to the dictation of those he
expected to restrain. It seems so obvious that action
f this kind ought not to be taken that it seems a folly
make this trite observation. Yet the miners in the
nthracite region are insisting that the firebosses who are
quired to maintain discipline in the mines of that dis-
ict shall join the union and subject themselves to its
llings.

We do not believe that any of the miners who advocate
unfair a proposition would want the officials of their
nion to join an operators' organization, which would
spend or fine them if they did not follow its behests
d the members of which would threaten them with
rsonal injury if they did not comply with its com-
ınds. Such an organization would under the law be
egal and is almost unthinkable under present-day con-
ions. Yet the parallel is not unfair.

Much trouble we imagine would develop if a fireboss
o had joined the union were to venture to order his pit-
nmitteeman to make the latter's place safe or to wait
his room was cleared of firedamp, or to go out and get
bit made of proper guage. The fireboss has difficul-
enough in disciplining the miners under his charge.
is not right to compel him to be amenable to both mine
ner, union and state. If any change is needed, it is
t he shall be a servant of the Department of Mines
ne, so that he may be entirely free of dictation from
vate and commercial interests.

⁂

he Workmen's Compensation Act in Illinois

he State of Illinois has done much pioneer work in
matter of testing the advisability and efficiency of a
kmen's compensation law. For some time past, the
e operators and mine workers of Illinois have been
n the opportunity of signifying their choice of
ther they would operate and work under a law pro-
ng a just compensation for time lost on account of
ry to the workman in the performance of his duties
nd about the mine.

framing the law, every care was taken that its pro-
ns should not be drastic. It was not desired to in-
rate a paternalism in the system of state govern-
that would make the mine operator responsible for
ns of every nature. Neither was it desired to shift
esponsibility from the mine worker to his employer,
dless of the questions of carelessness and neglect on
art of the worker.

dustrial accidents may, in a general way, be classified
r two heads:

rst, accidents arising from improper or badly de-
d machinery and equipment, or improper regulations
ing to the safety of the operative or worker. For
this class of accidents, the employer is or, justly, should be held responsible.

Second, accidents arising from the neglect or carelessness of the workman. It is generally agreed that the responsibility for this class of accidents rests wholly on the worker. The neglect of the worker to take proper precautions for his own safety or to obey the regulations and instructions of his superintendent or foreman, has a broad bearing. Such neglect may be intentional on the part of the worker, due to his own stubbornness; or it may arise from an absent-mindedness on his part; but, in either case, the worker is evidently to blame, and should be held alone responsible for the results of such neglect. Likewise, carelessness, on the part of the worker, makes him alone responsible for the injury resulting therefrom.

There is a class of accidents, however, the responsibility for which is not so clearly defined and regarding which there will always be some difference of opinion. This class embraces those accidents due to the ignorance of the worker. When an injured workman claims, after the accident, that he was not aware of the danger to which he was exposed, the question always arises: Was this ignorance due, in part, to the failure of the employer to make the workman understand the danger; or was it due wholly to the failure on the part of the workman to fully comprehend the importance and meaning of the instructions given? These are questions that can only be settled finally by a careful consideration of the evidence in any case.

In Illinois, the original compensation act has now been modified in many important respects, and the revised act took effect July 1. The official copies of the act have not as yet been issued. By this act, which has been broadened so as to include employees of the state, county, city, etc., and to cover industries not included in the previous act, the various employments are divided into two general classes; namely, "extra-hazardous" and "nonextra-hazardous." As before, the act is made optional; but the employer in an extra-hazardous industry, while not obliged to give notice in order to operate under the new act, is compelled to give such notice in case he desires to reject the provisions of the act. In the case of nonextra-hazardous employments, notice must be given if the new act is either accepted or rejected.

One of the advantages of the act to the employer who elects to benefit thereby, is that having given notice of his willingness to provide and pay compensation for accidental injuries sustained by any employee, arising out of and in the course of the employment, according to the provisions of the act, is thereby relieved from any liability for the recovery of damages, except as provided by the compensation act. The advantage to the employee is that, in case of injury, not only is prompt and efficient treatment afforded the injured man, but he is assured of an adequate compensation for the time lost owing to the accident, subject, of course, to the nature of its cause and the responsibility therefor.

One of the greatest advantages of the compensation act, however, lies in the fact that it "knocks out" both the ambulance-chaser and the pettifogging lawyer, which have long been regarded as well-nigh necessary evils attending every mine accident. The operator is relieved of the great burden of defending himself against lawsuits as numerous as they are unjust in the majority of cases.

One of the prominent features of the revised act is the provision for the appointment by the governor, of an industrial Board, to be composed of one representative employer, one representative employee, and one representative citizen not identified with either. Under the provisions of the new law, this board takes over the functions of county courts, in respect to the appointment of a third arbitrator and the review of decisions on appeal. Trial by jury is entirely eliminated, and only questions of law, or charges of fraud, can be taken to the Supreme Court.

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A Crisis in Connellsville Coke

The Connellsville coke operators and consumers are waging a contest which promises to settle definitely who shall control the coke market in the future. The direct point at issue is the price at which furnace coke for second-half delivery shall be sold. The Connellsville coke trade has been subject to price wars before, but apparently this is the first instance where both sides have been so united and have shown such determination to win.

As is well known, the price of pig iron has been the principal factor in fixing the price of coke, so that as a rule the operators have had little to say in the matter. Theoretically, such a selling basis would seem to be fair to all concerned, since it is simply a matter of supply and demand. But practically this has not proved to be the case. Thus, the operators have frequently contracted at relatively low prices, corresponding to the ruling quotations for pig iron, but have failed to participate in a rise in the latter market. Or, again, when they have succeeded in closing at a high figure, the furnaces have frequently blown out and failed to take the coke, since such is not mandatory, coke contracts usually being made only to comply with the customer's requirements.

Coke operators have recently found that the average selling price at which coke was being marketed has not yielded them the required margin, in view of the high land values. Encouraged by their bankers, who are interested in their bonds and securities, they have stood out unitedly for a price of $2.50 on second-half furnace coke. The average price of last year's contracts, and also a number of those for the current year, was considerably higher than this, while in December of last year, the spot price touched $4 and higher. As the market eased off through the early part of this year, the operators fixed upon $2.50 as the minimum at which they would contract.

During this time the pig iron market was steadily declining, until it touched $15 at eastern Pennsylvania furnaces and $14 at valley furnaces for foundry pig iron. It is, of course, true that such prices do not justify $2.50 for coke, but the operators rightly contend that the furnace men were fully informed that this would be the minimum in the future and, knowing this, they should not have permitted the iron market to reach such a low point. Considering that they have deliberately ignored warnings to this effect, it is clear that the responsibility rests entirely with them.

As regards the tonnage involved, the operators estimate that contracts aggregating 175,000 tons per month expired June 30. During the last few days of June a compromise was effected, covering about 90,000 tons of coke for July delivery only, at $2.50; most of these sales carried a clause guaranteeing the price against decline. The remaining 85,000 tons are still to be covered and furnace men insist that they will shut down tight rather than pay the price the operators are demanding; we are informed on good authority that four or five furnaces actually were blown out early in July. The coke operators are equally determined in their position in the matter, and are likewise shutting down ovens, keeping only a sufficient number burning to meet contracts already made.

One of the chief difficulties in the situation is the unbalanced financial condition of the different operators. Many of the older companies secured their land at low prices and have practically wiped this cost off the books. On the other hand, the newer ones bought in at relatively high figures, sometimes as high as $1500 per acre, and we believe even up to $2000. These latter have in most cases been bonded at approximately the cost of the land, in order to obtain the money required for development. The buyers at these high prices justify their investment on the grounds that the life of the Connellsville region is now limited to between 20 and 25 years, and there are no other known coals making such a perfect coke. Close observers, however, have noticed that the increased demand for coke in recent years is being covered with byproduct ovens, using but a small amount of Connellsville coal. Thus the market has not shown a disposition to yield to the high margin of profit which is now economically essential to most of the operators in the Connellsville region.

This is clearly shown in the following example, the assumed figures for which are exaggerated: An operation has two acres of coal per oven, and each oven has a maximum capacity of 700 tons per annum, the life of the plant thus being 20 years, on the basis of a recovery of 7000 tons of coke per acre. If the land were acquired at $1500 per acre, and the operation bonded for an equal amount, the total investment would be $4000 for each two acres with one oven. With interest at 5 per cent. amounting to $150 per annum, and $200 a year to be charged off for exhaustion and amortization, this makes a total of $350 to be carried by 700 tons, or 50c. per ton.

Possibly in some of the best years in the Connellsville coke market, such returns have been effected, but certainly not over an average of a number of years. As a matter of fact, prices have more frequently ranged around a level that would give a profit to only such operations which have neither bonds, interest, or exhaustion charges. Hence we see the reason for the determined stand of the operators in the matter of $2.50-coke. It may be rightly said that the Connellsville acreage should never have been priced so high. Obviously, this appears only too true, but we are now confronted with a condition and not a theory.

SOCIOLOGICAL DEPARTMENT

The Fourth of July at Gary, W. Va.

By An Eye-Witness

SYNOPSIS—The United States Coal & Coke Co. used the occasion as has been customary with them to advance the interests of safety, to promote patriotism, to develop a cordial feeling between themselves and their men, to knit the community in a bond of fellowship, to encourage the local fire-fighting forces, to promote a kindly interest of drivers for their mules and to enliven the dull routine of a line of mining camps which are shut in closely in narrow valleys between forbidding hills.

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The United States Coal & Coke Co. made the Fourth of July Celebration at Gary, W. Va., an opportunity for laying stress on "safety first." If this practice became common perhaps the Fourth of July might place against its terrible reputation for the destruction of life an honorable record as a promoter of safety and human welfare.

The celebration was ably managed by Col. E. O'Toole, general superintendent of the United States Coal & Coke Co. All civic societies were invited and the parade was as follows:

1. Verhovay Sick Benefit and Burial Association, Gary, W. Va.

2. Verhovay Sick Benefit and Burial Association, Filbert, W. Va.

3. First Tug River Sick Benefit and Burial Association, No. 1, Filbert, W. Va.

4. First Tug River Sick Benefit and Burial Association, No. 2, Thorpe, W. Va.

5. Count Bathtyani Sick Benefit Association, Gary, W. Va.

6. Count Bathtyani Sick Benefit Association, Filbert, V. Va.

7. Gary Lodge of Odd Fellows with band of 14 pieces and 8 members in line.

8. Tug River lodge of Odd Fellows with band of seven ieces and 30 colored members in line.

9. United Supply Co.'s decorated float with Sunday-school hildren.

10. Contestants in ball game between Gary and Hunt- igton, W. Va.

11. United States Coal & Coke Co.'s Mine No. 2, near ennon, marshalled by Superintendent J. M. Tulley, a float presenting a mine drift, followed by the first-aid corps, nd 28 mules ridden by their drivers dressed in comic cos- mes representing the nationality of each, the marshal of e cavalade being the stable boss. The mules were capari- ned in muslin with "First aid" in gold letters.

12. Sawmill department with large log float 12 ft. long, ft. thick, drawn by eight large mules, decorated with bunt- g. Woodsmen in the rear.

13. No. 3 plant marshalled by C. G. Seaton, the superin- ndent, was led by a horseless carriage pushed by a mule aped in all the colors of the rainbow and marked as gen- ating 100,000 mule power. This took first prize. All the ays at No. 3 followed carrying the sanitation, machine and rpenter's shop employees, and behind these a float of a odel miner's house with J. D. Jennings, master mechanic in arge. Then followed a float with the Sunday-school chil- n and 12 mules in working harness followed by No. 3 coke rkers.

14. Plants Nos. 4 and 5 marshaled by A. N. Harris, super- endent, with United Supply Co.'s float in the lead. All workers from these mines, American, white and colored d foreign, were in line with their wives and 22 mules ily draped. A float with Sunday-school children brought the rear.

15. Plant No. 6 marshalled by Neil Freil, superintendent, with a wagon load of school children and their teachers. Then the first-aid corps with a patient in bed swathed in bandages and 35 decorated mules and their drivers making a striking cavalcade.

16. Plants Nos. 7 and 8 were officered by F. A. Kearns superintendent, with merrymakers marching to the tune of "Dixie." The children of No. 8 carried a banner inscribed, "$358,780 paid in pensions last year—Safety first." A float of school children and a United Supply Co. float proclaiming pure food then followed. A banner brought up the rear inscribed, "$750,000 paid out last year for Safety first."

17. W. W. Harding, of No. 9 mine, expected to carry away the prize as always before. He had 30 lively mules tricked up in bunting and mounted by as many drivers. Then followed a float of well-dressed Sunday-school children, and another worthy of special mention showing a mine-room face with coal shot down and a man loading a car. The Supply company also furnished a notable float.

18. Plant No. 10 was marshalled by Superintendent Booth, with a Hungarian band of 16 pieces, a float of Sunday-school children and another with 25 fine mine mules without a scratch on any of them, and all dressed in comic costumes.

19. Plant No. 11 was marshalled by I. H. Dunn, the superintendent, and was represented by a float filled with school children followed by miners carrying flags, 39 fine mine mules, a float of the United Supply Co., filled with clerks and drawn by four large mules decorated in five colors, a farm wagon filled with "country people," and an inscribed banner.

20. H. T. Graham, the superintendent of mine No. 12, and his corps of officials tried to carry off the honors with 200 native, foreign and colored miners with 75 school children, all carrying lettered cards spelling repeatedly "Safety first." A band brought up the rear. This exhibit of mine No. 12 was especially noteworthy.

21. In the rear of the procession was an assemblage of all nations, the participants being those who had not been placed in other parts of the parade owing to their late arrival.

The program for the day was as follows:

1. Empire Theater—Moving pictures and vaudeville.

2. 10 a.m. Ball game, Gary versus Huntingdon, for a prize of $25.

3. 11:30 a.m. First-aid contest. All teams invited.

4. 1 p.m. 100-yd. dash. Prize $5; 50-yd. dash, open to boys under 16 years of age, prize $2.50.; 25-yd. dash, open to girls, prize $2.50; potato race, open to all, prize $2.50; sack race, open to all, $2.50; wheelbarrow race, open to all, $2.50; greased-pig contest, prize the pig; greased-pole contest, prize $5; society with most men in parade, $25; society with second largest number of men in line, prize $15; best double-mine team, prize $10; second best double-mine time, prize $5; third best double-mine team, prize $3; each driver must have driven his team at least a month; best float prize, $15; second best float, prize $10; third best float, $5; most comic "get up" not in the nature of a float, $5; tug of war, Sandy Lick versus Tug River (6 men on each side), prize $12; contests between fire departments, prize $10.

5. 2:30 p.m. Ball game, No. 6 Gary versus Tazewell, colored; prize $15.

6. 4:30 p.m. Herbert bicycle act, free.

7. 9 p.m. Fireworks at Gary.

The parade assembled at 8 a.m. and marched for inspection at 10 p.m., and took an hour to pass the stand. The judges were J. C. Herndon, J. Horne, E. G. Callahan, of Uniontown, Penn., and L. Blenkinsopp The first-aid contest was in charge of Vitus Klier, chemist; S. J. Price, foreman of U. S. Rescue Car No. 7; J. C. Herndon, J. Horne, E. G. Callahan and L. Blenkinsopp, mine inspector 11th district. J. R. Fleming and C. H. Brown, of the Bureau of Mines, took moving pictures of the parades. They are preparing pictures of the working conditions in the mines of the United States Coal & Coke Co. to serve as illustrations of necessary safety precautions in mining work.

It is estimated that there were 5000 people on the field. With all the excitement no one was injured. A dash of rain did make matters unpleasant for a while, but otherwise nothing occurred to mar the pleasure of the day.

Powder Regulation in the State of Washington

By Ralph W. Mayer*

A disastrous explosion, caused by a child sticking a red-hot poker into a keg of powder, wrecked a dwelling house, killed the inmates and caused the Washington legislature to pass a law prohibiting the storage of kegs of powder in homes. This caused the coal-mining companies to build small powder houses from which daily supplies could be issued to the mines.

The Northwestern Improvement Co., of Roslyn, sells powder checks at the store. Each check is good for a quarter of a keg of powder. A man starting work buys two powder cans at a merely nominal price, each holding a quarter of a keg or six and a quarter pounds of powder. He presents his empty powder can and one powder check at the powder house and in return gets a full powder can. The miner has two cans and every time he takes a full can out of the powder house he returns an empty, which is filled during the day so that it will be ready for the next shift.

If any of the cans become damaged by rock falls or in any way except by gross carelessness, the company gives the miner a new can free of charge. Clerks from the stores are stationed at each of the powder houses for one hour before each shift goes to work. They simply exchange the full canisters for the empty ones and take the powder checks in payment for the powder.

The Cans Are Not Filled by Clerks

They do not handle the loose powder or fill the cans. During the day a man chosen for his carefulness and steady habits rides from one powder house to another and fills the empty cans which the miners have returned.

He uses an automatic filling machine which is part of the equipment of each house. The powder is emptied from the kegs into a large wooden hopper, which discharges through a stationary funnel. The powder can is placed under this funnel and a lever pulled which releases just enough powder to fill the can. As this machine measures the powder out by bulk and not by weight, the can is placed on a small scale placed near the machine and any small inaccuracy corrected, although corrections are seldom necessary.

The powder cans are stored on wooden shelves around the sides of the building. Only enough powder for one day's supply is kept at these powder-distributing houses. Every evening the man who fills the cans turns in an order for the next day's supply for each powder house. The main powder magazines, into which the cans are unloaded, are large stone buildings situated out of the way of danger. The distributing powder houses are comparatively small brick and concrete buildings, one being built at each mine. They are kept scrupulously clean, being swept out every time they are used. They are electrically heated and lighted, and no open lights are allowed near them. A pipe with running water passes a few feet from the door. The powder cans are handed out through a small opening in the iron door of the building. This trap in the main door is hinged at the bottom and can only drop half way down, thus forming a stand or shelf on which the powder cans can be placed while being exchanged. There are no other openings in the building. Only the man in charge is allowed in the magazine.

At present the miners take their empty powder cans home. Sometimes they leave much powder in the cans and this practice is unsafe. It has been suggested that a small trap door be placed in the wall of the powder house with a chute leading from it to the floor so that when the miners come out of the mine they can drop their cans through it into the powder house, thus avoiding the trouble of carrying them home and the danger of having powder in their dwellings. No account would be kept of the powder left in the empty cans as it should not be there. Two men work in each room in the mine and one of them always has a can into which any small quantity of powder can be emptied and not brought to the surface.

If it is considered unsafe to have the opening for the empty cans in the powder house a small addition could be added into which they could be dropped. Every miner has metal checks for putting on his loaded cars of coal. By putting one of his coal checks on his empty powder can and calling for his check number when he wanted a full can, no difficulty would be experienced in tracing the cans.

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*Assistant foreman, Northwestern Improvement Co., Roslyn, Wash.

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Another Fourth of July Celebration

In the Fourth of July celebration held at Central City, Ky., in the heart of the western Kentucky coal fields, the most interesting feature was a first-aid contest in which eight teams participated, including one of boys from the mines of the W. G. Duncan Coal Co. Other teams came from the mines of the Central Coal & Iron Co. and from Luzerne, Martwick, Taylor, Crescent, Graham and Powderly.

The contest for first prize was a tie between Crescent and Luzerne, each team making an average of 100; and by a vote of the men the prize was divided between them. The second prize of $30 went to the corps of Central Coal & Iron Co., although this team was considerably handicapped by the eagerness of the crowd to see it work. A special prize was made up for the "Graham Junior" team of the W. G. Duncan Coal Co., as the efforts of the youngsters were thoroughly worthy of special notice.

The judges were Dr. H. Tuldesley, of Central City; G. T. Powell, in command of Government Rescue Car No. 3, and Lieut. Winston Pilcher, U. S. A., retired, of Nashville, Tenn. The committee which arranged the contest was composed of F. P. Wright, Crescent Coal Co.; S. A. Yorks, vice-president, Central Coal & Iron Co.; W. G. Duncan, Jr., W. G. Duncan Coal Co., and L. B. Walker, president District 23, U. M. W. of A. It is planned to hold a much larger meet at Central City on Labor Day, Sept. 1, as 20 teams have already entered, and handsome prizes have been offered by the Kentucky Mining Institute.

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National Conservation Exposition

A national conservation exposition is to be held at Knoxville, Tenn., and the miner's field day is set for Sept. 20. The Bureau of Mines will ship a large steel tube from Pittsburgh and erect it at Knoxville, so that exhibitions can be given demonstrating the explosibility of coal dust. Contests will be held between various teams from Tennessee, Kentucky, Virginia, West Virginia and Alabama, and prizes will be awarded to the most competent teams by the American Red Cross and the Mine Safety Association. The field-day proceedings will be under the auspices of the Tennessee Mine Foremen's Association. At the meeting held at the Imperial Hotel, Knoxville, Tenn., to arrange the meet the following leaders in safety work were present: H. M. Wilson and J. W. Paul, of the Bureau of Mines, from Pittsburgh Penn.; Major R. W. Patterson, of the American Red Cross from Washington, D. C.; E. F. Buffet, of the Tennessee Mine Foremen's Association from Oliver Springs; E. C. Mahan representing the coal operators; E. B. Sutton, of the Bureau of Mines, and D. T. Blakely.

DISCUSSION BY READERS

Mixed Lights in Mining

etter No. 6—Before forming and expressirg a def-
e opinion as to the advisability of using mixed lights
coal mine, it would be well to carefully determine,
ar as possible, the degree of danger attendant there-
If the danger is within the limits of control, the
assumed in the use of mixed lights is as justifiable
ther risks incident to coal mining and arising from
ral conditions.

he bituminous mining law of Pennsylvania (1911)
nits the use of mixed lights in a mine generating
without specifically stating the conditions under
h open lights are permitted, the use of the open
ts under these conditions being left to the judgment
he mine manager, subject, however, to the approval
he state mine inspector, who, under the bituminous
is armed with discretionary power (Art. 20), which
rsonally consider of a negative character.

hen any portion of a mine becomes dangerous, owing
he generation and accumulation of explosive gas, it
mes the duty of the mine management to provide
the safe working of such section or sections of the
where gas is being generated in dangerous quantity,
rohibiting the use of any open lights therein, except
re the gas is generated only at the face of live en-
(Art. 10, Sec. 3; and Art. 28, Sec. 2).

considering the danger attending the use of mixed
s in a mine, there are two conditions that may arise:
irst, the open-light section may be adjacent to the
y-lamp section, on the return side of the latter. In
case, even assuming that all the legal requirements
trictly enforced and that the sections are completely
ted from each other as far as ventilation is con-
d, it must be admitted that the possibility of dis-
still exists. Under these conditions, the greatest
er lies in assuming that the open-light section will
in free from explosive gas, which the facts of ex-
nce prove to be a false assumption.

cond, the open-light section may be adjacent to and
e intake side of the safety-lamp section, both sec-
being ventilated by the same air current. In this
the danger is as great as that to which we have
referred, while the conditions that favor the spread
possible disaster are materially increased. My per-
experience of the danger attending this second con-
enables me to speak with positiveness of its immi-
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gard the danger incident to the use of mixed lights,
y case in coal mining, to be exceedingly great and
d the power of control. The practice is based sim-
pon a pure assumption, and there is no man liv-
owever expert he may be, who is able to make that
ption a positive assurance. *Just as long as we per-*
bringing the two factors necessary to an explosion
the range of possible contact, just so long do we
the danger of disaster beyond the limits of control
njustifiably expose life and property to destruction. The belief that the strict enforcement of our present mining laws will *restrict* instead of eliminate the dangers of mining, leads to a false feeling of security. The best safeguards of life and property are such precautionary measures as will tend, as far as possible, to *eliminate* rather than to restrict these dangers.

The lax methods of mining operations commonly employed in the United States may be, in part, excusable on the ground that the conditions here are not such as to necessitate the enforcement of more sane and scientific measures. This excuse, however, is rapidly losing favor as conditions change and it is necessary to go deeper for the coal. It is now quite generally recognized that more scientific and practical safeguards and methods are necessary, in order to minimize the dangers that surround the miner.

Another condition that attends the use of mixed lights in the mine and one that greatly intensifies the danger, is the false sense of security that pervades the minds of the workers in an open-light section or mine. Miners naturally look upon the safety lamp as a necessity, only where there is the recognized danger of an explosion occurring. As a consequence, every mine worker is prone to regard a section of the mine where open lights are used, as entirely free from explosive gas. This belief leads to a careless disregard of danger arising from the ignition of gas in this section. Neither the miner nor the mine manager apparently considers seriously the possibility of a so-called non-gaseous section of the mine becoming dangerous at any moment, from the presence of explosive gas. I am convinced, and believe that most practical mining men will concur in the opinion, that the greatest menace to a mine worked by mixed lights, lies in the open-light section. It is my conviction that the use of mixed lights in a mine generating explosive gas is, at least, impolitic and injudicious.

The safety of mine operations is so closely related to the economy of working that a high degree of efficiency in the former instance means a proportionate increase in the latter. The common belief that the largest profits from the least expenditure in mining represent the greatest economy is only theoretically true. In practice, this principle will only hold true for a limited time and eventually fail, because it cannot be carried to extremes without disastrous results.

In reference to safety lamps, it is true that the same production cannot be effected as in the use of naked lights; because the activities of the workmen are curtailed, in a measure, by the dimness of the light. But, on the other hand, the results of working with open lights, in a gassy mine, may prove so disastrous as to more than counterbalance the advantage and profits arising from their use.

In view of the fact that workmen's compensation acts are now receiving much attention from legislators, it may prove a matter of economy as well as humanity, on the part of operators, to safeguard by every practical means the lives of their employees. It is a pleasure to note that a large number of coal operators are coming to regard the coal miner as something more than a mere physical machine designed for the production of coal.

I. C. PARFITT.

Jerome, Penn.

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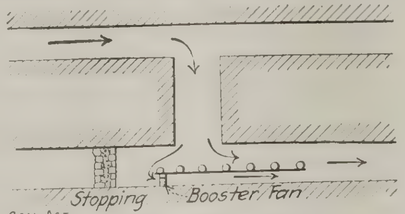
The Booster Fan

We have used a booster fan to increase the circulation in a portion of our mine where the air was slack. My foreman, G. E. Rockefeller, after some experimenting, has discovered that in using a booster fan, it is much better not to allow all the air to pass through the booster; but to arrange this fan behind a brattice, as shown in the accompanying sketch.



COAL AGE
PROPOSED ARRANGEMENT OF A BOOSTER FAN

Some time ago (COAL AGE, Vol. 1, p. 1150) there was started an interesting discussion on the installation of a booster fan to assist the general circulation in a section of the mine where the air was deficient. In that connection, I thought the information might be of value to those who are using booster fans for this purpose.

He first built a good stopping in the entry, just outby from the crosscut through which the air current entered the heading. As shown in the figure, he then erected a brattice extending from a point near this stopping forward a few yards beyond the crosscut. The booster was installed at the end of the brattice nearest the stopping. By this arrangement, the fan was found to do good work, and the current of air discharged from behind the brattice greatly assisted the general current passing up the heading.

M. C. BUTLER, Supt.

Fairfax, Wash.

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A Humidity Chart

Regarding J. S. Watson's question, COAL AGE, July 12, p. 62, allow me to call attention to the U. S. Department of Agriculture's publication by the Weather Bureau, Bulletin No. 235, which contains complete psychometric tables for obtaining the vapor pressure, relative humidity and temperature of the dew point, from the readings o the wet- and dry-bulb thermometers. The bulletin can be obtained from the Weather Bureau, at Washington at a cost of 10c. per copy, and is a fine investment fo any student of atmospheric conditions.

DONALD M. LIDDELL.

Elizabeth, N. J.

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Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Having found the heat absorbed by the products, the next step is to find the heat absorbed by the unburned air. Let x = weight of air required to make 1 lb. CH_4 inflammable. Then, since 1 lb. CH_4 consmes 4 lb. O + 13.39 lb. N = 17.39 lb. air, the unburned air is x — 17.39 lb. The original temperature of the air being 60° F., the rise is 1200 — 60 = 1140 deg. and the heat absorbed is 0.2374 (x — 17.39) 1140 = 270.636 x — 4706.36 B.t.u., which makes the total heat absorbed

$$8154.3139 + 270.636x - 4706.36 = 270.636x + 3447.9539 \textit{ B.t.u.}$$

Since the heat absorbed is assumed equal to the heat generated,

$$270.636x + 3447.9539 = 23{,}513$$

and

$$x = \frac{23{,}513 - 3447.9539}{270.636} = 74.17 \textit{ lb. air.}$$

This is the total weight of air required to make 1 lb. of methane (CH_4) inflammable. In other words, the weight ratio of gas to air, at the lower inflammable limit, is 1 : 74.17; But since the specific gravity of methane, referred to air as unity, is 0.559, the volume ratio of gas to air, at this point, is 1 : 0.559 × 74.17; or 1 : 41.46. That is to say, a mixture of pure methane and air first becomes inflammable when 1 volume of this gas is mixed with 41.46 volumes of air.

The percentage of gas in this mixture is

$$\frac{1}{1 + 41.46} \times 100 = \frac{100}{42.46} = 2.3 \textit{ per cent. } CH_4$$

Lower Explosive Limit—The continued addition of air to methane causes the firedamp mixture to become more and more inflammable till a point is reached when the combustion of the gas is so rapid that the mixture is explosive. As this condition is approached, in practice, owing to the mixture of the gas and air not being uniform, the ignited gas often snaps and cracks in the combustion chamber of a safety lamp.

In the same manner, an accumulation of firedamp, in the mine, when ignited, may burn with greater or less energy or violence and small explosions may occur here and there, followed perhaps by the general explosion of the entire body of the firedamp. The explosion depends not alone on the proportion of gas and air in the mixture, although that is important, but on the intensity and volume of the igniting flame. Thus, it happens that a firedamp mixture ignited in the narrow confines of the mine workings may, after burning for a brief period with more or less energy, suddenly develop a violent explosion.

The lower explosive limit of pure methane has been determined, by experiment, to occur when 1 volume of the gas is mixed with 13 volumes of air; or the percentage of gas in the mixture is

$$\frac{1}{1 + 13} \times 100 = \frac{100}{14} = 7.14 \textit{ per cent.}$$

This limit, however, is considerably modified by any conditions that tend to increase or decrease the amount of heat developed.

The Coal Age Pocket Book

Maximum Explosive Point—The maximum explosive forc of a combustible gas is developed when the proportion of ga to air is just sufficient for complete combustion. If the gas i the mixture is in excess of this proportion the full heat en ergy is not developed, owing to the incomplete combustion o the gas. On the other hand, if the air is in excess of wha is required for complete combustion, the unburned air ab sorbs a portion of the heat generated by the combustio which thus becomes latent.

The maximum explosive force of methane is develope when the proportion of gas to air is 1 : 9.57. It is calculate in the following manner: Write, again, the chemical equatio expressing the reaction that takes place when this gas burn in oxygen, forming carbon dioxide and water; thus,

$$CH_4 + 2\,O_2 = CO_2 + 2\,H_2O$$

Molecular volumes, 1 2 1 2

It should be observed that when the symbol of each ga is written as a molecule (oxygen = O_2) the prefix or numb written before the symbol, indicating the number of mol cules of that gas taken, shows also the relative volume of th gas concerned in the reaction; because the volume of a gaseous molecules at the same temperature and pressure the same.

The above equation shows that two volumes of oxyge ($2O_2$) are required to completely burn one volume of methan (CH_4); and there are formed one volume of carbon dioxid (CO_2) and two volumes of water ($2\,H_2O$).

But, oxygen forms 20.9 per cent., by volume, of the a mosphere. Therefore, when methane is burned in air, th volume of air required to completely burn two volumes of th gas is

$$\frac{2 \textit{ volumes}}{0.209} = 9.569, \textit{ say } 9.57 \textit{ vol.}$$

Hence the proportion of gas to air that will develop, in ex plosion, the maximum force is 1 : 9.57. The percentage gas in the mixture, at this point, is

$$\frac{1}{1 + 9.57} \times 100 = \frac{100}{10.57} = 9.46 \textit{ per cent.}$$

Higher Explosive Limit—The continued addition of ai after the maximum explosive point is reached, causes the e plosion of the gas to be less and less violent as the volun of air is increased, till finally a point is reached where th gas is so diluted with the air that explosion ceases and th mixture is simply inflammable. The point at which explosi ceases is called the "higher explosive limit." For pu methane, this point is practically reached when the propo tion of gas to air is 1 : 5, although the position and cha acter of the igniting flame may vary this proportion slightl The percentage of gas in the firedamp, at this point, is pra tically

$$\frac{1}{1 + 5} \times 100 = \frac{100}{6} = 16.67 \textit{ per cent.}$$

INQUIRIES OF GENERAL INTEREST

Coking and Steaming Coals

What are the qualities or constituents of a grade of
ıl that would be termed a "good coking coal"; and
at are the qualities and constituents of a good "steam-
coal?"

What is the lowest percentage of fixed carbon in a
l that would be considered as a coking coal; and what
the highest percentage such a coal may contain?

C. A. Pearson.

Duluth, Minn.

It is only possible, in the most general way, to name
qualities that are essential to a good coking coal.
ch a coal will generally contain from 15 to 30 per
t. of volatile matter. An important property of a
ing coal is that on being heated the coal passes
ough a semifused or pasty condition and the hydrocar-
gases driven off while the coal is in that condition
der the mass highly porous. When the coal contains
small a percentage of volatile matter, it will not fuse
lily; while too large a percentage of volatile matter
develop too great a porosity and the resulting coke
not have sufficient strength for the purposes for
ch it must be used.

t is not possible to state any limiting percentages of
l carbon that would determine the coking qualities
he coal. While many attempts have been made to
rtain on what the coking properties of coal depend,
ing definite has been determined further than that
relation between the volatile matter and the fixed car-
or, preferably, the relation between the hydrogen of
coal and the fixed carbon is important. A good cok-
coal must also contain a low per cent. of ash; and,
many purposes, the sulphur content must be less
1 per cent.

ıe physical properties and condition of the coal are
believed to be of more importance than is generally
rstood, in order to produce a good merchantable
A coal having a free vertical or jointed structure
generally produce a better coke than a coal having
minated or bedded structure. Crushing the coal
ly improves its coking qualities; and some coals
would not coke otherwise have been made to pro-
a fair coke by crushing to a fine uniform grade,
permits a more regular and uniform escape of
ases and assists the formation of the porous structure
is such an important feature of a good coke. The
ntage of fixed carbon, in some of the best coking
varies from 50 to 75 per cent., while the carbon-
gen ratio has been found to vary from about 20 to
even 12, in some coals that have been coked.

qualities of a good steaming coal will depend very
y on the style of boiler used. In many of the long
lrical and flue boilers that are still used in a large
er of mining districts, it is necessary to employ a
urning, long-flaming coal to produce the best re-
Many tubular boilers cannot be fired to advantage with a highly bituminous coal, for the reason that the small tubes of the boiler require too frequent cleaning to prevent them from being clogged with the soot deposited in them. The present practice, however, is to enlarge the size of the tubes of these boilers.

Many power plants are today using hard (anthracite) coal to avoid the too frequent cleaning of the boiler tubes that is necessary when using softer coal. The higher price of the hard coal, however, makes its use prohibitive in most mining plants, except those located in the hard-coal region. Almost without exception, the smaller sizes of coal are used for steaming purposes at the present time, the larger sizes, from chestnut up, being used for domestic purposes.

An Inclined Plane Difficulty

We are lowering coal over an incline 5000 ft. long and having a grade varying from 15 to 47 deg. We use an 8-ft. double drum, having two brakes on each drum; but the friction is so great as to wear away 2¾ in. of wood in 18 days. Can you suggest something of advantage?

M. K. Marlowe.

Block, Tenn.

From the brief description given, we believe that the weight of the loaded cars is too great and should be counterbalanced by a counterweight or balance-truck, running on a separate track; or the weight of the empty cars ascending the plane should be made to counterbalance the weight of the descending loaded cars. If a balance-truck is used, the counterbalancing weight should always be sufficient to draw up the empties but not so great but that it can, in turn, be drawn up by the loaded cars descending the incline. The counterbalancing of the weight of the loaded cars, in this manner, will relieve the load on the drum and reduce the wear on the brakes holding the drum.

A Hoisting Problem

If one rope of a double-compartment mine hoist is 5½ in. short and the other rope 3 in. long, how will you arrange these ropes so that the cages will reach their respective landings at the same time?

John Nelson.

Des Moines, Iowa.

In general mine practice, in a double-compartment hoisting shaft, the ropes supporting the two cages are so arranged that one rope will wind on the drum as the other winds off, a single drum being used. In this way, one cage is hoisted while the other is being lowered. In the present case, as we understand the question, one rope being 5½ in. short and the other 3 in. long, there is a difference of 2½ in., which is the actual shortage when one of the cages is brought flush with the landing. It is then only necessary to lengthen the rope supporting the other cage 2½ in.

EXAMINATION QUESTIONS

Mine Rescue Work

(*Answered by request*)

Ques.—How would you render first aid to a person overcome by mine gases?

Ans.—Place the patient on his back with something under the shoulders to throw up the chest. Loosen the clothing around the throat and pull out the tongue. Perform artificial respiration by the Sylvester method as follows: The operator kneels at the patient's head, grasps his arms just below the elbows and draws them gently but steadily outward and upward, holding them as far above the head as they will go for about two seconds. He then brings the arms down with the elbows bent, until they press lightly against the chest, holding them there for about two seconds. The operation should be repeated about 15 times per minute. After natural respiration is begun, apply the pulmotor, if one is to be had. In a case of gas poisoning use the pulmotor at the start. A pulmotor should form a part of the first-aid equipment in every mine where gas is generated or where electrical power is installed.

Ques.—How should a person be treated who is suffering from mine burns?

Ans.—Send for a doctor. Raw, blistered surfaces should be protected from the air. If the clothing sticks, do not peel it off but cut around it. The adhering cloth or a dressing of cotton or other soft material applied to the burned surface, should be saturated with picric acid (0.5 per cent. solution). If this is not at hand, coat the spot with a paste of flour and water or a heavy oil, such as machine oil, vaseline, linseed or olive oil. Cover the dressing with cotton, gauze, lint, clean waste, a clean handkerchief or other soft cloth held lightly in place by a bandage. The same coverings should be lightly bandaged over a dry, charred burn, but without wetting the burn, in this case, or applying oil to it. Do not open blisters.

Ques.—A man is found unconscious with a live wire lying across his lower legs Assuming that the current is to be short-circuited first, should this be done at a point between the victim and the power house, or at a point on the other side of the victim from the power house? State fully if there is any difference in the two methods.

Ans.—The effect on the man will be the same whether the current is short-circuited between the power house and the victim, or on the other side of the victim from the power plant. It will always be better, if possible, to flip the wire off the man's leg with a dry stick or other nonconducting material, since this will avoid the possibility of an induced current passing through the man when the switch, or circuit-breaker, is thrown open at the power house, owing to the current being short-circuited. If there is a circuit-breaker on each of the lines ("double-pole breaker"), this would not occur; but, with a "single-pole breaker," there is danger of a possible "field discharge" from the generator further injuring th man, since such a field discharge would raise the voltag throughout all the wires in the circuit, no matter wher the "short" is placed.

The reason that the current may be short-circuited o either side of the man with equal advantage, is that th drop in potential caused by the "short" will be practicall the same on both sides of the victim, assuming the di- tance between these two points is small as compared wit the length of the circuit and therefore negligible.

Ques.—Give in full the method of artificial respiratio to be employed and any other conditions of treatme necessary in case of electric shock.

Ans.—The method of artificial respiration and treat ment recommended by the Commission on Resuscitatio from Electrical Shock, as explained in a pamphlet i sued by the National Light Association, New York, i briefly as follows:

Send for the nearest doctor; but, without waiting, a soon as the victim is clear of the live conductor, quickl feel with the finger to see that there is no obstruction i the mouth, removing any tobacco, or false teeth foun there. Then, without stopping to loosen the patient clothing, begin artificial respiration at once as every m ment is precious.

Turn the patient on his stomach, with arms extende and face turned to one side so that the nose and mout are free for breathing; and, if possible, have an assista draw the tongue forward. Kneeling astraddle the man thighs and facing his head, press the loins (muscles o the small of the back) with the palms of the hands, th thumbs nearly touching each other and the fingers sprea over the lowest ribs.

Now, holding the arms straight, swing slowly forwa so that the weight of the body is thrown gradually upo the victim. This operation should take from 2 to 3 se and must not be violent as internal organs may be i jured. Then, immediately swing backward so as to r move the pressure, but leave the hands in place, thus r turning to the first position. After 2 sec. again swin forward, repeating these operations slowly and regularl at the rate of 12 to 15 times a minute, making the doubl movement of compression and release in from 4 to 5 se Follow your own deep breathing as a guide, swingin forward with each deep expiration and backward wit each inspiration.

Continue this operation without interruption unt natural breathing is restored or until the physician a rives. During this time, keep the patient warm wit proper coverings and by laying hot-water bags or bo tles beside his body. Give no liquids whatever, by mout until consciousness is restored.

If there are any burns, they should be attended after natural respiration is restored. These should treated the same as other burns, by the application flour, oil, or vaseline to exclude the air. An emulsion boiled oil and lime water is good.

COAL AND COKE NEWS

Washington, D. C.

An important feature of the report of the Interstate Commerce Commission regarding transportation conditions in New England in general and on the New Haven road in particular, issued during the past week relates to special inquiries made by it with respect to coal and the conditions under which that article is transported. On that point the Commission says:

> We find that class rates in central freight association territory are distinctly lower than in New England, especially on classes 5 and 6. These two classes move a very large amount of carload traffic, being the two classes which apply very generally to carload business. Class rates from New York and Boston to New England points are about the same as those from New York and Pittsburgh into trunk line territory.
>
> Class rates from interior New England points appear to be rather higher than corresponding rates in both trunk line and central freight association territories.
>
> We have also instituted a comparison between rates from these same points on three or four of the principal commodities.
>
> Coal is not produced in New England, but is extensively consumed. Coal rates from the various seaports of New England to near-by interior points are uniformly high as compared with rates for similar distances in the other territories under consideration. Rates to more distant interior points are not so extravagant and are often low. The reason for this appears to be that coal reaches the various ports of New England by water and is from thence distributed by rail. This water-and-rail route competes with the all-rail route, and the purpose of these high rates to near-by points is to maintain the all-rail rate.

Allowable Deductions

In issuing the final draft of its revision of the income ax section of the new tariff the senate Finance committee luring the past week made some concessions to mining inerests designed to eliminate or break the force of criticisms hat had been passed upon the new act by operators of minng properties. Under the new acts a corporation which nakes income returns is allowed to deduct among other hings:

> All losses actually sustained within the year in business conducted by it within the United States and not compensated by insurance or otherwise, including a reasonable llowance for depreciation by use, wear and tear of property, f any, and in the case of mines a reasonable allowance for epletion of ores and all other natural deposits not to exceed per centum of the gross value at the mine of the output of the year for which the computation is made.

HARRISBURG, PENN.

From a decision of Judge Mestrezat of the Pennsylvania upreme Court, work of mine foremen is covered by statute nd aside from the duties imposed upon them by law, they annot be held liable for an accident when the company is harged with neglect.

This question was raised when the commission to codify he mine laws was at work, and it was claimed the statutes ere written in the interests of the operators. It was ointed out that one sentence in the law would prevent mine orkers from recovering damages inasmuch as it specified hat in those mines where electricity was used, responsibily for safeguarding the lives of the workers would be aced upon a certified electrician. This feature was condered a snake and was bitterly fought.

The decision in part states:

> That a mine foreman is responsible only for those duties overed by the statutes and where he exercises authority hich is not covered by statute, he is going beyond his jurisction and through the neglect of the coal company which not providing proper safeguards, the company is responsible r damages.

The decision is far reaching in the effect it will have on ture damage cases, wherein employees may have been inred or killed. It upsets the custom which has been esblished, making the mine foreman responsible for accints in mines. According to the opinion, that official must ok after the care of the mines and see that the mine laws e observed. He cannot become an agent for a coal comny to evade responsibility, where it can be shown that it s not made its mines reasonably safe from accidents.

Receivers Appointed

Judge Orr of the United States Court at Pittsburgh July 9 pointed receivers for the six bituminous coal companies of nnsylvania which were subsidiary companies of the American Water Works and Guarantee Co., which passed into the hands of a receiver on the failure of First-Second National Bank of Pittsburgh and which was one of the big "Kuhn enterprises."

The Court appointed as receivers for the Isabella-Connellsville Coke Co., S. A. Gilmore, J. D. O'Neil and Wm. K. Johnson for the Naomi Coal Co., Thurston Wright, Samuel A. Gilmore and Wm. K. Johnston; for the Somerset Smokeless Coal Co. Robert P. Watt, Samuel A. Gilmore and Wm. K. Johnson; for the United Coal Co. James D. O'Neil, Thurston Wright. Wm. K. Johnson and Robert P. Watt; for the Pittsburgh and Baltimore Coal Co., James D. O'Neil, Robert P. Watt and Wm. K. Johnson; for the Merchants Coal Co. of Pennsylvania, Robert P. Watt, Thurston Wright and Wm. K. Johnston. The bond for each of the receiverships was placed at $15,000.

The defendants all joined in the petition for the receivership. The bill in each case sets forth that the petition for the receiverships was filed for the purpose of protecting the property and assets of the companies on account of the debts due.

Judge Orr in appointing the receivers made an order which allows them to pay the miners of the United Coal Co., Pittsburgh and Baltimore Coal Co. and the Somerset Smokeless Coal Co. a total of $100,000 in wages.

J. S. Kuhn and W. S. Kuhn were president and Vice-President of the United Coal Co. which controlled the other coal companies.

No Extra Session

Governor Tenor is reported as stating on July 8 that he had not thought of calling an extra session of the legislature, either this summer or the fall after the election. For some weeks rumors have been current that it was the intention to reconvene the general assembly to act on an "Employers' Liability" and other bills and in the event of the constitutional amendment permitting the state to issue $50,000,000 of bonds for consruction of highways, to summon the legislature to pass enabling acts so that bonds might be issued next year instead of waiting until the session of 1915. The Governor said in part.

> I know of no contingency demanding the convening of the general assembly in extraordinary session nor shall I call an extra session should the constitutional amendment for the bond issue for road construction be ratified by the people at the November election.

PENNSYLVANIA

Anthracite

Harrisburg—The Governor has approved a legislative resolution authorizing the Chief of the Department of Mines to investigate conditions and operations of quarries, ore and clay banks, ore and graphite mines, oil and gas wells drilled through coal measures, and to suggest needed legislation to the Governor for presentation to the legislature of 1915.

Wilkes-Barre—The Susquehanna Coal Co. has filed appeals from the assessment and valuation of its coal and surface property as fixed by the Board of County Assessors in Newport, Nanticoke and Plymouth Townships. This is the first of appeals to be taken by a coal company to the new triennial assessment for the year 1913, as recently completed by the Board of County Assessors. All the other coal companies are expected to file appeals soon and the entire assessment will again be threshed out in the courts.

Scranton—Three men were killed recently by falling down the shaft at the Brisbin Colliery of the Lackawanna Coal Co., a depth of about 600 ft. The men were employed at the head of the shaft, taking care of the cars coming from the mine.

Philadelphia—Headquarters have been opened to prepare plans for the entertainment of the mining men who are expected to visit Philadelphia as delegates to the sixteenth annual session of the American Mining Congress which meets on Oct. 20-24.

Committees from the Chamber of Commerce are daily holding meetings to arrange for the transportation and care of the visitors.

Permanent quarters were recently opened in the Land Title Building by J. F. Callbreath, the secretary of the Mining Congress and Assistant Secretary E. L. Wolcott, both of Denver. The local finance committee of the Chamber of Commerce of Philadelphia of which E. T. Conner is chairman, and N. B. Kelley, secretary met yesterday to estimate the funds which will be needed for the entertainment of those attending the convention. It is expected that about 1500 mining engineers and experts will attend the convention.

Pottsville—The Supreme Court of Pennsylvania July 9 handed down an opinion that "robbing pillars" in the mining of coal is perfectly legal. The issue was fought out in a case "Streng vs. Buck Run Coal Co.," of Pottsville, who had asked for an injunction to restrain the above company from mining certain pillars on lands leased from the Strengs.

Judge Brumm, of the Schuylkill County Court decided that all pillars may be robbed "except those necessary for the present and future working of the mine." He also decided that the panel or "gob" system of mining is superior to the pillar system, and the Supreme Court has sustained him in both decisions.

Bituminous

Johnstown—Strike sentiment cropped out suddenly July 11 in the mines of the Altoona Coal and Coke Co. at Cupon, near Gallitzin, when several hundred men refused to work longer because the company proposed to change from two to three shifts in the main heading. This company is turning out a grade of coke said to be equal to the Connellsville variety and is pushed with orders. It is thought the trouble will be settled soon.

A part of the big coal deal of the Manor Real Estate and Trust Co., of Philadelphia in the Indiana coal field was consummated July 10 when 680 acres of bituminous coal in seven tracts were purchased by that company for $45,000. The land is situated in Green and Cherryville townships in Indiana County, and adjoins lands in Cambria County, for which the same company paid as high as $200 per acre.

Bentleyville—Residents in the northern part of town are becoming alarmed over the fact that crevices are appearing in the land in that particular section, due, it is thought, to the removal of coal. It has been found that wells are hard to find which will supply water all the year round, and many have gone dry. It is thought the removal of coal too near the surface is the cause.

Monongahela—Representatives of the Monongahela River Consolidated Coal & Coke Co., in whose mine 97 men lost their lives in an explosion on Apr. 25, are settling the death claims with the legal heirs. The company is said to be paying the widows with families $2000. The scale runs from this amount down to $500.

WEST VIRGINIA

Charleston—Miners employed at the mines of the Seng Creek Coal Co., on Coal River, who went on strike in violation of orders from the union officials, have decided to return to work rather than sever their connection with the national organization. This follows some vigorous action on the part of the union officials who ordered the miners' local union, at Coal River Siding, to end their strike or surrender their charter.

Judge Henry K. Black, of the Kanawha County Intermediate Court, has issued a call for a special Grand Jury to sit beginning July 17, for the purpose of investigating conditions in the Paint and Cabin Creek coal fields. Governor Hatfield's letter calling upon officers to resign or handle the strike situation is believed to have resulted in this action. The Senate Committee investigating conditions in West Virginia coal-mining regions will probably resume work this week.

Sheriff Bonner Hill recently sent reinforcements to the Ohlney mining camp a Consolidated Coal Co. property where rioting had broken out and nearly 1000 shots had been fired at the camp from strikers on the hillsides.

Bluefield—Miners at the Mabscott mine, which was the first operation in Raleigh County where work was discontinued in connection with the strike trouble, have returned to work, and other operations affected in a similar manner have likewise resumed active mining.

KENTUCKY

Fleming—The construction of model roads has become an important part of the work of the large coal companies operating in Eastern Kentucky. The Mineral Fuel Co., which is busily engaged in building two or three new towns and opening up a number of new mines, will start work at once on a number of miles of road in and around its towns and properties. Three miles of fine road, suitable for automobile traffic, will be constructed between Fleming, the first of the company's towns, and McRoberts, on the property of the Consolidation Coal Co., the two companies dividing the expense. The latter company has already built about twelve miles of roads in and around McRoberts and Jenkins.

Louisville — Kentucky mines will be among the first visited by the mine sanitation section of the U. S. Bureau of Mines, which has been organized for the purpose of investigating the conditions of mining in the various states, and determining the standards of living among the miners as well. The newly-developed sections of Eastern Kentucky will be visited, but it is expected that the bureau will find conditions in and around McRoberts and Jenkins, where the Consolidation Coal Co. has its mines, to be rather above the average, as this company is one of the most advanced in the state in its methods and in the housing and general treatment of its employees.

OHIO

Columbus—The officials of the Lorain Coal and Dock Co. which operates a large coal tract in Belmont County deny the statement that the Lorain Coal & Dock Co., the Y. & O. Coal Co. and the Belmont Coal and Mining Co. will consolidate. Edward Johnson, president of the Lorain Coal and Dock Co. is on a trip to Europe and nothing can be done until his return if any merger is to be effected. The negotiations for the merger of the first two named concerns, which were discussed some tme ago have been dropped.

INDIANA

Shelburn—The Kettle Creek mine, after an idleness of two months, has resumed operations.

Sullivan—A new steel tipple mine to employ 200 men will be sunk on a 700-acre tract near Cass, by Job Freeman, a coal operator of Terre Haute. The new company will be known as the Ayrdale Coal Co. The land involved is surrounded by mines in active operation and is pierced by three railroads. The mine will be just east of the new steel tipple of the J. Woolley Coal Co. at Paxton and is part of the proposed extensive coal development in the south end of Sullivan County.

Evansville—P. O. McKinney owner of a coal mine across the Ohio River at Lockport, Ky., is arranging for a distributing point in this city. His mine has a capacity of more than 1000 tons daily.

ILLINOIS

Sorento—The charges that the C. & A., C. & I. M., C. M. & St. P., and the T. St. L. & W. had arbitrarily advanced freight rates on coal shipments in Illinois, were taken before Chas. F. Gerry, special examiner of the Interstate Commerce Commission. The complainants are the shipping companies with mines at Panama, Coffeen and Sorento, who declared that the new rates mean either the shutting down of their mines or raising the price on coal that would make its sale prohibitive.

Staunton—The hoisting engineer at mine No. 14 of the Consolidated Coal Co. lost control of his engine when hoisting a load of lumber, resulting in the death of one laborer and seriously injuring another. The company explained the accident by claiming that the difference in weight between the lumber and a load of coal is so great, that the engineer, not knowing what the cage was loaded with, proceeded as he always had in hoisting coal, and the engine got beyond his control.

Peoria—A new state law provides for the abolition of the institution known as the county Mine Examiners Board composed of three men in each county, and substitutes therefor a commission of three men for the state, whose duty it shall be to examine and license miners. The Governor has not yet appointed this new board, and under the law every miner now working without a state license is subject to a penalty of from $100 to $500 fine and imprisonment for from 30 days to six months, for each day of the violation. Fortunately, however, this law is not being strictly enforced.

MISSOURI

Joplin—Mine No. 19 of the Weir Coal & Mining Co., which has been shut down since June 12 as a result of an explosion, resulting in one fatality, has been repaired and operations resumed.

ALASKA

Washington, D. C.—A bill authorizing the President to construct a railroad in Alaska and to mine coal in that territory was introduced in the Senate, July 10, by Senator Poindexter, of Washington. For these purposes the President would be authorized to borrow $50,000,000. The bill would provide that hereafter no coal land shall be disposed of except under lease.

FOREIGN NEWS

Calgary, Alberta—An English syndicate has bought a tract of coal land near Canmore, amounting to 8000 acres at a cost of about $2,000,000. It will build a road and expects to be marketing coal in Calgary by October.

Sydney, Nova Scotia—Fifteen hundred miners at Nos. 2, 3 and 4 Collieries, Sydney Mines, went on strike July 8. The cause of the trouble is that no horses are supplied in these mines and practically all the work of placing cars falls upon the miners. An early adjustment of the difficulty is anticipated.

Ottawa, Ontario—The Canadian Government has leased one of the finest coal areas in the world to American interests. This was recently discovered and staked by Dr. Reinhold Hoppe, of Oakland, Calif. It is located in the Province of Alberta, about 200 miles from Edmonton. The area is of great extent, and the coal is said to be an anthracite of a quality superior to the famous Pennsylvania hard-coal deposits.

PERSONALS

E. T. McOlvin has resigned his position as superintendent for the Rich Mountain Coal Co., to accept a similar place with the Marion Gas Coal Co., to take effect July 15, 1913.

William T. Hawkins has been appointed fuel agent on the Missouri Pacific-Iron Mountain system, succeeding W. J. Jenkins, who resigned as fuel agent of the railroad to accept the position of vice-president and general manager of the Consolidated Coal Co.

A. D. MacFarlane has resigned his position as resident engineer of construction at the Bayview Mine of the Tennessee Coal, Iron & R.R. Co., near Birmingham, Ala., to accept a position as chief engineer for the La Follette Coal, Iron & Ry. Co., at La Follette, Tenn.

Frank D. Rash, vice-president and general manager of the St. Bernard Coal Co., has been elected as one of the board of directors of the Kentucky Manufacturers' and Shippers' Association, an organization which has as its object the general betterment of conditions affecting its members, especially in the matter of freight rates.

David Ross secretary of the Illinois Bureau of Labor Statistics for the past sixteen years has resigned to Gov. Dunne. He gives no reason for his action.

After having been unsuccessful in his attempt to have John Mitchell, former president of the United Mine Workers of America, made State Labor Commissioner, Governor Sulzer, of New York, has sent to the Senate for confirmation the appointment of James M. Lynch, of Syracuse, President of the International Typographical Union.

OBITUARY

John Dunn a retired coal operator and one of the best known business men of New Philadelphia, Ohio died at the home of his son John Dunn recently, at the age of 78 years. He was a civil war veteran.

Robert Pettigrew, one of teh best known mining men of he state of Washington, was found dead of apoplexy in the arden back of his house at Roslyn, July 8, after the members f his family had searched for him several hours through he town and the surrounding hills. Mr. Pettigrew came to Roslyn 25 years ago and at one time had charge of the Missouri Pacific coal property in Missouri.

CONSTRUCTION NEWS

McClellandtown, Penn.—The Puritan Coke Co. has under way some extensive improvements at the McClellandtown plant.

Sharpsville, Penn.—The Shenango Furnace Co. has anounced that it will build a byproduct coke plant at Sharpsille to furnish its three blast furnaces with coke.

Morgantown, West Va.—The Elkins Coal & Coke Co. will add to the electric equipment of its Colliery, at Bretz, W. Va., a 200-kw. motor-generator set.

Punxsutawney, Penn.—The work of constructing 200 new coke ovens, power house, etc., at the Cascade Coal & Coke Co.'s plant in Sykesville, is going forward at a rapid rate.

Greensburg, Penn.—Within the next month the erection of sixty houses will be begun by the Greensburg Coal & Coke Co., which is opening a new coal works near the Greensburg city limits.

Barnesboro, Penn.—The Cambria Coal Co. will install in its mines, near Barnesboro, a 200-kw. motor-generator set, three 7½-kw. transformers, and the necessary switchboard apparatus.

Toledo, Ohio—A permit has been issued to the New York Central lines here, by the building inspection department, for the erection of a $100,000 coaling station to be built on Detroit avenue on the Lake Shore grounds. The construction contract has been let to the Phillis-Lang Co.

Steubenville, Ohio—The Steubenville Coal & Mining Co., operating the High Shaft, are making some extensive improvements including new steel head frames, cages, etc. It is also installing a pair of Crawford & McCrimmon Co. first-motion hoisting engines. The output will be greatly increased.

Clarksburg, W. Va.—The Central Fairmont Coal Co. is installing a complete electric system in its Snake Hill coal mine near this place. The current will be supplied by the Monongahela Valley Traction Co., and the improvement will reduce operating expenses and add to the dispatch of handling coal.

Bristol, Tenn.—Rapid progress is being made in the work of installing a central power plant in the Lee County coal field by the Electric Transmission Co., which was organized here a few months ago. This concern is now making an expenditure of $800,000 and eventually expects to invest from one to two million dollars.

Birmingham, Ala.—At a cost of $100,000 the Republic Iron & Steel Co. will erect a power-generating plant at East Thomas. This plant will be capable of furnishing sufficient power to supply the furnaces at Thomas and in addition it is planned to generate current to operate Sayreton mines and three other openings in addition to some new operations which have not yet been started.

NEW INCORPORATIONS

Uniontown, Penn.—The National Coal & Coke Co., composed of Uniontown men, has secured a charter.

Harrisburg, Penn.—The Buck Ridge Coal Mining Co. of Philadelphia, has filed notice of an increase of its capital to $600,000.

Roanoke, Va.—The Stone Mountain Coal Corporation has been incorporated with $50,000 capital stock to develop coal lands.

Joplin, Mo.—The Oak Orchard Mining Co. has been organized with a capital stock of $2000 by E. W. Hoffman, A. R. Snyder and J. A. Johnson

Tulsa, Okla.—The Schulter Mining & Coal Co. has been organized here with a capital stock of $100,000. The directors are: N. J. Kampers, A. Campbell and E. R. Perry, all of Tulsa.

Charleston, W. Va.—The Shannon Coal Co., with offices in Parkersburg, and of which H. T. Camden is president, has decreased its authorized capital from $500,000 to $100,000.

Pittsburgh, Penn.—A merger of three Pittsburgh coal companies is seriously contemplated, the Youghiogheny & Ohio Coal Co., the Lorain Coal & Dock Co., and the Belmont Coal Co. The capital of the new concern will be $15,000,000.

Connellsville, Penn.—The stockholders of the Westmoreland Coal Co., at a special meeting approved the proposed increase in the capital stock from $5,000,000 to $6,000,000, and the issue of $1,000,000, seven-year, five per cent. collateral notes.

Cleveland, Ohio—The W. H. Warner Coal Co. of Cleveland, Ohio, has been incorporated with a capital stock of $5000 to deal in coal and coke. The incorporators are Whitney Warner, W. C. Saeger, M. T. Flanagan, John C. Barkley and F. K. Studer.

El Dorado, Ill.—The Crescent Coal & Coke Co. has been incorporated here with a capital of $25,000 with E. H. Chenot, of St. Louis, Josh Anderson, A. M. Bourland and I. N. Bourland of this place as incorporators. They will take over the mine about two miles south of here.

Columbus, Ohio—The Blocton Co. has been incorporated with a capital stock of $10,000 by Charles M. Crist, H. A. Shafer and C. L. Laboiteaux. The company is organized to take over a coal mine located near Williamson, W. Va., the output of which will be handled over the Norfolk & Western R.R.

Dover, Del.—Articles of incorporation were filed, July 11, for the Lohman Hold Manufacturing Co., of Pittsburgh, Penn., to manufacture, sell and deal in and with Lohman skylit carbite pit lamps. The capital stock is $50,000 and the incorporators are H. Werner Lohman, Otto F. Lohman and William John Hold, all of Pittsburgh, Penn.

Charleston, W. Va.—The Gage Coal & Coke Co. has been organized with an authorized capital of $150,000, of which $1400 has been subscribed, and $140 paid in. The principal office of this concern is in Pittsburgh, Penn., and the chief works in Barbour County, W. Va. The incorporators are: Henry E. Lineaweaver, A. M. Godfrey, W. H. Foster, J. B. Robbins and C. G. Jones, all of Pittsburgh, Penn.

Charleston, W. Va.—A charter has been issued to the Huddlestone Coal & Coke Co., with principal office and chief works in Sherman, Logan County, W. Va. The authorized capital is $100,000, of which $500 has been subscribed and $50 paid in. The incorporators are: J. A. Huddlestone, of Excelsior; H. M. Bertolet, of Charleston; G. S. Borden, and Dan A. Newhall, also of Charleston, and W. W. Whyte, of Welch.

INDUSTRIAL NEWS

Birmingham, Ala.—The coal operators of Alabama will meet July 26, 1913, on the property of the Roden Coal Co., Marvel, Alabama.

New York, N. Y.—The "Mining and Scientific Press" announces the removal of its New York office to the Woolworth Building, Broadway, Park Place and Barclay Sts., New York City.

Clarksburg, W. Va.—The Rich Mountain Coal Co., of Clarksburg, W. Va., has sold its belongings to the Elkhorn Fuel Co. and the Consolidation Coal Co. is handling the output and managing the property.

Pittsburgh, Penn.—The Hirsch Electric Mine Lamp Co. has opened a Pittsburgh office at 328 Diamond St. This office will be in charge of M. Marks, who will oversee the distribution of Hirsch lamps in the Pittsburgh district.

St. Louis, Mo.—The Polar Wave Ice & Fuel Co. has contracted for its new office building on Olive St., west of Grand. It will be 100 ft. wide by 152 ft. deep, and will be a four-story glazed terra cotta building. The estimated cost will be about $75,000 and it will be the finest retail coal office building in the country.

St. Louis, Mo.—The C. & N. W.'s coal road extending from Benld to St. Louis, will probably be in operation about Oct. 1. It is not known yet in just what way this road will enter East St. Louis, but it is a certainty that the company is figuring on a huge tonnage of coal moving to the Northwest this fall.

Morgantown, W. Va.—J. V. Thompson has purchased three new tracts of Greene County, Penn., coal. He bought 74 acres in Whitely Township at $300 an acre; 40 acres in Morgan Township at $190 an acre, and 25 acres also in Morgan Township, also at $190 per acre.

New Salem, Penn.—More than 800 people attended the celebration at Footedale when the new concrete swimming pool was opened. A band concert and festival, together with swimming contests and other sports rendered the occasion enjoyable to all concerned.

Toledo, Ohio—The giant ore loader at the C. H. & D. docks, East Toledo, was blown against a concrete bumping post, July 5, and almost demolished during a high windstorm which swept over the city in the afternoon. Wilford Oaks who was in the cab was crushed to death when he was thrown from the tower, a distance of 90 ft., and a part of the loader fell on him. The immense crane cost $1,000,000 when built and the damage is estimated at $100,000.

Charleston, W. Va.—Suit was entered July 10, by Mrs. Maud Estep, widow of Cesco Estep, who was killed on the night of Feb. 7 last, when the armored train shot up the strikers' camp at Holly Grove, against the Chesapeake & Ohio Ry. Co., the Paint Creek Colliery Co., the Imperial Colliery Co., the Christian Colliery Co. and Quin Morton as defendant. The plaintiff asks $10,000 damages for the killing of her husband.

Boston, Mass.—Owing to the increase of business in New England of the Schutte & Koerting Co., manufacturers of high-grade bronze, cast iron and steel valves, ejector and steam and water jet apparatus, the Boston office has been moved from 98 High St. to 132 High St., Boston, Mass., where it now occupies a large part of the building on the street floor. For similar reasons the Denver office, formerly located at 1710 Glenmore St., has been moved to the First National Bank Building, Denver, Colorado.

Chattanooga, Tenn.—Objection has been raised by the Chattanooga and Birmingham creditors of the Dayton Coal and Iron Co. to the receivers. The protest has been filed in the United States district court here. It is alleged that the present receivers, H. E. Noyes, former general manager of the company, and Archbald Bowman, of New York, were named at the suggestion of the Dayton Coal and Iron Co. Ltd. and that they therefore are not proper persons to look after the interest of the petitioners in the affairs of the bankrupt concern.

Salt Lake City, Utah—The Standard Coal Co., of this city, recently concluded a contract with the L. R. Wattis Construction Co. for the building of a road to cost approximately $50,000 from the Coal company's mine in Spring Cañon, Carbon County, to Storrs, a station five miles from Helper. The coal company expects to have its first coal on the market during the last two weeks of October. Over $200,000 of mining machinery is to be installed.

Uniontown, Penn.—The Dillworth Coal Co.'s plant, at Rice's Landing, which has been closed for several months, will likely be reopened within a short time. For the past few days about fifty men have been at work inside the mine cleaning it up. At present sufficient coal is being produced to run the boilers, but it is thought the mine will be running full time within a few weeks. The work is being done by the bondholders who purchased the plant at receivers' sale a few months ago.

Scranton, Penn.—The total shipments of anthracite coal from Pennsylvania last month amounted to 5,970,047 tons as against 6,191,646 tons in June, 1912. The amount of coal on hand and at tidewater and lake shipping ports increased 30,403 tons from 502,626 tons on May 31, to 533,029 tons on June 30. The Lehigh Valley R.R. led in tonnage with 1,183,821 tons. The total anthracite shipment for the first six months of the year was 34,851,854 tons as against 26,096,979 tons in the first half of 1912.

Uniontown, Penn.—The Etna Connellsville Coke Co. instituted suit, July 10, in the Fayette County Court against the Whyel Coke Co. to recover $10,442.62, with interest from June 26 of the present year. It is stated in the suit that the plaintiff made an agreement to furnish the Whyel Coke Co., 67,200 tons of furnace coke during 1913, or 5600 tons per month at $3 per ton. For the first three months the coke was received and paid for by the defendant, then for some unknown reason part of the amount mentioned in the contract was refused and payment was not made on shipment. Suit is, therefore, instituted on the grounds that the Whyel Coke Co. broke the agreement.

Springfield, Ohio—As a result of the sale of the northern and southern ends of the Detroit, Toledo and Ironton R.R., to Otto Bannard and M. N. Buckner, of New York City for the upset price of $1,650,000 it is expected that there will soon follow a thorough reorganization of the company upon a solid basis. At least this is the aim of those at the head of the movement. One of those in a position to know something about the motives in railroad circles said that the first mortgage hondholders and the others interested evidently had an understanding before the purchase of the central division. If this were not true it was pointed out that the men representing the Central Trust Co. would not have bought the line between Lima and Wellston.

Des Moines, Iowa—Several years of commercial warfare against the good name and patents of the Christy Box Car Loader Co. were brought to a close on June 25, 1913, when Hon. Smith McPherson, judge of the Federal Court, rendered a decision holding that the Ottumwa Box Car Loader Co. was infringing the Christy patent. It was further decreed that the defendant the Ottumwa Box Car Loader Co. and its officers, agents and employees, be permanently restrained from the further manufacture, sale or use of the said infringing box-car loader or any box-car loader infringing upon claims 1 and 2 of the patent of the complainant. Following this decree the court denied a motion for a supersedeas bond. This prevents the Ottumwa company from using, making or selling the infringing machine.

COAL TRADE REVIEWS

GENERAL REVIEW

Coal markets are holding remarkably firm in view of depressed conditions. Anthracite is moderately active under a restricted production. Bituminous strong with producers in full control of the market.

The Eastern hard-coal trade is sluggish, the demand coming mostly from New England and the West. The steam grades are in fair condition, except pea, which is going into storage. Companies have few orders, but there is apparently no effort to sell; the partial suspension at the mines has restricted the production to within the limits of the demand.

The Eastern bituminous shippers are concentrating their entire efforts upon filling contracts, and are not looking for any new business. Buyers are beginning to complain about delayed deliveries, which latter are probably due to the coal being diverted to more profitable markets. Contract figures on the West Virginia grades are being well maintained, and indications are that there will be sufficient of a shortage to justify an advance. The better grades are all well sold up, and, while there is some tendency to sag in the spot market, the season's prices remain firm.

In the Pittsburgh district, a better car supply followed the suspension in mining over the Fourth of July holiday, so that production has been slightly heavier. Quotations on slack are much firmer than customary at this period, and other prices are being well maintained, though no premiums are reported. The bank failure in Pittsburgh may so embarrass the Connellsville coke producers, many of whom were relying upon this institution for accommodations, that the operators will be forced to recede from their demand for higher prices. In the adjoining markets, few coal producers are willing to contract over a long period, and it is feared that the heavy crop movement is going to result in a severe car shortage this fall.

Prices in Ohio are holding firm and showing a strong rising tendency; there is an insistent demand from the Northwest, which will probably continue throughout the season, and domestic dealers are beginning to store up to full capacity. Steam consumers are also demanding a heavy tonnage, and production was large last week because of the holidays the last of the week previous, which enabled the railroads to catch up. With the miners again at work in the New River field, the pressure in the West Virginia market will probably soon be relieved. The situation is already showing some improvement, but the dumpings have been light due to the lack of coal, and shippers are apparently about all sold up for the balance of the month.

There is already some stocking in the Middle West in anticipation of an acute car shortage the coming fall; the Eastern grades, particularly, are in heavy demand, but the pressure for Western coals is easing up slightly. Business generally is larger and along broader lines, with coal moving freely and the market showing definite indications of improvement.

BOSTON, MASS.

Soft coal is still strong, but the settlement of the West Virginia labor trouble has tended to relieve the pressure. Tonnages for future delivery difficult to obtain. Prompt market slightly softer. Retail anthracite prices advanced and trade moderately active.

Bituminous—The market here this week is almost featureless. On Pocahontas and New River the situation is quiet, but with prices firm. There is practically no Hampton Roads coal being offered. The shippers are bending their energies more toward getting down coal to load waiting vessels and steamers than in the direction of new business. The miners resumed work in New River on July 7 and a fair output has resulted since that time, although "normal" for this year is said to average less than 60% of capacity for the various mines. The expectation is, therefore, that prices will remain firm on the Southern coals, and that there may be enough of a shortage to warrant returns considerably in advance of the contract figure. The Western and Lake trades are reported in excellent shape and the general outlook is fairly satisfactory from the operators' standpoint.

Georges Creek shippers are also behind on their orders and there is more or less congestion at the Baltimore piers. Steamers have been kept waiting about the same as at Hampton Roads, and there is no let-up in sight. All the interests in that district are doing a large business this year, and at unusually remunerative prices.

The Pennsylvania coals are sagging off a little for spot shipment, but on season orders there is no change. Most operators are still reluctant to sell more than a small fraction of their output, partly through fear of a still shorter labor supply and partly because they hope to realize better prices later. The better known grades are understood to be well sold up and it is difficult to get quotations for deferred delivery.

Anthracite—Notwithstanding that companies are understood to have relatively few orders on their books, there is no apparent effort to place the domestic sizes; the dealers here are for the most part keeping their stocks up the limit of capacity. The retail price was advanced 25c. in Boston on the first of the month on all sizes, making stove now $7.50. This has now been followed in most of the cities, and there is discussion of a further advance in order to cover the new Pennsylvania State tax, which has been handed on by the shippers to the retail dealers. The hard-coal trade in New England is still active, and even the steam sizes are in good request.

Bituminous quotations at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.45	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.35@2.70	2.60@2.90	2.92@3.02	
New York*	2.65@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.00
Providence†				3.78@4.00
Boston†				3.90@4.10

*F.o.b. †On cars.

NEW YORK

Bituminous movement mostly on contract. One large buyer asking for quotations for the year beginning next April. Market firm but quiet. Anthracite unsettled because of the Pennsylvania State tax.

Bituminous—There is no appreciable change in the local market. The trade is in a good, healthy position, and there has been somewhat of a shortage due to the restricted output occasioned by the holidays over the Fourth of July. There is no improvement in the labor situation, nor any prospects for any in the near future. The car supply has been sufficient, the railroads having had an opportunity to catch up during the holidays.

Supplies at tidewater continue about normal, and there is not much demand in the spot market. The movement is confined almost entirely to contracts, and there are still some inquiries from consumers who have not yet covered. There is also one important buyer sending out inquiries for quotations on a large tonnage for shipments beginning Apr. 1, 1914. The local market is not quotably changed, and we continue prices as follows, with the market firm generally:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.65@2.70; good grades of Pennsylvania, $2.75@2.80; best Miller Pennsylvania, $3.05@3.15; George's Creek, $3.25@3.30.

Anthracite—The new Pennsylvania state tax on hard coal has had an unsettling effect upon local market. Some companies are continuing to sell at the regular circular prices, but others are billing their customers for the amount of the extra tax, it being noticed, however, that they are rendering a distinctly separate statement of this account, which would seem to indicate that they desired to be in a position to reimburse the buyers.

The market is only moderately firm, and indications are that it will be duller yet before there is any improvement. Most companies are stocking pea and buckwheat in the steam grades, and there is also some chestnut going into storage. While none of the sizes are in what could be termed "short supply," stove coal probably approaches nearest this condition.

Operations in the mining regions appear to be somewhat better than was anticipated a week or ten days ago. Both the car and labor supply are only fair. We continue to quote the New York market on the following basis:

		Individual		
	Circular	Lehigh	Scranton	Schuylkill
Broken	$5.00	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.25	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.25	4.90	4.95	4.90 .....
Chestnut	5.50	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.70

PHILADELPHIA, PENN.

Local trade sluggish, but the Western and New England consumption is absorbing the surpluses. Steam grades in fair demand except pea, which is flat. Considerable interest in the new anthracite tax. Bituminous is strong.

The second week of partial suspension of operations at the mines finds the trade absorbing practically all of the output. While the local business still continues sluggish, the demand from the New England territory and the far West is taking care of what surplus there is. This, of course, applies to the prepared sizes. The steam-coal market, outside of pea coal, is in fairly good condition, although the movement of these sizes is undoubtedly on contracts; for pea there is practically no demand at all, and it is understood that most of the production is going into stock.

The attitude of the dealers has not changed to any extent regarding the new state tax, but most of them have signified their intention of submitting to the inevitable. The most complaints seem to come from consumers outside of the state, who are undoubtedly justified in taking the stand that they are not interested in the State of Pennsylvania to the extent of paying its taxes. Threats of suits to determine the constitutionality of the tax are heard from all sides. In event of the law being declared illegal the question arises, will the companies refund the taxes to the dealers, and the householders will be just as curious to know if what they pay the retailer will be refunded to them.

The bituminous market still continues to enjoy its meed of prosperity. Considering the many disturbing elements during the past two or three weeks, the market has held its own in a remarkable manner, there being no unusual advancing of prices and no feverish demand. As a matter of fact, high-priced coals are moving off promptly, and the low-priced varieties are sold before leaving the mines. There is little free coal in the market, and buyers are complaining about delayed deliveries, which is probably due to the fact that the coal is being diverted to better markets, or on sales that will net the operator more money. The Tidewater ports are handling an immense tonnage, and the outlook is favorable for the balance of the summer months.

PITTSBURGH, PENN.

Abnormal production of slack, due to heavy lake shipments is better absorbed than usual. Prices generally being well maintained but no premiums are reported. The deadlock in Connellsville coke continues, but may be broken by the financial troubles in Pittsburgh.

Bituminous—Car supply has been better the past week, the decrease in mining the preceding week because of the holiday giving the railroads a chance to catch up. Line demand has been somewhat less on account of stock taking and closing for repairs among consumers. Prices are held without difficulty, but premiums are practically absent. The production of slack is being absorbed better this year than in any previous years, despite the largeness of lake shipments, and on most roads there is practically none to be had at under the regular season figure of 90c. On the Pan Handle there is a little to be picked up occasionally at 70@75c. We continue to quote regular prices as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh Distict.

Connellsville Coke—The market has been ominously quiet during the past week. There was about 175,000 tons a month of furnace coke involved in contracts expiring June 30, operators having demanded $2.50 for their renewal without avail until at the close of June a compromise was reached in several cases, resulting in the sale of about 90,000 tons of coke for July only at $2.50, this price being, in the great majority of cases, guaranteed against decline. It seemed probable that the remaining tonnage would be rounded up by the operators at their price, but complications developed. On Saturday, July 5, several furnaces tried to buy prompt coke, but did not satisfy their demands. Some might have paid $3 on the spur of the moment, but as the coke was not to be had they withdrew entirely. Four of five merchant furnaces have been banked, practically going on strike against the market.

The failure of J. S. & W. S. Kuhn, Incorporated, and the First-Second National Bank, in which they were interested, at the beginning of last week, has introduced fresh complications. The Kuhn Co. controlled the Isabella Connellsville Coke Co., which has gone into a receivership, while two or three coke companies were so tied up with the bank, through receiving commercial accommodations, largely with their bonds as collateral, that some other coke receiverships are not impossible. Buyers are encouraged to hold off, since receivers might not be disposed to adhere to the $2.50 price, and a break in the market is quite possible. Foundry coke has been firm, with a moderate movement on contract. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $2.85@3; contract foundry, $2.85@3 per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 5, at 333,358 tons, a decrease of 76,641 tons, and shipments at 9665 cars, a decrease of 2316 cars. The great decrease in the week was due to the holiday falling on Friday, little work being done the succeeding day. It is believed that in the past week there has been definite restriction of output by some operators, due to contracts not having been closed.

BALTIMORE, MD.

Trade holding remarkable firm in view of depressed business conditions. Prices stiffening and slack the only weak branch. Water shipments light for the week, but average for the month will be heavy.

The coal trade here is holding up remarkably well under existing circumstances. This is ordinarily the dull summer period and besides business and financial conditions are more or less unsettled. However, should the business uncertainty continue, coal men say it will undoubtedly create a feeling of uneasiness in the trade.

West Virginia three-quarter is in remarkable demand, large quantities being rushed to the lakes, and prices stiffening up from the 90c.@$1 quotations of a week ago to $1@1.05 at present. At the same time the large output of slack with but moderate orders has caused that grade to drop as low as 50@55c. at the mines. Outside of slack, even the cheap grade of coals are holding steady and are in healthy demand. Pennsylvania steam fuels are showing no signs of shading off.

The movement to the piers here continues heavy; this is almost exclusively contract fuel for either coastwise or foreign loading, and it is rare that large free tonnages are found. Not as many foreign charters were announced for the past week, but enough have been engaged to insure a heavy movement throughout the present month.

BUFFALO, N. Y.

Bituminous producers refusing to contract far in the future. Car shortage anticipated in 30 days when the crop movement opens up. Some indication of improvement in coke. Local hard coal dull, but Lake movement still heavy.

It is generally agreed that the bituminous market is growing stronger and some dealers are reporting higher prices. One sale of 50 cars is reported, half at 10c. advance over the price of a month ago for immediate delivery and the other half at 20c. advance for future delivery. The refusal of sellers to bid on contracts for longtime deliveries is becoming more marked of late and shows what the feeling is.

Some dealers have a hard time to get what they want, and in case they are badly tied up with contracts the situation is anything but pleasant. Hereafter all contract figures will be fully up to current prices, with few willing to bid on longtime business. Crops will begin to move liberally within a month which will create a car shortage in addition to the scarcity of men. Nothing but a considerable falling off in consumption will weaken the market, and such is not liable to occur as business is brisk in practically all lines.

Coke is reported stronger, with the soft 48-hr. grades showing a decided improvement in demand. This alone, if it lasts, will add a strength to the entire market that it has long lacked. Coke has been weak all the season, which would indicate that something was the matter with the iron trade, which would naturally cause uncertainty in affiliated lines. Slack coal has not been active for some time, but that trade here is almost entirely governed by the lake conditions, which are not always well understood. If the production of slack that is necessary to a sufficient amount of three-quarter, happens to be excessive, it will remain weak even when sizes are strong, and vice versa.

Bituminous prices are, therefore, quite strong with the exception of slack, which is only moderately so, at $2.90 for Pittsburgh select lump, $2.75 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley about 25c. lower. Coke is improving, but with prices remaining on about the same level.

The demand for anthracite is light and is not expected to be heavier till the farmers are through moving the crops. Country dealers are often doing actually nothing and obliged to take up other business in order to make sure of an occupation. The city demand is better than that, but it is not at all good, and the rail line coal—is moving slowly. Nothing is active but the shipment of anthracite by lake. The smaller ports are quiet, but a large amount is going into the larger ports. For the week the loading has been heavy, aggregating 152,000 tons.

COLUMBUS, OHIO

Demand heavy and prices are showing a strong raising tendency. The Lake movement is large, domestic dealers are stocking to capacity and steam users are demanding good tonnages. The week's production was heavy.

The demand from the Northwest is insistent and the indications are bright for a continuation right up to the close of navigation. Reports from the upper lake docks show that there is no congestion of consequence. Bottoms are being chartered far ahead.

Dealers in all parts of Ohio, Indiana and Michigan are placing orders both for immediate and deferred delivery in preparation for the stocking period, which shows evidence of being earlier than usual. Considerable stir is also seen in school and other public fuel contracts, while the threshing season, which is now at hand, is causing quite a good demand in the rural sections.

Manufacturing establishments are using a large tonnage, and the same is true of railroads. Some of the larger consumers are showing a disposition to stock up to guard against a car famine. Most of the coal men believe that there will be an acute car shortage later in the season, especially when the domestic demand scatters the railroad equipment all over the country.

Production is fairly good in all of the mining districts of the state. This is due to the three holidays of the previous week, which allowed cars to accumulate at the mines. In the eastern Ohio district the output is estimated at 85 per cent. and the same percentage is given from the domestic fields of Jackson, Cambridge and Massillon. In the Hocking Valley, normal production is reported. In the Pomeroy Bend district the output was about 75 per cent. of normal.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump........	$1.60		$1.60	$1.60
¾ inch...............	1.45	$1.20	1.40	1.40
Nut..................	1.25		1.35	
Mine-run.............	1.25	1.10	1.25	1.20
Nut, pea and slack....	0.65		0.65	0.65
Coarse slack..........	0.55	0.70	0.55	0.55

HAMPTON ROADS, VA.

Many steamers delayed because of shortage of coal. With miners again at work, situation will probably be relieved shortly. Operators well covered and indications are that there will be little free coal for some time. Heavy demand in both foreign and coastwise trade.

Dumpings over the various Hampton Roads piers have been anything but heavy during the past week. This has not been caused by a shortage of vessels, but by the lack of coal. However, toward the end of the week conditions have somewhat improved; contractors have managed to take care of bunker steamers and the shortage has affected them but little. The miners in the New River district having gone back to work, coal is now coming forward to tidewater and it is hoped that the next week will see all piers working under normal conditions and the accumulated vessel tonnage taken care of.

There has been a heavy demand for both coastwise and foreign buyers, but as coal has not been in sight, few quotations have been made for July delivery. All suppliers seem to be booked up for their entire output for the balance of the month and indications are that there will be little free coal at this port for some time to come. Even with the shortage suppliers have managed to take care of several foreign cargoes moving to La Plata, Panama, Talcahuano, Rio de Janeiro and Tampico.

LOUISVILLE, KY.

Summer stocking now up to maximum. Market firm and will probably continue so until consuming season starts.

The surplus in the steam coals has disappeared, due to the restricted production over the Fourth of July, and there is a mild shortage now. The situation was made more acute by the sudden cessation in the heavy shipments of pea and slack from the western Kentucky field. However, this general shortage is probably only a temporary condition and is not a serious trouble.

The summer stocking of domestic grades is now up to maximum, and this department is generally firm all along the line; indications are that this situation will continue without a break until the consuming season starts. Some of the fancy grades of eastern Kentucky block coal have recently sold as high as $2 per ton f.o.b. mine; Straight Creek nut and slack is strong at 70c. with the lower grades, including western Kentucky, at 50@60c., and pea and slack at 30@35c.

INDIANAPOLIS

Indiana production running much higher than usual at this time. Car supply good, but trouble anticipated in fall. The hopper bottom car in Indianapolis.

Indiana mines are averaging about four days a week, which is regarded satisfactory for July, since this is probably the dullest manufacturing month of the year. There is no trouble about cars, but apparently there will be as there is a big corn and wheat crop to move. Prices at the mines and in Indianapolis are unchanged. Retail business is apparently larger than it was last year at this time.

DETROIT, MICH.

Market becoming steadily stronger and railroads are handling the coal well. Orders are mostly for spot delivery. Steam coals particularly strong.

Bituminous—The demand is holding fairly strong considering the hot weather prevailing at this time; this is particularly true of the steam coals, the prices on which are holding quite firm. Most orders are for prompt delivery or for not to exceed 60 days. The railroads are handling the heavy movement in a satisfactory manner, and there is no difficulty in obtaining cars as yet, but it is predicted that the situation in this respect will be quite acute in the fall.

If anything the market is becoming steadily stronger. Smokeless coals are particularly difficult to obtain, and this is diverting a portion of the demand for these grades to anthracite. The local market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.55	....	$1.50	....	....	$2.25	$2.00
Egg...........	1.55	....	1.50	....	....	2.25	2.00
Steam lump....	1.25	....	....	....	....	....	....
¾-in. lump.....	1.15	$1.15	1.05	$1.15	$1.15	....	....
Mine-run.......	1.10	1.10	1.10	1.10	1.10	1.50	....
Slack..........	0.80	0.85	0.50	0.65	0.65	Open	....

CHICAGO

Eastern coals in sharp demand. Small buying of Western grades has caused prices to sag. Coke more active. Some stocking of bituminous in anticipation of transportation difficulties in the fall.

In view of an expected car shortage, Western dealers are being advised to increase their stocks. With large crops in prospect and the railroads curtailing orders for equipment, it is regarded as certain that they will be unable to meet the demand when the crop movement is in full swing.

So far as Hocking coal is concerned, the market is far from being overstocked. It is estimated that only about one-half of the retailers have as much smokeless coal in storage as ordinarily at this time of the year. As a result of a lack of buying orders for Western coals, lump and egg are selling at the price of steam lump and mine-run. During the past two months, many of the operators in Indiana and Illinois have been running at from 50 to 60 per cent. of capacity. Dullness prevails in the spot market.

An increase in activity has been noted in the coke market. Some contracts for furnace and foundry coke have been closed for the year on the basis of $2.50 at the oven for furnace coke and $3 for foundry. Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump...........	$1.97@2.07	$2.55	$2.27	
Egg......................		2.55		$3.94@4.20
Steam lump..............	1.82@1.87		2.07	
Mine-run................	1.77@1.82	$2.20@2.30	1.87	3.30
Screenings..............	1.62@1.67	1.90@1.95	$1.62@1.67	

Coke—Connellsville and Wise County, $5.25@5.50; byproduct egg and stove, $4.85; byproduct, nut, $4.75@4.85; gas house, $4.50@4.60.

ST. LOUIS, MO.

The local market seems to be definitely improving. The Keokuk power it has restricted the demand for screening, but there is a general increase in quotations on other grades. Slack is the only weak branch of the trade.

The St. Louis market has started to improve, especially in regards to prices on coals from the Standard field. With the demand for screenings shut off on account of the Keokuk power coming in, there has been an abundance of these.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.85
3-in. lump	....	....	$1.20	....
6-in. lump	$1.15 @ 1.30	....	1.25	0.95
Lump and egg	....	$2.00	....	....
No. 1 nut	1.15 @ 1.30	....	....	0.90
Screenings	0.75 @ 0.85	....	0.75	$0.65@0.70
Mine-run	1.10	....	....	0.80
No. 1 washed nut	1.50	....	....	....
No. 2 washed nut	1.30	....	....	....
No. 3 washed nut	1.25	....	....	....
No. 4 washed nut	1.15	....	....	....
No. 5 washed nut	0.95	....	....	....

St. Louis prices on July anthracite are: Chestnut, $7.25; stove and egg, $7; grate, $6.75. Smokeless lump and egg are $4.65; byproduct coke, $5.10, and gas-house coke, $4.85.

NEW ORLEANS

River movement of coal to the South will be light. Several tows out of Pittsburgh failed to get through. First high-water stage wil see a heavy shipment.

Prospects for a mid-summer movement of Pennsylvania coal are not bright. Waterfall on the Missouri watershed has been lighter than usual, with the result that dredges are already being used in the Mississippi. Shoal water was reported first from Point Pleasant and the head of Island 26. Several coal fleets, which managed to get away from Pittsburgh failed to get out of the Ohio; the big tow boat "Sprague" got through light and is making use of the time in gathering all empty barges. They will be taken as far up the river as the stage will permit

A fleet of loaded coal barges from the west Kentucky mines is coming down the river towed by the "Reaper."

With the first rise in the Ohio, local agencies expect to receive no less than 3,000,000 bushels.

PRODUCTION AND TRANSPORTATION STATISTICS

The Car Situation

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended June 30, as follows:

	Surplus	Shortage	Net*
New England Lines	189	334	145
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	1,003	692	**311**
Ohio; Indiana; Michigan; Western Pennsylvania	1,422	302	**1,119**
West Virginia, Virginia, North & South Carolina	878	1,111	233
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	300	150	**150**
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,771	161	**1,610**
Montana, Wyoming, Nebraska	118	0	**118**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,423	61	**2,362**
Texas, Louisiana, New Mexico	342	4	**338**
Oregon, Idaho, California, Arizona	2,609	6	**2,603**
Canadian Lines	0	0	0
Totals	11,055	2,821	**8,234**
Greatest surplus in 1912 (Apr. 25)	94,692	2,144	**92,548**
Greatest shortage in 1912 (Oct. 10)	6,491	14,897	8,406

*Bold face type indicate a surplus.

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to July 1 were 1,004,028 tons as compared with 224,908 tons for the same period last year.

Bituminous Shipments for the same periods were: 5,492,091 for the current year as compared with 3,715,397 in 1912 making gross of 6,496,119 for 1913 and 3,940,305 in 1912.

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for April and May and the first four and five months of the years 1912 and 1913:

State	April 1912	April 1913	Four Months 1912	Four Months 1913
Missouri	189,751	204,255	1,142,277	1,047,445
Kansas	303,216	444,142	1,928,482	1,848,869
Arkansas	95,994	136,153	714,884	587,590
Oklahoma	164,270	246,155	1,092,475	1,155,467
Totals	753,231	1,030,705	4,878,118	4,639,371

State	May 1912	May 1913	Five Months 1912	Five Months 1913
Missouri	194,505	186,366	1,336,782	1,233,811
Kansas	254,924	407,124	2,183,406	2,255,993
Arkansas	103,647	130,020	818,531	717,610
Oklahoma	131,220	252,901	1,223,695	1,408,368
Totals	684,296	976,411	5,562,414	5,615,782

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic over the lines of the C. & O. Ry., for May, and the eleven months ending May 30, 1912-13, in short tons:

	May		11 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	284,109	391,699	3,277,754	23	4,017,374	25
East	155,872	151,952	2,357,236	17	2,012,940	12
West	908,536	893,581	8,153,781	56	10,031,074	62
Total	1,348,517	1,437,232	13,788,771		16,061,388	
Coke	29,438	25,167	285,457		215,707	
From connections						
Bituminous	101,854	13,661	638,124	4	198,125	1
Anthracite	2,638	364	13,952	.	33,555	
Grand total (except coke)	1,453,009	1,451,257	14,440,847	100	16,293,068	100

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for June and the first six months, of the years 1912-13, in long tons:

	June		6 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading	1,155,107	1,166,670	6,858,384	19.68	5,261,335	20.16
Lehigh Valley	1,183,821	1,175,688	6,592,131	18.91	4,712,666	18.06
Cent. R.R. N. J.	851,445	850,788	4,575,664	13.13	3,372,090	12.92
Del. Lack. & West	872,714	836,365	4,789,360	13.74	3,717,584	14.25
Del. & Hudson	568,352	670,331	3,504,539	10.05	2,573,212	9.86
Pennsylvania	510,341	555,674	3,167,106	9.09	2,354,891	9.02
Erie	661,892	708,906	4,079,792	11.71	3,167,540	12.14
Ont. & Western	211,375	227,224	1,284,878	3.69	937,661	3.59
Total	5,970,047	6,191,646	34,851,854	.....	26,096,979	.....

Stocks at Tidewater at the close of June were 533,029 tons as compared with 502,629 the month before.

COAL SECURITIES

The following table gives the range of various active coal securities during the week ending July 12:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	87	87	87	87	87
American Coal Products Pref.	109¼	109¼	109¼	109¼	109¼
Colorado Fuel & Iron	....	....	28	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	225	210	215	....	....
Island Creek Coal Com	49	48	49	....	....
Island Creek Coal Pref.	79½	79	79	....	....
Pittsburgh Coal	....	....	15⅞	24⅜	14½
Pittsburgh Coal Pref.	76	74⅞	76	95	73
Pond Creek	17¼	16½	17	23¾	16½
Reading	157¾	155¼	157¼	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	86	86	86	95	84
Virginia Iron, Coal & Coke	....	....	40	54	37¼

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	93½	96	93⅝	June '13	93⅝	99⅛
Colo. F. & I. gen. 6s	..	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.	79⅞	Sale	79⅞	79⅞	77½	85
Cons. Ind. Coal Me. 1st 5s.	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s.	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	73	74	76	June '13	76	80
Tenn. Coal gen. 5s	99¼	99⅞	99⅞	99⅞	99¾	103
Birm. Div. 1st consol. 6s	100½	102¼	101	April '13	101	103
Tenn. Div. 1st g 6s	100	100¼	102	Feb. '13	102	102
Cah. C. M. Co. 1st g 6s	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	97	92	June '13	92	98

DIVIDENDS

Consolidation Coal Co.—Regular quarterly dividend of 1½% payable July 31 to holders of record July 23.

Pacific Coast Co.—Regular quarterly dividend of 1½% on both the common and the second preferred and 1¼% on the first preferred, all payable Aug. 1 to holders of record July 19 to Aug. 1.

COAL TRADE NEWS

The Hard Coalers Slowing Up—The Philadelphia & Reading Coal & Iron Company's mines will work only four days per week during the balance of the month; the Susquehanna Coal Co. will restrict operations to three days per week; the Lehigh Valley Coal Co. will work on a basis of five days per week; the Lehigh Coal & Navigation Co. will work four days per week during the balance of the month.

PRICES OF MINING SUPPLIES

THE MARKET IN GENERAL

The slowing down of business in all sections of the coun- ry seems imminent, and manufacturers state that industrial nactivity has already manifested itself in many ways. There s a tendency on the part of all classes of manufacturers to o very slowly in the construction of new plants, and the cquisition of existing ones is either held up entirely, or is he subject of careful deliberation.

The volume of business has not slackened to any large ex- ent as is seen by the orders being received by the largest teel makers, which are now running at the rate of 23,000 tons day, compared with the maximum capacity of approximately 8,000 tons daily. On the other hand, this interest has, at imes, booked as high as 70,000 tons daily, spread over an ntire month.

The financial situation is the real cause of the business rouble and the higher rates demanded for money by bankers, oth in the United States and abroad, is causing a great deal f curtailment, and will probably result in the stopping of nuch work. Some of the leading railroads of the country nd industrial concerns with extremely high credit have re- ently borrowed, and paid as much as 7% for their money for hort periods. There is not enough profit in business to in- uce large manufacturers to pay such rates of interest with he hope of making anything on it.

Business is largely tied up with the political situation, hile the inability of Congress to settle the tariff and the urrency Bill has had a bad effect on the situation.

LABOR

Strikes have been less frequent, and there is not so much issatisfaction as there was in May. There continues to be ouble among the miners in West Virginia. A part of the uilding trade in Chicago is tied up, and the strike of the eavers and dyers at Paterson continues, more or less, al- ough it has been gradually weakening for the last six eeks. In New England, there have been serious differences tween capital and labor in certain of the mills around Bos- n. The attempt of the U. S. Secretary of Labor to settle me of these strikes will be watched with much interest.

The trainmen on 48 railroads operating east of the Missis- pi have voted a strike, unless increase in wages is granted. ere has been a refusal to arbitrate the differences under e Erdman Act and there is a possibility of a serious strike. the other hand, it is not generally believed that the train- n will leave their jobs at this time when there is a mani- st lessening in the amount of traffic.

Laborers for general contract work in New York and vi- ity are more plentiful than last year, but good outside or commands $2 per day, and there seems to be likeli- od of this rate being diminished during the present year at st.

IRON AND STEEL PRODUCTS

The unfilled orders of the United States Steel Corporation ing the months of May and June decreased more than 0,000 tons. Since the first of the year they have declined 0,000 tons. In spite of this fact, the unfilled orders at end of June were larger, with only three exceptions, than other year since the organization of the corporation in 2.

The unfilled orders will undoubtedly continue to decrease htly for two, if not three, months longer. By that time re should be enough information to foretell whether a tracted spell of dull business is in sight or the turning t has been reached. The mills have not, as yet, curtailed r operations to any large extent, but they will do so, uld the volume of orders decrease much more, and espe- ly if they do not receive prompt shipping instructions.

ailroads are practically out of the market as far as buy- any kind of materials is concerned, and likewise, the er industrial companies are waiting until more informa- regarding the future is at hand. Quite a little activity oted in the demand for pipe, and the automobile manu- urers continue to take large quantities of all kinds of erials.

teel Rails—Business continues to slow down, and there been very little activity in rails of standard sections, although about 100,000 tons were sold during June. In light rails, the falling off is just as marked, and in a few months the rail mills will have finished their schedules of operation. Before that time, however, it is probable that new orders will be received.

Quotations are unchanged at $1.25 per lb. per standard section, weighing from 50 to 100 lb. per yd.; $1.21 for 40- to 50 lb. rails; $1.30 for 16- to 20-lb. rails. These quotations are per 100 lb. for car-load lots f.o.b. Pittsburgh.

In Chicago, 16- to 20-lb. rails are $1.30; 12-lb., $1.333; 8-lb., $1.40. Relaying rails are sold $24 per gross ton in Chicago, and in New York at $22.50. These quotations can likewise be obtained at other points.

Track Supplies—Business has again fallen off, and is now almost nominal. With the reduction in the volume of business came a contraction of prices. Railroad spikes are now quoted at $1.80, Pittsburgh. Track bolts with square nuts, $2.30@2.40. These prices are per 100 lb. Tie plates are $33@35 per net ton. Quotations in Pittsburgh are likewise easier; railroad spikes are quoted at $1.70@1.75 for the large size and $1.80@1.85 for a small size.

Pipes—Business in the pipe trade is most satisfactory compared with the other iron and steel markets. Several makers in and around the Pittsburgh district report more business received during June than any other month of the year. There is a foreign inquiry in the market for approximately 700 miles of 8-in. pipe, and the National Tube Co. has booked an order for 110 miles of the same size. For pipe used by oil companies in particular there is an exceedingly great demand, and in some instances premiums have been paid over regular prices for prompt delivery. A revision in discount has been made, and net prices are approximately 5% higher than they were last month.

Discounts and net prices are as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded...........	79%	70½%
2½- to 6-in. steel lap welded...........	78%	69½%
7- to 12-in. steel lap welded............	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

Diameter	Cents		Diameter	Cents	
	Black	Galvanized		Black	Galvanized
¾-in.........	2.43	3.40	5-in.........	30.50	45.00
1-in..........	3.58	5.00	6-in.........	42.25	58.25
1¼-in........	4.85	6.80	7-in.........	59.50	85.00
1½-in........	5.80	8.10	8-in.........	62.50	89.00
2½-in........	12.90	17.80	10-in........	$1.03	$1.46
3-in..........	16.80	23.30	11-in........	1.13	1.64
4-in..........	23.90	33.20	12-in........	1.27	1.82

Sheets—Continued weakness has prevailed in the sheet market, and early in June the price of 27 galvanized in large lots, Pittsburgh, declined 5c. per 100 lb. to $2.25. At that time there was quite a fair business transacted at these prices, and the mills placed a number of orders on their books for future delivery. Since then, efforts have been made to secure galvanized sheets at $3.25, but in many instances mills have refused to accept these quotations except for fourth-quarter delivery. The reason for this is that their order books have been filled with enough third-quarter business to keep their mills very actively engaged, and for the slight additional capacity they have, there was no need of cutting the quotations. There is no doubt that numerous mills would be very willing to accept $3.25 for fourth-quarter.

The following quotations are for lots of a few bundles each. f.o.b. Pittsburgh and Chicago. Price for large lots is as stated, $2.25 f.o.b. Pittsburgh for No. 28 base.

	Cents per pound			
	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24................	2.70	3.50	2.65	3.45
Nos. 25 and 26................	2.75	3.65	2.70	3.60
No. 27	2.80	3.90	2.75	3.85
No. 28	2.85	3.95	2.80	3.90

Structural Materials—There is a dearth of business in the East, principally because building operations cannot be financed on any reasonable terms. In the West, the railways are curtailing their orders for bridges and structural material for similar reasons, it being almost impossible to secure funds to pay for these improvements. How long such a condition will last is only a matter of conjecture, but in the meantime, structural mills are working on old orders, and have very little new business. Some extremely low prices have been made for fabricated work, and it is probable that mine improvements can be carried on more cheaply now than at any time in several years.

Quotations for structural steel bars are unchanged and plates, beams and angles being held at $1.50 base Pittsburgh. Chicago price is $1.68@1.73. These prices are per pound in carload lots.

Spiral Riveted Pipe—Prices are without change. The following quotations are f.o.b. factory, freight equalized with New York, being figured at a discount of 50, 10 and 10% from list. These are for orders amounting to approximately $250. For large orders, prices are cheaper by 12½ to 20½.

Diameter in in.	Thickness Birmingham wire gage	Net price per 100 ft. With bolted joints complete Plain	Asphalted	Galvanized
4	18	$19.76	$21.48	$30.74
5	18	23.40	23.70	37.14
6	16	33.05	35.76	49.73
7	16	37.58	40.76	56.82
8	16	43.17	46.80	65.00
9	16	50.06	50.10	74.22
10	14	66.42	71.08	96.15
11	14	71.20	76.57	102.24
12	14	83.75	89.15	118.30

Pig Iron—Curtailment in the output of pig iron has not been as drastic as was expected late in the spring, and in point of fact, prices have declined faster than production. The daily rate of pig-iron manufacture in June was over 87,000 tons, which is smaller than any month since October of last year, but it is a difference of only a few figures for the high record established in February was only 92,300 tons daily. For the last 19 months the pig-iron production of the country has exceeded 2,000,000 tons monthly. The make in June was 2,600,000 tons compared with 1,045,000 tons, the low point, in January, 1908. It is believed that production will show a further falling off of from 5% to 10% this month, for already several furnaces have been banked, and the high price of coke is having an influence, for there is little profit in making iron to sell at $14 with coke costing $2.50. Consumers have been buying iron only sparingly, although some fair-sized lots have been disposed of to manufacturers of cast-iron pipe and the malleable foundries in the East. Prices are down $2 to $3 below what they were in November and December, and as low as $10 has been accepted for No. 2 Southern Foundry at Birmingham.

WIRE PRODUCTS

Wire—The only orders received by manufacturers of wire and wire products are from jobbers and consumers who need material for immediate requirements. There is little or no incentive to buy for forward delivery, as prices have apparently reached their maximum, and in some cases are lower. In Pittsburgh, there has been a decline of $1 per ton on annealed fence wire. Annealed fence wire in large lots can be had at $1.55. Galvanized barbed wire at $2.20, annealed is $1.80. These quotations are f.o.b. Pittsburgh. In Chicago No. 9 plain wire is $1.78; painted barbed wire $1.98, and galvanized $2.38.

Wire Rope—The demand is less than last month. Quotations are as follows: Two-inch rope, Pittsburgh, 50c. per lin.ft.; 1¼-in., 23c.; ¾-in., 10c. These quotations are for the best grade of rope, and cheaper grades can be had at considerable concessions from these figures.

Copper Wire—There has been a distinct falling off in the volume of business and prices are very much unsettled. Some quotations are 17c. per lb., but it is probable that a desirable order for large amounts could be placed at much less than this figure. The one redeeming feature in the wire trade is the proposition to electrify several important trunk lines in the West.

HARDWARE

Nails—The nominal asking price of nails continues unchanged, at $1.80 Pittsburgh and $2.10 New York. This price is not a reflection of market conditions, except in so far as it portrays the dullness at Pittsburgh and the inability to secure orders even if concessions were made. For small lots in jobber's store, 2c. is named at Pittsburgh and 2.20c. at Chicago; approximately the same prices may be obtained in important jobbing centers throughout the Middle West as at Chicago.

Bar Iron and Steel—Prices are much better than the casual observer would think, in comparison with the small amount of business being transacted at the mills. This is easily explained, because consumers are now buying from store in New York in comparatively small lots, in preference to loading up with material at the mills, which may be considerably cheaper before it is used. Quotations from store are as follows:

Refined iron:	Per lb
1 to 1⅞ in., round and square	2.10c
1½ to 4 in. x ⅜ to 1 in.	2.10c
1½ to 4 in. x ¼ in. to 5/16 in.	2.30c
Norway bars	3.60c
Soft steel:	
¾ to 3 in., round and square	2.05c
1 to 6 in. x ⅜ to 1 in.	2.05c
1 to 6 in. x ¼ and 5/16 in.	2.20c
Rods—⅝ and 11/16 in.	2.15c
Bands—1½ to 6 3/16 in. to No. 8	2.35c
Beams and channels—3 to 15 in.	2.15c

Extras for triple B (BBB)

3/16 and ¼ in.	2c.
5/16 and larger	1.75c

Chain—There is less demand than a month ago. Ruling quotations per 100 lb., f.o.b. Pittsburgh, are as follows:

3/16 in.	$7.5
¼ in.	4.9
5/16 in.	3.9
⅜ in.	3.4
7/16 in.	3.2
½ and 9/16 in.	3.0
⅝ and 11/16 in.	2.9
¾ and 13/16 in.	2.8
⅞ and 15/16 in.	2.7
1 to 1¼ in.	2.6

Extras for BB

3/16 in.	1.5
¼ in.	1.5
5/16 and larger	1.2

METALS

Copper—Less copper was bought in June than in previou months of the year, but as consumers continue to take fai quantities on contracts made some time ago, and, principall because an important refinery in the East was closed dow the statistical position showed an improvement, and the stock remaining at the end of the month were smaller than an other month this year. This, however, had no effect on quo tations, so prices continue to melt away slowly but steadily Producers' agents made no open effort to sell below 14¾c but jobbers who frequently acted for selling agents wer willing to make sales at 14⅜c. for electrolytic. Europea consumers are not buying anywhere near as much as the were a year ago.

Tin—Not since the present boom in tin started in the earl part of 1911, have prices been as low as they now are. Th London market steadily declined throughout the month an sales were made at around 39c. per lb. This is a very drasti decline, representing a reduction price of 13@14c. in th high figures and fully 25%. Whether the tin market will re turn to a level of around 30 to 40c., as has been the case fo a number of years, is only a matter of conjecture, but fro the statistical position there seems to be no good reason wh such prices should continue for any length of time.

MISCELLANEOUS

Portland Cement—Manufacturers of portland cement hav enough orders on their books to keep them running well int September of this year. At the same time there is very littl business being transacted for forward delivery and it woul not be at all surprising if a revision of prices were made i the fall. The reason for this has been the sharp falling o of contract work all over the country. Municipalities are no doing anywhere near the amount of contracting work the were two years ago, due to inability to finance the operation Similar conditions prevent railways increasing their faciliti and it seems likely that there will be less cement used in th last half of 1913 than was in the corresponding period of 191

Prices show no change; in Pittsburgh, the price is 90c.@ $1; in Chicago, $1.10@1.20; in the Lehigh Valley district, 95c.@ $1. All these prices are in bulk at the mill, and general con sumers have to pay 40c. per bbl. for the package and als freight to destination, making a price to Pittsburgh of $1.5 and one in New York of $1.58. The allowance for bags re turned varies from 7½ to 10c.

Bars, Concrete Reinforcing—Consumers of bars are speci fying freely on old contracts, but are not entering new one Quotations for small lots from Pittsburgh warehouses ar as follows:

PITTSBURG, CENTS PER POUND

	Warehous Stock
¾-in.	2.00@2.1
⅝-in.	2.05@2.1
½-in.	2.10@1.2
⅜-in.	2.25@2.3

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

olume 4, No. 4
sued Every Saturday
ill Publishing Company

NEW YORK, JULY 26, 1913

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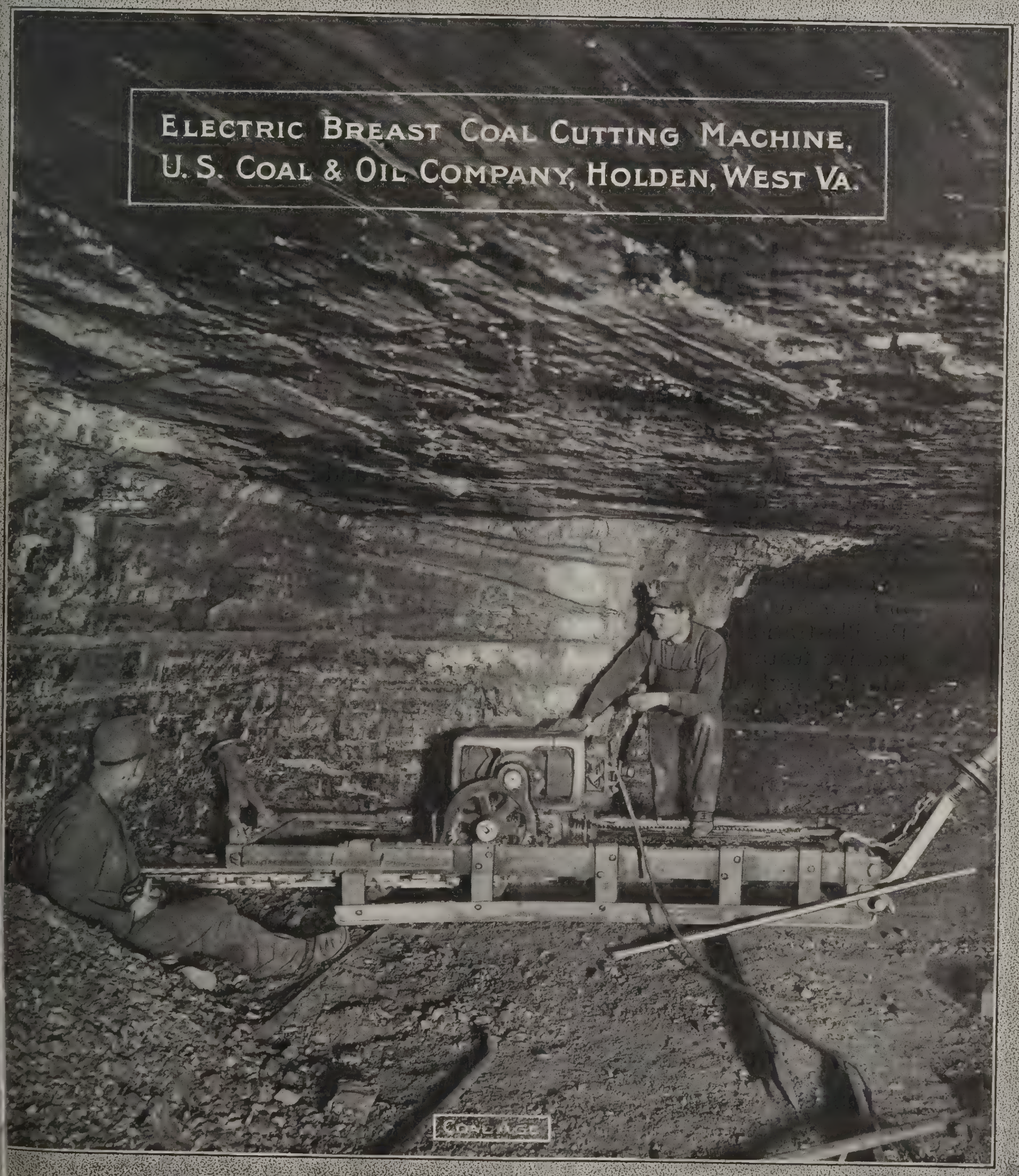
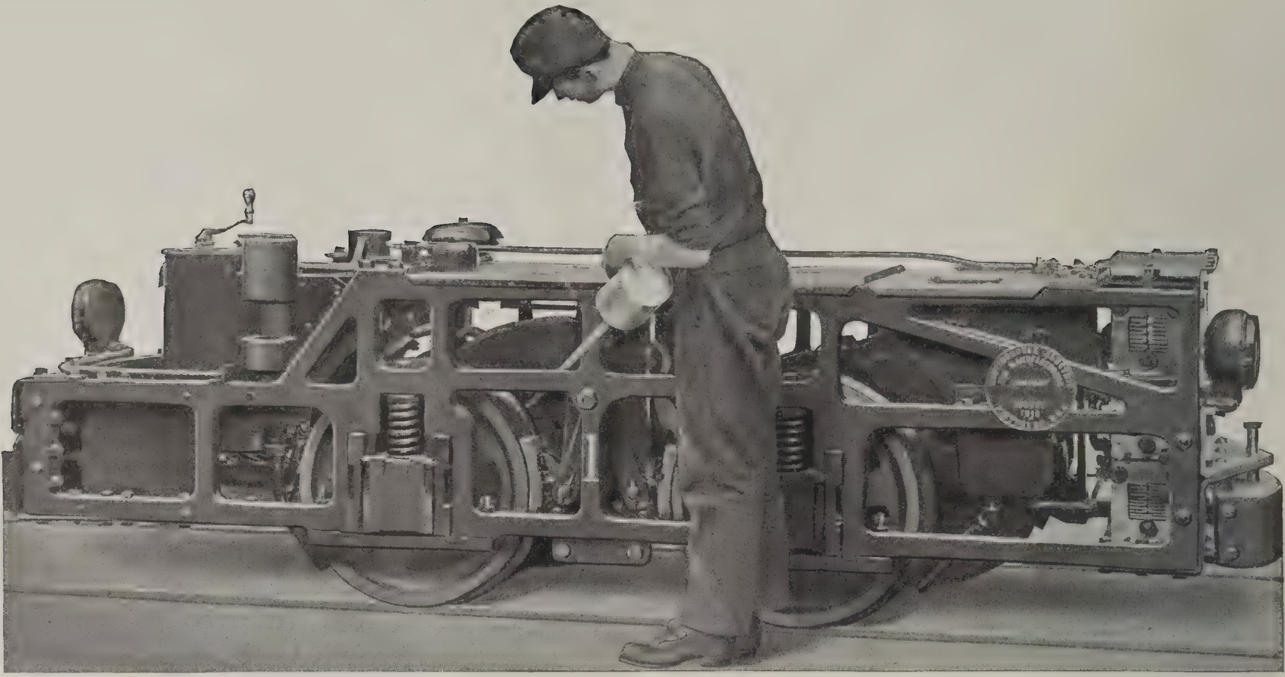
Advertising Index, Last Page



ELECTRIC BREAST COAL CUTTING MACHINE,
U. S. COAL & OIL COMPANY, HOLDEN, WEST VA.

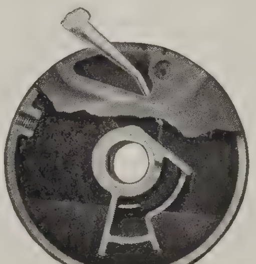


The Lubricating System

on Baldwin-Westinghouse Mine Locomotives reduces wear to a minimum

The frame is so designed that the journals, and the motor armature and axle bearings are easily reached for thorough lubrication.

The lubricating system of the motor, as shown in the illustration, is a distinctive feature of Baldwin-Westinghouse Mine Locomotive Motors. A large pocket is provided for the waste which comes in contact with the shaft through openings in the housings and the bearings.



The oil is poured into a separate reservoir and is absorbed by the waste. All grit and dirt in the oil is thus filtered out and only clean oil reaches the shaft. The depth of oil in the reservoir can be easily gauged. An overflow opening in the armature oilwell prevents flooding the bearing. The axle bearings are oiled in a similar manner.

This system, with specially designed bearings for long life in service, has been adopted as standard after years of investigation.

Full information regarding these locomotives upon request.

Address either company

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any post-office in the United States or possessions, and Mexico. $4 to Canada.

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CIRCULATION OF THIS ISSUE 11,350

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The Trouble With Filson

The Weekly Ad-Talk Page

A couple of weeks ago I was eating dinner in the dining room of a hotel in one of the smaller coal mining towns of Illinois.

At the next table were two business men who were engaged in conversation and their table was so close to mine that I could not help overhearing a good deal of what was said.

After comparing notes on various matters of business and talking over the affairs of the village, I heard one of them break in thus:—

"Say, what do you think of Filson's new patent device?"

"Well, it looks good to me," was the reply, "I think he has the right idea and it certainly seems well made, but there's one thing about it I don't like."

"What do you mean?" asked the other.

"Well, he doesn't advertise it—seems as if it ought to have a ready sale, for I know there's a demand for that sort of an article."

"I have thought of that myself; it certainly looks as if he doesn't believe in it himself, or he would stake some money on it and buy a few pages of advertising."

"That's the point exactly. If he had absolute confidence in it, I'd buy it, but as he doesn't, it looks as if there was a nigger somewhere in the wood pile."

At this point the busy waitress began loading up my table and I stopped eavesdropping. However, as I ate my dinner I thought to myself, "Well, from listening to those two men, I have gathered in material for another weekly ad talk page."

For the men were right. There is usually something wrong, incomplete, unaccepted, questionable about an unadvertised article. Either the maker is afraid of it, or the publishing firm is afraid of it and won't discredit itself by standing silent sponsor for it in its selling section. Something's wrong or that advertising campaign would commence.

Men are shrewd. They don't want to buy an article if they think that the manufacturer himself doesn't believe in it to the limit. If he isn't sure enough of it to come out in black and white and show it up in all its points, the buyer is pretty sure to fight shy of that article.

If a thing is not advertised—why? You do well to put that question to yourself and wait.

COAL AGE

Vol. 4 NEW YORK, JULY 26, 1913 No. 4

There's an old saying worded something like this: "A man would never know he had neighbors were it not for the women folks." The following is clipped from a recent issue of an Alabama paper and was written by a woman. Until now we never knew, or at least never realized, the manifold beauties of our mines. When we might toil in such a picturesque place and amid such romance, why should any of us want to remain on top?

* * *

"The mine machines, viewed in a machine shop, or on the surface where they are lifeless, inanimate—do not attract you.

"But come below. Now see them. They are huge shadow shapes in a quivering sensitive dark. Each one attacks a solid wall of coal, advances a long saw-like cutter bar beneath the seam at one rib of the room and feeds itself across the entire length of the face at a speed of thirty inches per minute.

"See that cutter down at Mulga—you'll never forget it! See that longwall cutter at work in Montevallo! Get lost in the depths of a great mine—these vast, strange, petrified forests of a thousand centuries ago—here are the works of Hephaistos himself come true! If ever there was a place where fancy itself may run wild riot, it is down a deep coal mine.

" 'Hear the gas?' the engineers with you halt where the track swerves off to another one of the entries into another 'room.' All is quiet save a far-off trickling sound, slight and musical.

" 'Why, like a little waterfall somewhere.' You stop and listen dumbfounded. 'Some water there, too,' says the mine superintendent, 'gas and water mixed.' The sound goes on. It never, never stops. In the silent, subtle dark it even seems to increase, until, in fancy, a hundred little white streams steal through the ancient coal plants, the black roots, the reeds, the shadowy ferns and mammoth trees buried there these million years. The old coal forest is *young again, all quivering with light and life and passion for the sun.*

"Half lost in the everlasting gloom near the rigid heading, the miners swing their pit lamps up to the low roof, where close under a stratum of slate, above the shining band of coal, ever lurks that alluring sound, the voice of a mysterious invisible vapor, poisonous breath of the long imprisoned coal plants—the deadly firedamp.

"Instantly it catches fire. Quick as forked lightning, treacherous, wild, fantastic—golden hair of the Lorelei—it plays over the face of the coal. 'Light carbureted hydrogen,' explains the engineer, 'as cooly as though he were saying, 'Fine weather we're having today.'

"The witch-like strands of the blue and yellow flames leap now like strange live things. 'The ghosts of the mines!' says the superintendent as he and the miners quietly beat out the flames.

"D'you wonder the niggers take 'em for ghosts?"

* * *

No! we are not surprised that the darkies are superstitious, but we do wonder what would have happened if about that time a full-grown rat, or perhaps two rats, "buried there these million years, should have become *young again, fresh again, all quivering with light and life and passion for the sun.*"

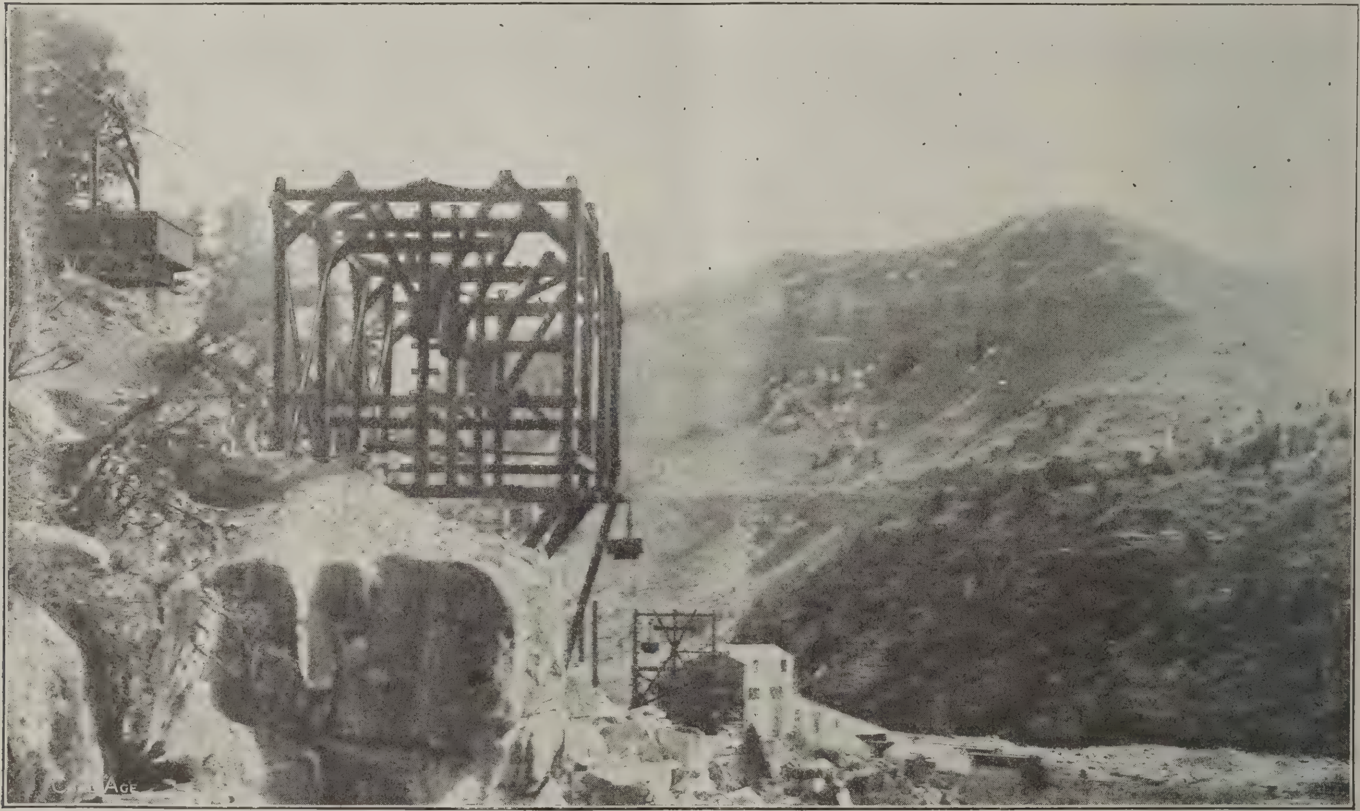
A Recent Utah Coal-Mine Development

By W. R. Elliott*

SYNOPSIS—The topography of the country practically forbade surface haulage from the mine to the tipple. An aërial tramway was therefore installed and a type of mine car developed, the body of which is composed of two tramway buckets which may be lifted from the supporting truck by the tram carriers, and thus conveyed down the mountain to the loading tipple spanning the railway tracks.

⁂

About the middle of 1912 the Spring Cañon Coal Co., an affiliated interest of the Knight Investment Co., of Provo, Utah, decided to develop its property, comprising a total of 2000 acres in Carbon County, Utah, and located about five miles up Spring Cañon from the town of Helper, a division point on the Denver & Rio Grande R.R.



The Four-Saddle, Overhanging Tower Where a Decided Change in Grade Is Made

Three workable coal beds underlie this acreage. These are known as Nos. 1, 2 and 3, the vertical distance between No. 1 and No. 3 seams being 180 ft. The coal in all these measures is jet black, heavy, hard and compact, has excellent luster, without stains, spots or pyrites. The average analysis of the samples from the different deposits are as follows: From the upper or No. 3 seam, volatile matter, 43.4 per cent.; fixed carbon, 51.2; ash, 3.6; moisture, 1.8; sulphur, 0.89; heat content, 14,725 B.t.u.; thickness of deposit, 8 ft. From the middle or No. 2 seam, volatile matter, 47.4 per cent.; fixed carbon, 47.2; ash, 4.6; moisture, 0.7; sulphur, 0.98; heat content, 14,739 B.t.u.; thickness of deposit, 4 ft. 8 in. From the lower or No. 1 seam, volatile matter, 46.7 per cent.; fixed carbon, 46.9; ash, 4.5; moisture, 1.9; sulphur, 1.07; heat content, 14,547 B.t.u.; thickness of seam, 9 ft.

A Branch Railroad Was Necessary

A branch line was built from the Denver & Rio Grande at a point immediately north of Helper to a place where a satisfactory tipple location could be secured, a distance of approximately four miles. For a distance of 3000 ft. between the tipple site and the southern extremity of the property where development work was commenced, the topography of the ground was such as to preclude the railroad being extended further, unless Shay engines were secured to operate thereon. The branch, as constructed, has a maximum gradient of 3.87 per cent., with curves of 10 deg. It is laid throughout, including the tipple tracks, with 75-lb. rails. The Spring Cañon Coal Co. owns its own roundhouse, water tank, etc., these buildings being located at the Helper terminus of the branch, and the present motive power consists of two consolidation-type locomotives.

Two systems of coal transportation from the mine to the tipple were considered, namely, surface and aërial tramways. The sides of the cañon are precipitous. There are also one or two tributary cañons over which high and expensive trestles would be necessary if surface haulage were employed. In consideration of the foregoing, the aërial tramway was selected as the most satisfactory solution of the conveying problem. This apparatus was

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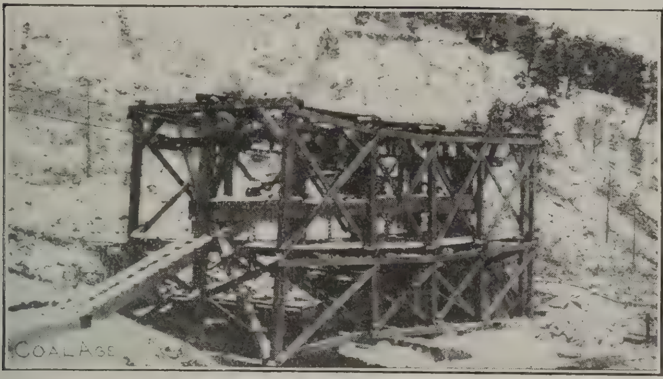
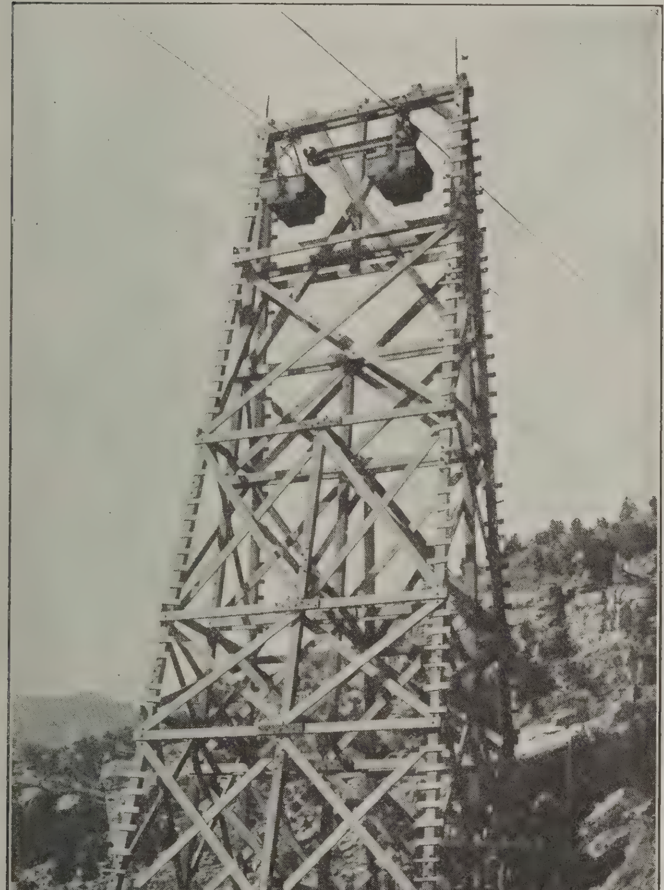
*Engineer and manager, Utah Engineering & Machinery Co., Salt Lake City, Utah.



The Cable Back-Balance

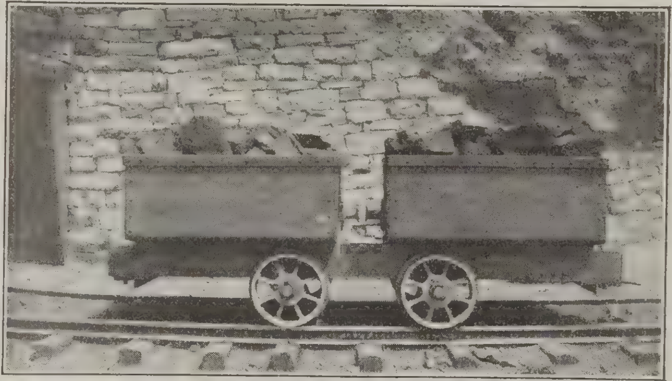


One of the Tramway Towers

furnished by the Trenton Iron Co. (now the American Steel & Wire Co.), and was installed under the direction of its engineers, Messrs. Carstarphen & Holmes.

Although most of the construction work was done during the coldest weather of winter, no time was lost. The final plans were received Jan. 9 and the last carload of machinery on Jan. 23. The line was started on Feb. 13, and has been in continuous operation ever since.

A Locomotive and Trip of Cars



The Two-Bucket Mine Car

One of the Towers, Showing the Large Bucket Clearance

Owing to the abrupt topography of the cañon and the location of the tramway, considerable ingenuity was necessary in the design of some of the supporting structures. At one point, where a sharp change of grade takes place, the vertical curve in the cable is divided between four saddles. One side of this structure rests on solid rock, while the other is cantilevered over the edge of the precipice. At the loading terminal, one end of the structure is carried on a 50-ft. arch truss. The line is 10-ft. gage and the towers are so designed as to allow ample clearance when the buckets are swinging. This was necessary on account of the high winds that prevail in the winter. Lock coil cable is used for the tracks, the one for the loaded buckets being 1⅝ in. in diameter, while that for the empties is 1¼ in. in diameter. These cables rest in grooved saddles supported by 10-in. channels on towers. Each is anchored at one end, while at the other it is attached to chains, which, in turn, pass over heavy sheaves and are fastened to weight boxes. This method of back-balancing at all times maintains a uniform tension on the cables independent of the loading or weather conditions. The gross weight of box and stone on the loaded cable is 35 tons, and on the smaller cable, 16 tons. The weight boxes are so suspended, that when the loads are off the line, the box rests on the ground, and when the line is loaded, the box springs clear. This relieves the cable from the total strain when not in use, and increases its life.

Car in Position on Transfer Table

Hangers Engaging the Bucket Trunnions

Platform Depressed, Buckets Suspended

Mine Foreman's Office and Empty and Loaded Tracks. Note Safety First Signs over Both Openings

The difference in elevation of the terminals is 321 ft., of which 225 ft. occurs in the first 1300 ft. from the loading terminal. This inclination is sufficient not only to run the tramway, but to develop considerable power. The tramway is motor-driven and required 12 hp. to start off with the empty buckets going up hill. After being limbered up about 15 hp. was developed, with a loading equal to 75 tons per hour. At the ultimate capacity of 250 tons per hour, approximately 50 hp. will be developed.

This is no inconsiderable item and is not wasted. The motor acts equally well as a generator and returns surplus current to the power line, at the same time acting as a brake to regulate the speed of travel. Brakes are also provided on both the main drive and pinion shafts for stopping the line and controlling its speed, should any accident occur to the motor or other connections.

The traction rope is a ⅞-in. lang-lay cable and is maintained at proper working tension by a 5000-lb. back balance. The rope speed is 500 ft. per min., this having been found most desirable for the loads handled. The tension sheave of the traction rope is 10 ft. in diameter and is located at the discharge terminal. This sheave runs upon a bearing mounted on a truck connected to the weight box and set at a considerable inclination from the horizontal to compensate for the difference in level between the empty and loaded tracks.

A Peculiar Coal-Mine Car

The tramway buckets are so made that they may be placed, two at a time, upon a suitable truck, which is run into the mine and otherwise handled exactly the same as an ordinary mine car. From these trucks the loaded buckets are transferred to the overhead cableway at the loading terminal by means of an apparatus called the "transfer table."

As above stated, the trucks come from the mine carrying two buckets each of a nominal capacity of 2000 lb., but in actual practice, the average weight of contents is 2300 lb. The mine locomotive pushes the cars over a knuckle from whence they coast to the scales. Immediately in front of these are set the blocks or squeeze-brakes consisting of a pair of heavy timbers set one on each side of the track. These are pivoted on the end next to the approaching cars and clear the wheels slightly. The other ends are connected with links and levers to allow of their being closed sufficiently to prevent the cars running through. When the operator stationed here releases this brake, the cars coast across the scales into the loading terminal of the tramway.

After passing the scales the cars are stopped upon the adjoining transfer table. This is a large platform pivoted at one end, the other being connected to a pair of cranks driven by an electric elevator machine and capable of being raised or lowered as desired. The track crosses this platform near the center, where there is a vertical movement of about 12 in.

A pair of hangers having been previously positioned on the overhead rail above the transfer table and pushed outward to clear the approaching loaded truck, the table is raised. This operation brings the platform track level with that of the scales. The car is run upon this platform, the support for the empty hangers withdrawn, permitting the hooks forming the ends of the hangers to fall beneath the trunnions of the buckets. The platform is then lowered which leaves the buckets suspended by the hangers from the overhead rail. They immediately coast to the front of the terminal, where an operator is stationed to space them at regular intervals.

A gong geared to a sheave wheel gives warning when the proper distance has been attained for attaching the bucket. The platform meanwhile remains down until two empty buckets have been positioned over the truck. The operator then throws a switch; the platform rises and the empty truck thereon lifts the buckets clear of the hangers, which are then pushed outward and the latch holding the truck in position on the platform withdrawn. This allows the car to run through a switchback and coast into the mine.

The Transfer Tables Are Duplicated

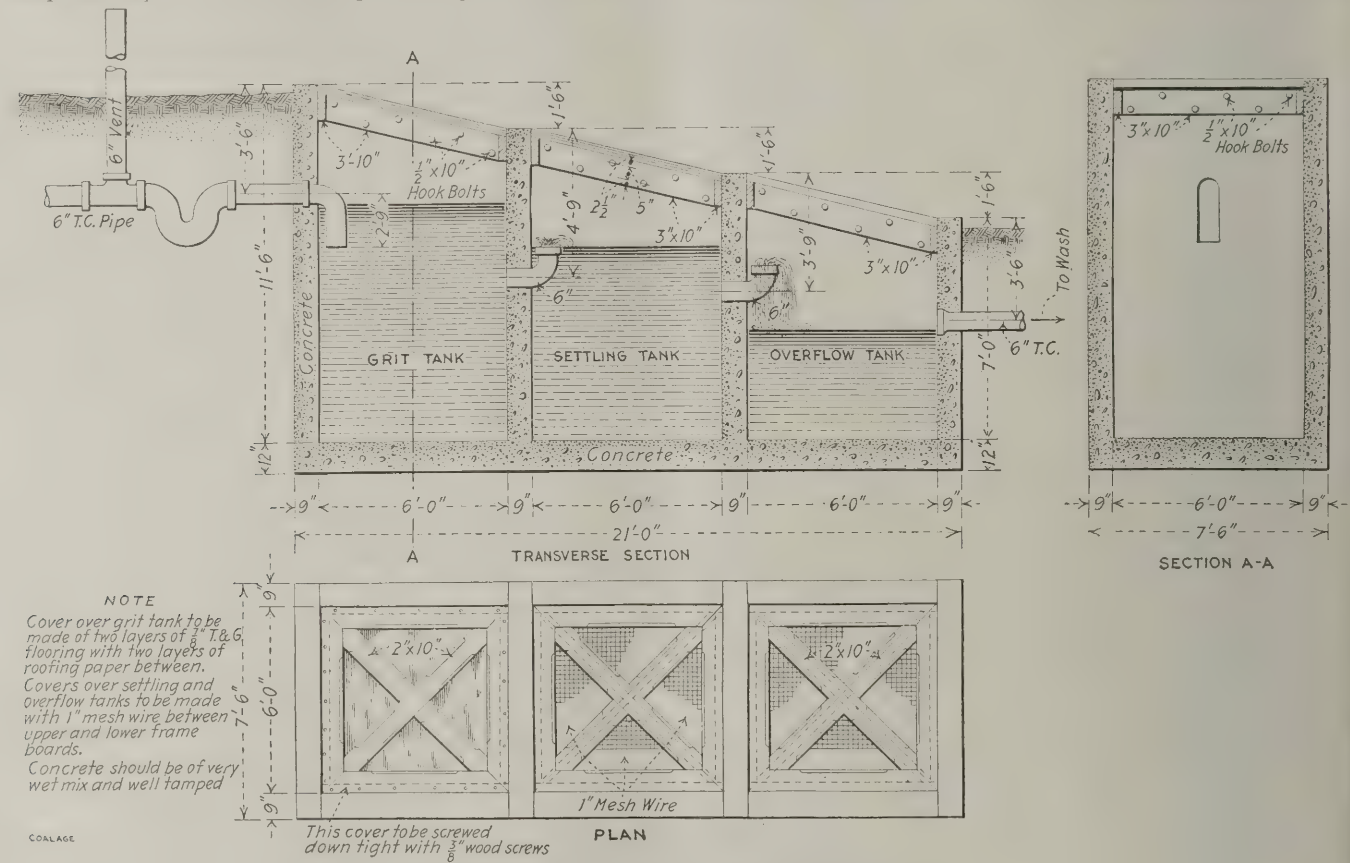
In order to facilitate the rapid handling of buckets two transfer tables are provided, so arranged that one man can operate both at the same time, or either independently. The time cycle for complete operation on one table is 40 sec., or for the two tables, 50 sec.; but four buckets are transferred with the two tables, while only two are handled with the one.

The Head of the Conveyor Line. Note Character of Country

The loading terminal is located on a ledge of rock, and all available space was utilized to the best advantage. The driving and breaking mechanism is placed in an excavation beneath the floor, the traction rope passing around sheaves 8 ft. in diameter to eliminate bending stresses. The track to the kick back passes directly over the wheel pit and between the incoming and outgoing parts of the traction rope.

The track, or suspension cables for the buckets entering and leaving this station, have a difference of elevation of 4 ft., to give necessary grade for the buckets to run freely anywhere in the station without assistance from the operators. The difference in elevation of the cables here required a difference of half that amount on the first tower from the loading terminal. On other towers the empty and loaded cables are carried at the same elevation with the exception of the tower next the discharge terminal, where a difference also exists.

The discharge terminal presents only one unusual feature—that of having the hopper located under a sharp curve in the overhead rail at the extreme end of the structure. This necessitates bringing the buckets to a complete stop in order to dump. The grips employed to secure a hold upon the traction rope are operated directly by the weight of the load they carry. Thus, the heavier the load the greater the pressure exerted by the grip jaws on the cable. These grips can only be relieved by bodily lifting the load and depressing the tracks simultaneously. This is accomplished in the terminal by attachers and detachers wherein the load is lifted by side rollers rising on incline planes at the same time the track is depressed. This causes the jaws to remain open long enough for the rope to enter or leave the grip as the case may require. This operation is entirely automatic, the grip at all other times remaining closed.


6" Vent
6" T.C. Pipe
3'-6"
11'-6"
12"
Concrete
3'-10"
1/2"x10" Hook Bolts
2'-9"
1'-6"
4'-9"
2 1/2"
5"
3"x10"
6"
3'-9"
6"
3'-6"
7'-0"
6" T.C.
To Wash
GRIT TANK
SETTLING TANK
OVERFLOW TANK
Concrete
9"
6'-0"
21'-0"
A
TRANSVERSE SECTION
3"x10"
1/2"x10" Hook Bolts
7'-6"
SECTION A-A
NOTE
Cover over grit tank to be made of two layers of 7/8" T.&G. flooring with two layers of roofing paper between.
Covers over settling and overflow tanks to be made with 1" mesh wire between upper and lower frame boards.
Concrete should be of very wet mix and well tamped
2"x10"
1" Mesh Wire
This cover to be screwed down tight with 3/8" wood screws
PLAN
COALAGE

Settling Tank for Sewage Purification

A Freight Elevator for Handling Supplies

A freight elevator is installed at the discharge terminal to facilitate the transportation of material brought in on the railroad for use in the mine. This elevator is 10x6 ft., with a lifting capacity of 2500 lb. It is equipped with modern safety speed governor and automatic limit stop, which prevents the platform from running beyond the terminal landing and thereby causing accidents. Material elevated from the ground to the floor of the discharge terminal is conveyed to the mine over the tramway in the coal buckets or by special hangers adapted to such material as steel rails.

Particular attention has been paid to the problem of lubrication, grease cups being provided for all bearings, sheaves and rollers on the entire tramway. The terminals are housed in with corrugated iron, which has been painted. The towers also have been painted, furnishing a pleasing contrast with similar installations often left in the rough state.

A total force of ten men at $35 per day is required to handle an output of 2000 tons. This brings the transportation charge from mine to tipple to 1¾c. per ton. Had the conditions governing the location of loading terminal and tipple been favorable, this would have been materially reduced.

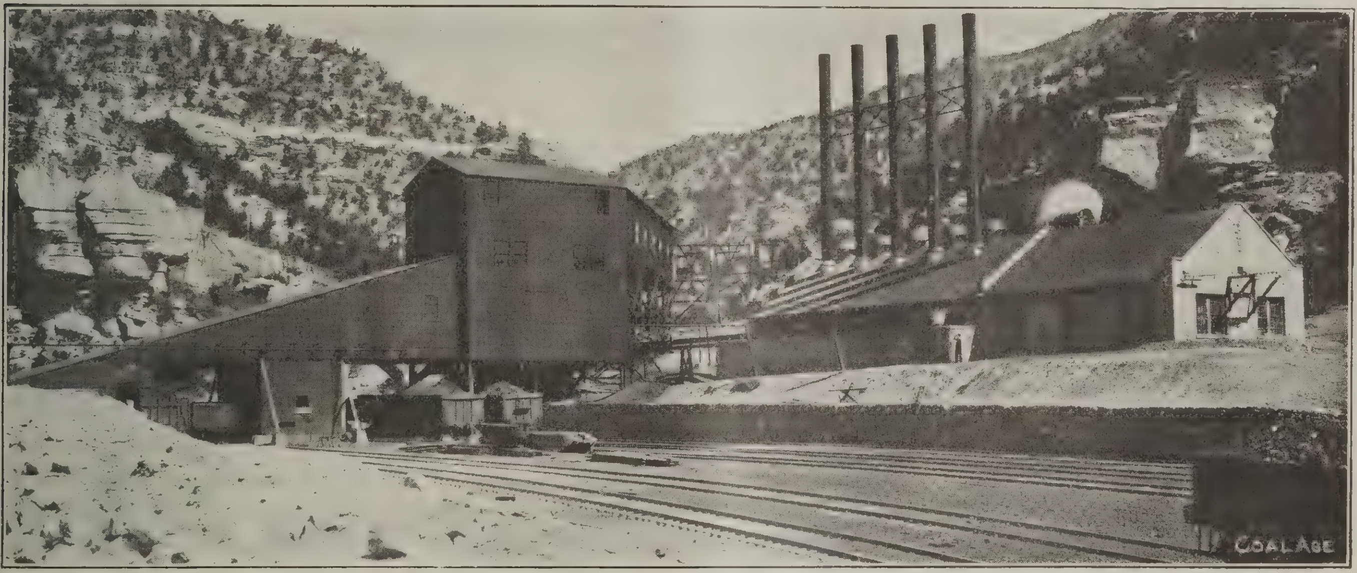
The tipple building, which is steel construction throughout, was built by the Ottumwa Box Car Loader Co., and is equipped with shaker screens which permit the standard separation, common to the district, to be made. After discharge from the tramway into a bin, provision has been made for picking the coal on a suitable table 30 ft. long between centers and 5 ft. wide. It is hardly probable, however, that this will be required in view of the clean condition of the coal naturally. This conveyor may, however, be used as a feeder.

Two box-car loaders are installed adjacent to the outside track, permitting the loading of lump and nut, or run-of-mine into cars upon either track. Provision is also made for coaling the engine with run-of-mine or lump.

A Well Equipped Power Plant

The power-plant building is a substantial stone structure with an asbestos shingle roof carried upon steel trusses. A bin for boiler coal extends the length of the boiler house, the fuel being conveyed thereto by a belt and screw conveyor. Steam is generated in five Scotch marine boilers of 150 hp. each manufactured by the Springfield Boiler & Manufacturing Co. The power-house equipment consists of two 250-kv.-a. sets and one 50 kv.-a. set. The former are Buckeye engines connected to General Electric generators, while the smaller unit is driven by a B. F. Sturtevant vertical engine. The latter unit is expected to provide current for lighting the towns, mine and mine buildings and driving the pumps.

Current is generated at 2300 volts and suitable transformers provided near the tipple and at the mine where needed. All equipment is motor driven with the exception of the box-car loaders, which are operated by engines. For the main-haulage and coal-cutting machines three motor-generator sets have been installed, each delivering 100 kw. at 250 volts. Direct current is used inside the mine. The mine fans are also driven by direct-current motors, so that the amount of air furnished may be regulated to amply meet all requirements but prevent undue absorption of moisture. Fifteen-ton haulage locomotives are used on the main haulageways, 6-ton gathering locomotives being employed to bring the cars from the rooms.



The Power Plant and Tipple Spanning Railroad Tracks

Good Houses, Water Supply and Sewerage System

The water supply for the plant is obtained from a large spring, located about one and a half miles up Spring Cañon from the tipple. The flow from this source is more than ample to care for the present requirements of the plant. Gravity supply is obtained at the boiler house, while a pump house located about midway between the tipple and mine to which the water flows supplies the town and provides for the sprinkling system underground. Two 5x6-in. vertical single-acting triplex electric pumps equipped with automatic compensator and float switch are installed in this pump house.

The miners' houses are exceptionally good, being built of stone and made strictly modern throughout, containing four rooms exclusive of the bath room.

A good sewerage system has been laid and all houses are connected thereto. Two settling tanks have been built for the purification of this sewarage. Satisfactory results are being obtained from this system of purification, the discharge being clear and odorless.

⁂

A Big Western Coal Consolidation

The *Boston News Bureau* says under date of July 3:

Plans for extensive coal development in Colorado fields are on foot. By their consummation 30,000 acres of Routt County coal lands will be taken over by a combination of Belgian and Paris capitalists. Five Paris banking concerns and coal kings of Belgium are said to be interested. These include Prince Henri de Croy, a member of the ruling house of Belgium, and Camille Peria and W. J. van Maanen, representing French and Belgian capitalists. A. R. Bickerstaff, of Consolidated Securities Co., of Toronto, Can., and Benjamin L. Dorsey, have taken over the coal lands. Foreign moneys will purchase $28,000,000 worth of bonds in Yampa Fuel & Iron Co., and Colorado & Northern R.R.

President Dorsey, of Yampa Fuel & Iron Co., says: "We have ironbound contracts with the bankers of the French and Belgian capitalists providing for sale of the $28,000,000 of bonds, as soon as they have been shown that the properties in Routt County are as represented."

Denver newspapers say that there will be an initial expenditure of $22,000,000 in Colorado and Wyoming. A railroad is projected from Hayden, Colo., to Casper, Wyo. It will be known as the Colorado & Northern Ry., and will extend from Hayden on the Moffat road through the Routt County coal lands to Hahns Peak, a copper and placer mining district. It is expected to lead to the reopening of old copper mines and the revival of the placer-mining industry in that section. It is projected thence through the copper fields of the Bartle Lake district to Walcott, Wyo., 16 miles. There it will intersect the main line of the Union Pacific Ry., thereby furnishing transportation facilities for the coal East and West.

From Walcott the railroad would extend to Caspar, Wyo., connecting with the Chicago & North Western and Burlington lines. These connections will afford facilities for placing Colorado coal in the Northeast as far as St. Paul and Minneapolis, and Puget sound in the Northwest, equal to nearly a third of the United States. The plans call for 210 miles of new road.

The first section of the road it is ascertained will be completed within a year.

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Explosives transported on mine cars should be kept off the floor and away from iron fittings, as such fixtures are apt to be affected by currents from the drawbars if the rails are slippery and sand is used to overcome slipping.

Solutions of Two Gasoline-Motor Problems

By R. O. Hodges*

SYNOPSIS—The two most apparent objections to the gasoline motor are that the oil may explode and that the exhaust is liable to befoul the mine air. The evidence of all past experience shows these difficulties are not hard to meet, and the author believes they should not act as a bar to the further use and development of gasoline motors.

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There are two dangers from the gasoline mine motor which have been much exploited, and which are, of course, present in some degree. The first danger is that of fire. At first sight it seems like insanity to take any quantity of such an inflammable material as gasoline into a mine. We believe, however, that we have so surrounded the transportation of the gasoline with safeguards that we have reduced this danger to a minimum, and that with reasonable attention the possibility of fire need hardly be considered.

In our system the gasoline is always handled in sealed tanks. These are filled in the oil house, carried to and installed on the motor; and after they are once in place, it is impossible to get any gasoline into them without removing them from the motor. The tanks are of extremely heavy and durable construction, and while it is not safe to say that they cannot be punctured, yet only as a result of gross carelessness could the gasoline escape from the tanks. We have a valve in the gasoline reservoir itself and another in the pipe line, so that the operator can shut off the gasoline supply at two points well removed from each other. The tanks are placed under heavy covers, so near the center of the motor that severe accidents can occur without causing the gasoline to escape.

Accidents to Motors Which Have Not Caused Explosions

We sent a motor to the experimental mine at Bruceton, Penn., and before the experts of the bureau knew as much about explosions in the mines as they do now, they set this motor, with a full gasoline tank, out in front of the mouth of the mine, with a coal car just behind it. They put a little red flag on the motor with the idea that when the explosion occurred, they might be able to see the flag wave. Nobody ever knew what happened to that flag, but the coal car with its load was blown over the top of the motor and 250 ft. beyond, ceasing to travel only when it struck the opposite hillside. The explosion also blew the metal covers from the top of the motor, but did not cause any gasoline to leak, nor did it damage the gasoline tank in any other manner.

At a mine in central Pennsylvania two of these motors met head on, one of them having 25 loads behind it and the other 25 empties. One motor had both side frames badly smashed and the bumper was broken into half a dozen pieces. On this motor the engine was heard to continue running for an hour or more after the wreck occurred; in fact, it continued its revolutions until the gasoline was exhausted. The other motor had the top entirely torn off, but the gasoline tank was not punctured, though it was torn from its fastenings, and about half a tankful of the gasoline escaped in about an 1/8-in. stream. We have since arranged the fastenings on the tops of our motors, so that in a future case probably not even this can happen. However, the officials at the mine had the possibility of a fire in mind when they approached the disaster, and they used safety lamps and moved with care and precaution, as is essential in all cases where gasoline motors are wrecked. In West Virginia two of our motors collided, and though the bumpers were badly broken and the side frames sprung, no gasoline escaped from either motor.

The Gasoline Pipe Breaks and the Oil Ignites without Injury

In a West Virginia mine the gasoline pipe of a motor broke and the motorman ignited the oil with his lamp. He became frightened and ran away from the motor. Everybody about the mine was desperately afraid that the motor might blow up at any minute, and they would not go near it. The fire, fed by gasoline from the tank, kept on burning for about an hour, the feed pipe being so small that it only supplied enough gasoline to keep a good blaze at the back end near the carburetor. This fire burned the insulation off the magneto, cables, etc., but as it did not get near the gasoline tank, the latter did not blow up and the men finally put some sand on the blaze and extinguished it. Though the fire destroyed the magneto, carburetor and cables, it did no other damage of any kind.

The Gases in the Exhaust

Many analyses have been made of the exhaust gases from gasoline motors. These gases consist of nitrogen, which, of course, is inert in combustion; carbon dioxide, CO_2, sometimes, but incorrectly called black damp; carbon monoxide, CO, or white damp; oxygen, hydrogen and water vapor.

Gasoline vapor in the exhaust gases is difficult to detect by chemical analyses. I am inclined to think that the reason for this is that the unburned gasoline, as soon as it strikes the air, and cools to atmospheric temperature, condenses into a liquid and falls to the bottom of the bottle in which the sample is taken or else to the ground. In order to obtain the worst possible conditions of operation, the motor was sometimes purposely thrown out of adjustment, and then there were undoubtedly small proportions of unburned gasoline in the exhaust. So small, however, do these appear to have been that chemists have not gone to the great trouble necessary to ascertain them.

Carbon dioxide is a suffocative gas, but possesses no poisonous quality. In quantities such as given off by the gasoline mine motor, its effect on the ventilation of the mine is practically negligible. Of course, water vapor, or steam, in such minute quantities as furnished by a gasoline locomotive, does no harm in a mine, and in many cases may do some good.

The only dangerous constituent of the exhaust is the carbon monoxide. One-tenth of 1% of this gas is decidedly dangerous, if a human being is exposed to it for a long time. We, therefore, have to consider the exhaust gases of the motor as being dangerous in direct proportion to the extent to which they contain carbon monoxide. This gas is never present in the exhaust from a motor when complete combustion has taken place in the cylinder, and its presence is an immediate evidence of incomplete combustion. Therefore, we can render the exhaust gases from these motors innocuous in direct proportion to the extent to which we can gain complete combustion.

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*Mechanical engineer, G. D. Whitcomb Co., Rochelle, Ill.

Note—Second installment of article read before West Virginia Coal Mining Institute, June 24, 1913, at Morgantown, W. Va., entitled "Gasoline Motor Haulage in Mines." The first installment appeared July 19, Vol. 4, p. 90. The consideration of the motor as a machine will appear next week.

How Complete Combustion Is Assured

We have gone as far as we can in this direction by making our combustion chambers at the end of the cylinder as nearly of a hemispherical shape as we can, by increasing the compression to the highest possible point in order to make the heat of the explosion as great as possible and by providing a carburetor with a single adjustment which is readily understood and which can be varied easily by the motorman as the changing conditions of the atmosphere indicate. We have used, moreover, abnormally large engines the power of which is greatly in excess of that needed for the actual work of the motor, with the idea of using the leanest possible mixture, and thus decreasing the liability to incomplete combustion.

I was privileged to witness one of the tests at Bruceton on one of our motors, in which the engine was purposely thrown out of adjustment, so that it was giving off a heavy, black smoke. A section of entry 9 ft. wide and about 6 ft. high, and I think about 1000 ft. long, was bratticed off with double brattice cloths so that no air could enter or leave the space inclosed. The motor was loaded with as great a load as it could haul when working in the inefficient manner purposely provided in the test, and was caused to run up and down for a space of about 500 ft. in this closed-off entry. We had two canary birds in this inclosure during the test, and at the end of an hour's running, under these conditions, the birds had fallen to the bottom of the cage but were still moving around, and showed only slight distress. They were far from being dead; so that the air was still quite fit to support human life for a reasonable period.

No Absorbent for Carbon Monoxide

I believe there is no known solvent for carbon monoxide except a solution of cuprous chloride, and this chemical is too expensive and inefficient to be considered for a moment in connection with a mine motor. A solution of slaked lime will have some effect in dissolving the carbon dioxide and will most markedly reduce the odors from the exhaust of the locomotive. We, in common with others, in our first experience with these motors, passed the exhaust through a solution of slaked lime, with the idea that in removing the odor from the exhaust we had removed its injurious elements. We were led to abandon the lime tank by discovering that after a short time the lime became heated and the odors from it were worse than the direct odors from the exhaust; wherein we "builded better than we knew."

As I have indicated above, the presence of carbon monoxide in the exhaust in dangerous quantities, is in every case indicated by smoke and also by considerable odor. The lime tank removed this smoke and odor, but did not remove the poisonous carbon monoxide. Therefore, in using the lime, we were merely removing the only index which the operator had whereby he could tell whether his motor was giving off poisonous gases.

There is no treatment which is commercially possible, which can be given to the gases from an internal-combustion motor which can make them less injurious. Strict attention, however, to high compression, ample engine size, perfect and easily understood carburation, and complete ignition will reduce the poisonous elements in the exhaust gases to such a low point as to make the motor, in any reasonable current of air, absolutely innocuous.

The Gasoline Motor in the Presence of Gas

I will not say that the gasoline mine motor is absolutely sparkless. It is possible to conceive of conditions under which there will be quite a decided spark, or even a short flame, from certain parts of the motor. These conditions, however, are invariably caused by neglect and abuse of the motor and are not present when the locomotive is running properly or has not been broken in some of its essential parts. Even if the motor should make sparks or a flame owing to neglect or abuse, these will occur near the rail and are, therefore, less likely to ignite methane than sparks from the trolley wire.

The gasoline motor, therefore, is safer than the electric locomotive, and is nearly as safe as the compressed-air motor for use in gaseous mines. Our company has consistently avoided installing these motors in workings where we knew there was a large quantity of explosive gas. This was, however, because we believed that it was not good policy to antagonize the mine authorities by placing a new machine in places which they believed to be unsuited. We felt they would soon become accustomed to its use and would not oppose its introduction when they knew how favorably it compared with the electric locomotive. It was for this reason that we did not install the motor in such mines, and not because we believed it was dangerous under such conditions.

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Coal Trade of Barcelona, Spain

The quantity of coal discharged in Barcelona, in 1912, according to the Daily Consular and Trade Reports, totaled 1,032,954 metric tons (1,138,315 short tons). Of the quantity stated, 649,351 metric tons came from Great Britain, 85,346 tons from Rotterdam, 8275 tons from Belgium, and 1832 tons from Philadelphia, the remainder being Asturian coal of Spanish production.

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Much Coal Used in Coke Making

According to the U. S. Geological Survey, the quantity of coal used for coke making in the United States in 1912 was 65,485,801 short tons. The coke produced from this coal amounted to 43,916,834 short tons, valued at $111,523,336, besides large quantities of gas, tar, benzol, ammonia, etc., as byproducts from the 11,048,489 tons of coke produced in byproduct ovens.

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Coal Age Index Is Ready

The index to Vol. 3 is ready for distribution and will be mailed under separate cover to each subscriber. Anyone not receiving the index may secure a copy free by sending us a postal-card request.

Proposed Method of Longwall Mining

By F. C. Cornet*

SYNOPSIS—Attention is drawn to some of the questions necessary to be considered before adopting the method of working a particular seam that will accomplish the most complete exhaustion of the coal and economy of working. Description of a method of longwall mining proposed for working the lower Kitanning seam, in the northern part of the state of West Virginia. The method contemplates the subdivision of the workings into panels to be worked on the retreating system, having due regard to the pitch of the seam so as to favor the movement of the loaded cars. Description of the method of systematic timbering at the longwall face, best adapted to the peculiar roof conditions in that seam.

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In the opening of a new mine, it is of the utmost importance to adopt such a system of working as will be best adapted to the extraction of the particular seam considered. This question can only be decided successfully after a careful study of the conditions affecting the mining of the coal in any given locality. These conditions are made known by a close survey of the region and careful inspection of adjoining workings, supplemented by the experience of others in that locality and the knowledge gained by thoroughly prospecting the area.

Some of the important points to be considered in this preliminary work are as follows: The depth, thickness and inclination of the seam; the character of the coal and the overlying and underlying strata; the position and general direction of any fault lines that may exist in the strata; and the probable quantity of water that may be expected and which must be provided for in the operation of the mine. The question of haulage, drainage and ventilation of the mine, together with the general configuration of the surface, and the available shipping facilities will determine the best location for the shaft, slope or drift openings. The question of markets, competition with other coals and transportation and labor must be carefully exploited before the desired output of the mine can be determined.

After a careful study of existing conditions, I have come to the conclusion that the following proposed method of longwall mining on the panel system would be particularly adapted to the working of the Kitanning seam, in the northern part of this state. The seam varies in thickness from 6 to 7 ft. In studying this seam, I have observed many times that the pillared areas of a hundred feet or more in width by several hundred feet in length, stand open sometimes for a month with absolutely no support but the props that hold the roof-slate in place. In most cases, the majority of the props had to be knocked out by hand or destroyed by shooting before a fall of roof would take place. I feel confident that the method of timbering described, simple as it is, will be adequate in the working of this seam.

In the design of the system I am about to describe, I have had particular regard to the complete exhaustion of the coal in each panel, in the speediest and most economical manner possible. At the same time, the safety of the men and regularity of the work have been given full consideration; and these items alone have led me to subdivide the panels, which not only expedites the work, but provides more avenues for escape, in case of accident. As this seam yields practically no gob for filling purposes, the retreating system of longwall was the only one to be considered.

As will appear in the following description, the proposed method is a panel system, in which each panel is worked independently on the retreating-longwall system. As shown in Fig. 1, the system can be applied either to the working of a new mine or to extending the workings of a mine already opened on the room-and-pillar system. In Fig. 1 the old room-and-pillar workings are shown on the left. Following this to the right are panels *A*, *B* and *C*, in different stages of advancement. On the same principle, in Fig. 2, there are shown two other panels *M* and *N*. The first three panels, *A*, *B* and *C*, are worked in three subdivisions. Panel *M* is not subdivided, while panel *N* has two subdivisions only.

Fig. 1 shows how the longwall method, as applied to an old mine worked on the room-and-pillar system, can be made to succeed that system without affecting the daily output of the mine. The general plan is not altered, except that the cross-entries can then be driven a greater distance apart, say 500 ft. instead of 380 ft., as in the room-and-pillar system. By this means, the area of coal in each panel is increased 44 per cent.; and there is nothing to prevent driving the cross-entries at a still greater distance apart, so as to further increase the area of coal in each panel at a later stage of the development when so doing will not interfere with the regular daily output of the mine.

It will be observed that in Fig. 1 the length of the first section developed is 1200 ft. This is a favorable length in the present instance, because the West Virginia mining law provides that not more than 60 men shall be employed on a single split of air; and, in the system employed here, it is impracticable to divide the air current in each panel. A length of 1200 ft. will permit 60 men to work on a single face, allowing 20 ft. for each man.

Moreover, the output of 60 men ought to be sufficient to justify the employment of a first-class foreman in each panel. This man would act as a "face foreman," and would be able to travel this distance and visit every working place several times a day, which would enable him to see everything that was done in his panel or district, and afford him no excuse for neglecting or overlooking anything. A face longer than 1200 ft., with only 60 men employed on that split, would result in slow progress and the "weighting" of the roof would advance too close to the face of the coal and require the use of more timber than is necessary or advisable. Again, a face shorter than 1200 ft. would make the employment of a special foreman for each panel less economical, and might result in the foreman's jurisdiction being extended over two or more panels, which would cover too large an area to enable him to make a thorough inspection of each working place, which is so essential to safe working.

A single glance at Fig. 1 shows that the working face of a panel is to be started at the inner end and on the

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*Mining, civil and mechanical engineer, Charleston, W. Va.

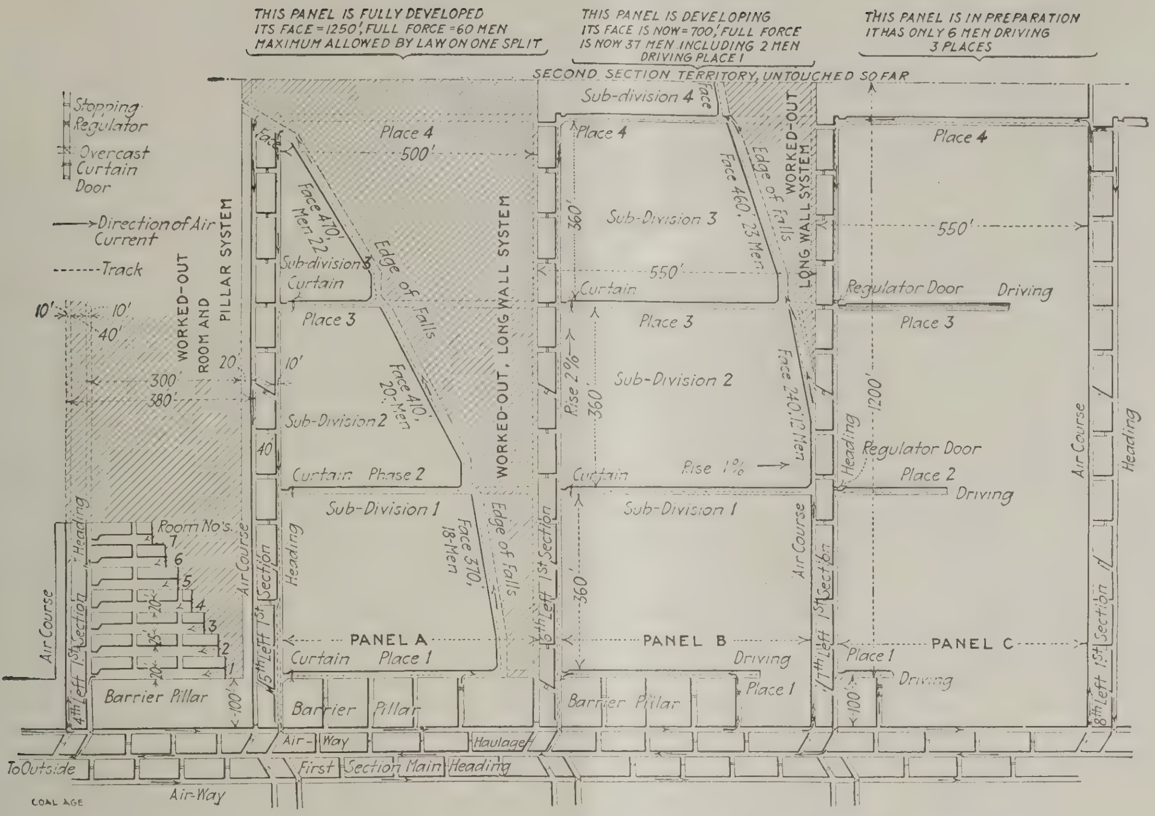

Fig. 1. A Proposed Plan of Longwall Worked on the Panel System and Started from Room-and-Pillar Workings

lower rib of the air course above the panel. For example, the working face of the panel *A* was started at the inby end and on the lower rib of the sixth-left air course. In the same manner, the working face of panel *B* was started at the inby end and on the lower rib of the seventh-left air course. Before starting this working face, it was necessary to drive a place across the inby end of the panel, to the air course above, as shown in panel *C*. The air current is then split at this point; and, while the larger portion is made to ventilate the panel below, a small scale of air is carried up to ventilate the headings being driven in the next panel above. Regulators are placed, as they are needed, at the points indicated in the figure, so as to divide the air in proportion to the requirements.

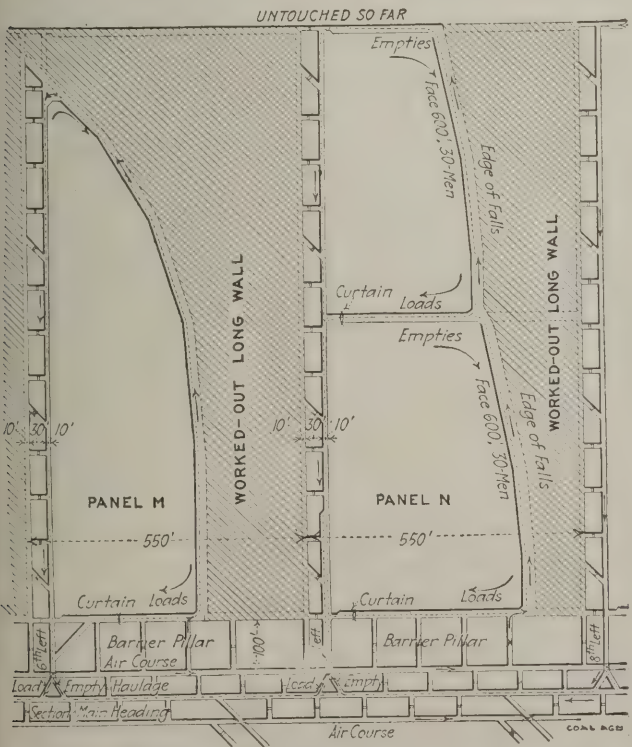

Fig. 2. Showing a Less Subdivision of Panels

The cross-heading at the inby end of the panel is driven wide enough to avoid the payment of yardage but no wider, in order to economize time. This heading is marked "Place 4" on the plan (Fig. 1). Following this, three other places are started in succession, outby on the same entry, thereby dividing the panel into three principal subdivisions. A barrier pillar 100 ft. wide is left flanking the main entries, which are driven triple to provide a main central haulage road and two intake air courses, one on each side of the haulway. As shown in the figure, the inby cross-heading (Place 4) is driven about 60 ft. from the boundary of the section, which saves the driving of the same distance of cross-entry, in each panel. As observed in panel *B*, the working face at the boundary line in each panel is 60 ft. ahead of the air, which is well within the 80-ft. limit allowed by the West Virginia mining law.

As shown in panel *C*, it is necessary to use a brattice to conduct the air current to the face when driving the cross-headings, all of which are driven wide enough to avoid the payment of yardage. The dotted line in each cross-heading and entry represents the track. The section of tracking along the working face must be shifted forward as the face is advanced. As indicated in the figure, the empties are taken up the cross-heading at the inby end of the panel or subdivision, in panels *M* and *N*; but, in panels *A*, *B* and *C*, the empties are taken up the first cross-heading leading to each subdivision and along the face, on the same track by which the loads are run out. In this arrangement, the face track has one loose end in each subdivision and is more readily shifted as the working face is advanced than where both ends are fixed and must be disjointed before the track can be shifted, and then again coupled to the track in the headings.

I have shown one undivided panel *M* with 1200 ft. of face track, and panel *N* having two subdivisions and 600 ft. of face track in each. When the empties are taken in at one end of the track and run out at the other, as in these panels, it is necessary to arrange for turning the cars end for end, either on the tipple or on a reverse switch in the heading, so that the gate-end will run out first when the car is loaded. Of course, where a rotary dump is used the cars have no end-gates, and it makes no difference in which direction they are run.

In driving the cross-heading marked "Place 1," it will be unnecessary to use a brattice, since the barrier pillar can be crosscut every 80 ft., as shown in the figure, and these crosscuts can be used, at a later stage of the development, to ventilate the workings in that subdivision.

An important feature, where the seam has a practically uniform dip, is to drive the main-haulage roads in such a direction as to provide a grade of 1 or 1.5 per cent. in favor of the loaded cars. The direction of the cross-entries must also be such as to provide a suitable grade for haulage in favor of the loaded cars. In the present plan, the main entries are shown as having a grade of 1 per cent. and the cross-entries a grade of 2 per cent., in favor of the loaded cars. It is further necessary to arrange the line of working face in a direction that will favor the movement of the cars along the face. To do this, the face foreman must start the work at the inby end of each panel and push those places ahead most rapidly, starting other places, in succession, outby from these as the line of face advances, as shown in panel *B*. The plan of ventilation is clearly shown in Fig. 1, the intake air being conducted along the face, toward the rise at the inby end, where it is returned through the cross-entries and conducted by an overcast into the main-return entry, which is here made the haulage road.

In Fig. 3 is shown a detailed plan of subdivision 2, of panel *A*, Fig. 1. The plan shows a 400-ft. face, giving room for 20 men. A number of cars have been set in on the face track, and some of these have been distributed at the inby end of the subdivision, ready for loading. Three rows of props are shown set in rows parallel and perpendicular to the face. The props are stood 6 ft. apart in the rows, the rows being 6 ft., center to center; but the first row is 7½ ft. from the face.

In the same figure are shown four cross-sections, illustrating the different phases of the mining operations. The first of these (phase 1) shows the face ready for the shooters and loaders, a cut 6 ft. deep having been made in the coal, at the bottom of the seam. The car is shown standing on the track next to the face, and the three rows of props are indicated by *A*, *B* and *C*.

In the next phase, there are two cases. The first of these shows a new cut being made by a chain machine, after the coal has been loaded out and the place cleaned up. The track has not been shifted and cannot be until the machine is out of the way. This makes it impossible to set a new row of posts, and leaves an unsupported width of roof 13 ft. 6 in. wide. It is true that posts could be set temporarily, but these posts would have to be drawn to allow the shifting of the track later. This arrangement is not advised, and it is well to remember, in this connection, that the cut made by the machine increases, almost to that extent, the unsupported width of roof.

It is preferable to follow the plan shown in phase 2, where the tracks have been shifted immediately after the place was cleaned up, and a new row of posts set, as shown at *D*. The row of posts *A* have been drawn and the roof allowed to fall. In this case, the cutting machine is loaded on a truck running on the track, the cut being made in the coal, at a given height above the floor of the seam. Phase 3 shows the face in a similar condition to that shown in phase 1. The dotted lines here show the position of the cut when made by a machine.

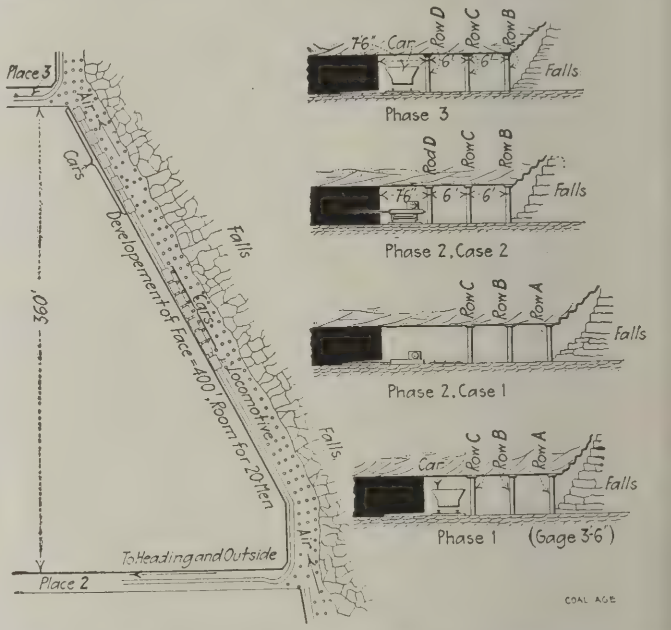

FIG. 3. DETAIL PLAN OF SUBDIVISION 2, PANEL A, AND CROSS-SECTIONS AT THE FACE

The success of the work depends, in a large measure, on the regular and prompt setting and removal of props. The setting of a new row of props immediately after the track is shifted must be followed promptly by drawing the back row of props to allow the roof to fall. By using a machine for drawing the back timbers, as explained in an article on this subject, COAL AGE, Apr. 5, p. 529, it will be unnecessary for the timbermen to leave the protection of the other rows while drawing the back row of posts nearest the fall. No props must be left standing, even though they may not be good enough to use again.

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Fire Protection of Headframes

The wooden headframe of one of the shafts of the Diergardt mine in Germany is protected from fire by a sprinkling system noted in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1. A pipe of 1-in. inside diameter leads to the headframe from two small boiler-feed pumps of about 2300 gal. per min. duty each. At 5-ft. intervals over the drum stage, are distribution pipes with openings. The device can be operated by a valve in the piping on the ground landing.

West Virginia Operators Allege Conspiracy of Competitive States

The following is the authorized statement of the West Virginia Mining Association, of which Wm. N. Page is president, G. H. Caperton, treasurer, and Neil Robinson, secretary:

Conclusive evidence that the shooting at employees of the Ohley mine on Cabin Creek on the afternoon of July 7, in common with all the numerous other outrages of a similar character that have been perpetrated in the last 15 months, was part of a gigantic conspiracy between the operators in Illinois, Indiana, Ohio and western Pennsylvania and the United Mine Workers is to be found in the published proceedings of the conferences of these operators with representatives of the union. These proceedings are published by authority of the conference, so there can be no doubt of their authenticity.

The origin of this conspiracy as related in these official publications dates back to Jan. 28, 1898, when representatives of the operators and the miners signed a contract, Clause 8 of which reads as follows:

> That the United Mine Workers' Organization, a party to this contract, do hereby further agree to afford all possible protection to the trade and to the other parties hereto, against any unfair competition resulting from a failure to maintain scale.

In union parlance "unfair" means "nonunion." The only nonunion coal field competing with the four states mentioned is West Virginia. Therefore, Clause 8 meant that in exchange for increased wages and other concessions elsewhere provided for, the union undertook to prevent West Virginia from becoming an effective competitor of the four states.

At every one of the conferences since then, the operators have urged the union to fulfill its contract by unionizing West Virginia, and the union has always assured the operators that it was doing its best. The discussions on this subject are reported verbatim in the proceedings published by authority of the conference. A few excerpts will show the character of these discussions. On page 17 of the official report of the conference of 1910 will be found the following remarks by C. E. Maurer, an Ohio operator:

> The granting of the 8-hr. day by the operators, after making these numerous other important concessions, was with the distinct understanding and explicit promise of the miners to give to the operators of the four contracting states adequate protection against the competition of the unorganized fields. From year to year they have been called upon to fulfill their promise. The operators, parties to that agreement, at the time of its execution, felt that it was absolutely necessary to the safety of their investments that they be protected from the encroachments upon them by their competitors of the unorganized fields. We ask for the fulfillment of the pledge of 1898.

At the same conference John Green, of the United Mine Workers, said (page 29):

> The United Mine Workers of America have diligently and aggressively attempted to carry out the promise made in Chicago in 1898. They have done everything in their power to redeem any promise they may have made to organize West Virginia. Since 1898 our organization has at various times spent hundreds of thousands of dollars trying to unionize West Virginia. We have also sacrificed human life in the attempt to redeem that promise.

At the 1912 conference (page 274), H. L. Chapman, a mine operator from Ohio, said:

> When we met in Chicago in 1898 and re-established the interstate movement, the competition from the non-union fields was the element that entered into negotiations in the adoption of the scale that was made there. It was understood in that convention, although it was not mentioned in the agreement, that miners of the competitive fields of the four states were to bring the non-union field up to the price paid for mining in those states, and unless they secured the adoption of an 8-hr. day at the next convention the competitive fields were to be relieved of these burdens.

At the same meeting (page 245) John P. White, president of the United Mine Workers, said:

> We are as anxious to establish the organization in the West Virginia fields and the other non-union fields as the gentlemen on the other side of the house are to have us do so. But the operators there have been successful in defeating the aims and purposes of the United Mine Workers to a large extent, although no one can deny that under the various administrations of the organization every effort has been put forth to try to break down the conditions that are complained of here on the other side.

On p. 217 of the official report of the 1912 conference may be found the following remarks by Duncan McDonald, secretary-treasurer of the United Mine Workers of Illinois:

> We have had thousands of men go to the penitentiary for trying to establish our organization in West Virginia and other non-union fields, and not only have they gone to the penitentiary, but they have been beaten up and slaughtered. We have had men go to jail. We expect that more of us will go to jail. The penitentiary doors have no terrors for us, as far as that is concerned. And if putting two or three hundred of our men in jail will organize West Virginia we will send two or three hundred down. The chances are we will have to get busy with that situation shortly.

Men are not usually sent to the penitentiary unless they have been convicted of crime. The declaration by Mr. McDonald, therefore, that he expected two or three hundred union men to land in the penitentiary is equivalent to an admission that he and they contemplated the commission of crime on an extensive scale.

Less than a week after this blunt admission by Mr. McDonald the union men on the north side of the Kanawha, where there was no trouble of any kind, and where no demands had even been presented to the operators, began buying rifles at a certain store in Charleston for the significantly low price of $1.98. In a short time they had accumulated more than a thousand guns. Then regularly organized squads of armed union men were detailed to go, first to Paint Creek and then to Cabin Creek, where the shootings and other outrages promptly began and have continued at frequent intervals since.

COMING SOCIETY MEETINGS

Alabama Coal Operators' Association—This association will hold its annual meeting at Marvel, on July 26.

American Institute of Mining Engineers—This institute holds its next annual meeting at Butte, Mont., on Aug. 18 to 21, inclusive. Bradley Stoughton, 29 W. 39th St., New York City, is secretary.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremens Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

International Geological Congress—The 12th session of this organization will meet, Aug. 7, at Toronto, Can. Address of Secretary, Victoria Memorial Museum, Ottawa, Can.

Kentucky Mining Institute First-Aid Meet—This meet will be held at Central City, Ky., on Labor Day, Sept. 1.

American Mine Safety Association—The second meeting of this society will be held at the Bureau of Mines, Pittsburgh, Sept. 22-24. H. M. Wilson, of the above address, is chairman of the organization.

American Mining Congress—This society meets for its 16th annual session at Philadelphia, Oct. 20-24; the secretary is J. F. Callbreath, who has opened quarters in the Land Title Building.

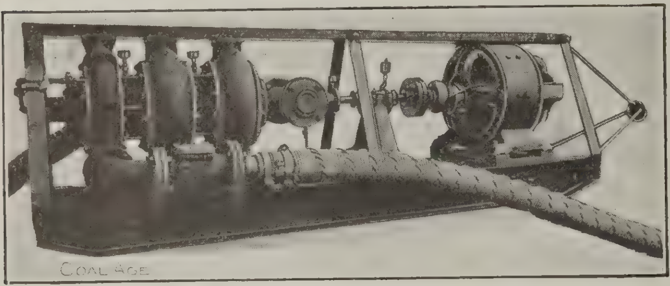
POWER DEPARTMENT

A Motor-Driven Mine Pump for Operation on Inclines

The accompanying illustration shows an interesting application of a motor-driven pump. It is designed for mine drainage and used on inclines up to 45 deg. from the horizontal.

The pump and motor are held together in a steel framework with an eye at the end to which a cable or rope is attached for lowering the outfit down the incline. The lower part of the framework acts as a skid.

Special arrangements had to be made for oiling the motor. The lubricating device for the lower bearing is seen between the coupling and the bearing housing; it is fed with oil from the upper end by means of a pipe.



The Pump and Motor on Skids

The pump, made by the United Iron Works, San Francisco, is 4-in., three-stage, and operates at heads up to 250 ft. The motor has a capacity of 30 hp. and is of Westinghouse manufacture. Several pumps of this type are in operation and are said to be giving eminently satisfactory service.

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An Induction Motor of New Design

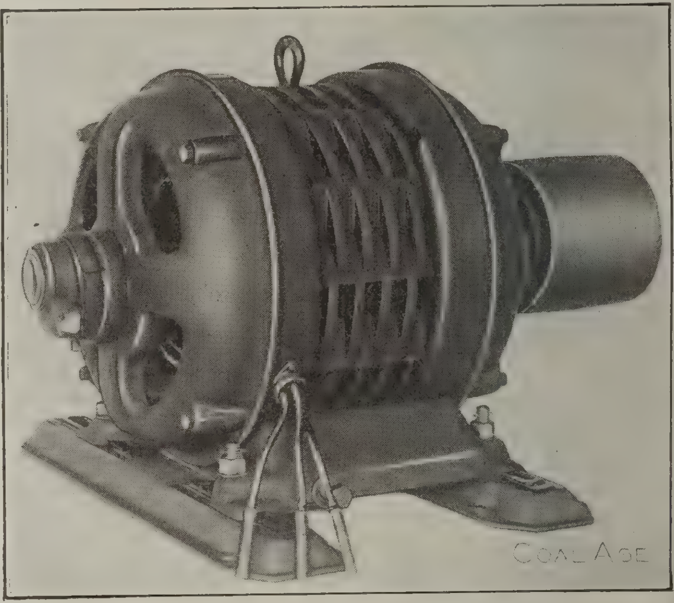
The new Westinghouse type CS squirrel-cage induction motors possess several noteworthy features. Among these are: The extensive use of pressed steel in their construction; rotors with cast-on short-circuiting rings, and moisture and heat-resisting insulation.

The use of pressed steel in motor construction represents a marked advance in design. It imparts great mechanical strength and is uniform in structure. Hence a motor of a given weight can be made with more active material than motors of corresponding capacity in cast-iron frames.

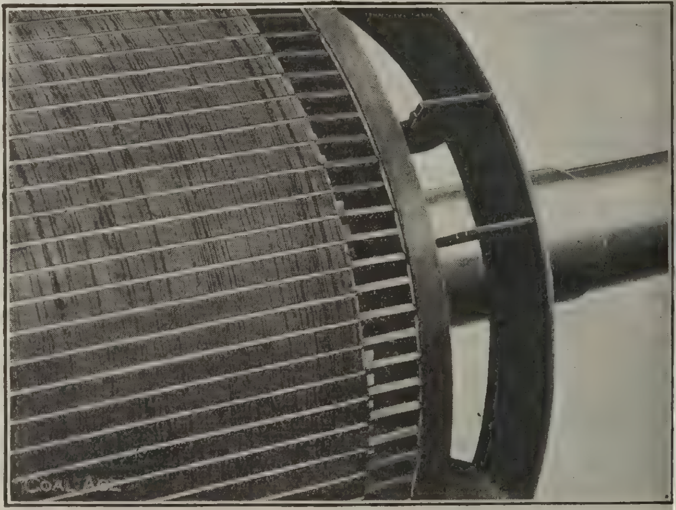
In these motors, rolled steel forms the frames of the sizes above 20 hp., the end plates of the smaller machines (which are of the so called frameless type), and the slide rails of all sizes. As a result these motors are compact.

Above 5 hp., the form-wound stator coils are laid in open slots, and repairs in case of accident can be readily made.

In all sizes, the rotor bars are insulated with a special cement which is moisture resisting and will withstand a high degree of heat and mechanical stress. In motors above 15 hp., the bars are connected electrically and mechanically by casting the short-circuiting rings around their ends. Hence these rotors, having nothing that can burn out, deteriorate under heat, or work loose under vibration, are practically indestructible.



A Complete Small-Sized Motor



End of Rotor, Showing Cast-On Short-Circuiting Rings

The bearings, being the only wearing part, have been designed liberally. They are protected from dust by a cap on the front end and by felt washers between metal rings on the pulley end.

The efficiency and power factor are high, not only at full loads, but at fractional loads also. This last feature is of special importance because industrial motors generally run at less than full load.

Proper Installation of Alternators

By C. A. Tupper*

SYNOPSIS—The principal differences in the construction of alternators, which bear directly upon the methods employed in installation, are here enumerated together with the successive steps to be taken in setting up the machine and making it ready for successful operation.

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Before any alternator can be placed in successful operation, there are certain conditions of installation that must be carefully met, and which it is extremely important to observe if satisfactory results are to be secured.

The location of each generator is usually fixed by the position it must occupy relative to the prime mover or shafting by which it is driven. There is, therefore, but little choice as to location, but it is always desirable to so place alternators, or in fact, any electrical machinery, that they will be in clean, dry surroundings, where there is plenty of light and as much room as possible. Good ventilation is also important, since the better the circulation of air, the lower will be the operating temperature of the machine.

There should be no combustible material near the alternator, and sufficient headroom should be provided to permit taking the machine apart, if necessary. The best method of bringing in the various parts and putting them in position will depend largely on the size of the machine, the location in which it is placed and the handling facilities available.

If a traveling crane is at hand, the work is comparatively simple, but if temporary hoisting appliances, blocking, rigging, etc., must be depended upon, the method of handling must be suited to the conditions under which the machine is installed. Where no crane is available, a horse or derrick, made of heavy timber, and of sufficient size to hoist the parts of the machine into place by means of a chain block, should be provided.

Foundations Should Be Large and Solid

In order to prevent vibration and secure smooth running, the foundation on which an alternator rests should be firm and substantial. Small, belted machines below 100-kw. capacity can, if necessary, be set upon timber supports or mudsills, but a concrete or masonry foundation is to be recommended wherever possible. All machines above 100-kw. capacity should be provided with concrete, brick or masonry foundations, concrete being the most suitable.

A good concrete for generator foundations may be composed of one part portland cement, two parts sharp, clean sand, and four to five parts of broken stone, all proportions by bulk and not by weight. These quantities may be varied somewhat, depending principally upon the size of the broken stone, and the consequent percentage of voids.

The foundation should be sufficiently large and heavy to secure freedom from vibration and settlement. Foundation bolts for securing the base rails or sole plates of the machine, are best set by means of a template. In order to allow for slight adjustments in the position of these foundation bolts, it is a good plan to place either wooden boxes or iron pipes, the internal dimensions of which should be at least two inches larger than the foundation bolts around these bolts at the top.

The length of these pipes or boxes will depend somewhat upon the size of the bolts, but in general they should not be less than 12 in. long, nor ordinarily more than 24 in. long. Their tops should be so placed as to be from ½ in. to 1 in. below the surface of the finished foundation.

The top of the foundation should be leveled off as carefully as is convenient, but should be kept a short distance below the floor line or the bottom of the sole plate or other generator support in order to allow for leveling the latter, by means of wedges, and the concrete should be given a sufficient time for the cement to set before the machine is placed upon it.

The smaller belted machines, or those driven by waterwheels, are usually shipped completely assembled, with the stator yoke and bearings fastened to the base. In many cases, however, the stator is separate from the base, and in machines of larger diameter, particularly those of the engine type, it may be in two parts, being split horizontally.

With the engine type of alternator, the yoke either rests on an extension of the engine bed, as with some of the smaller machines coupled to a high-speed engine, or on sole plates set on suitable foundations. The stator sole plates for the larger machines are usually made in two parts, the lower one being bolted to the foundations, while the upper plate is adjustable to facilitate centering the stator with respect to the field.

How to Set Up the Machine

In setting up a machine of this type, the following are the steps to be taken:

(a) Locate the sole plates temporarily in position, and support them on iron wedges to allow for further adjustment.

(b) Place the lower half of the stator in position, and level it approximately with the leveling screws. In case this part of the machine is arranged to shift sideways on the base or sole plate, set it to one side so that it will be away from the rotor when the latter is placed in position.

(c) Place the revolving field and engine shaft in the bearings, making sure that the shaft is level and true with the rest of the apparatus. In case the engine shaft has not been pressed into the rotor spider at the factory, and it is necessary to do this work on the ground, a careful machinist should be employed, if possible. If no such mechanic is available, any person who can exercise care, caution and common sense can do the work.

(d) Place the top half of the yoke in position, first making sure that all planed surfaces are perfectly clean. Carefully center the stator, with respect to the field, by means of the adjusting screws, and measure the air gap between the stator face and the pole pieces at a number of points around the circumference; it is highly important to have the air gap uniform, as otherwise the frame will be subjected to an unbalanced, magnetic pull, causing bad operation.

On large waterwheel or engine-type alternators, where the stator is split, it is usually necessary, for convenience in shipping, to disconnect and remove a few of the stator coils at the two partings in the frame. These must be carefully put in place and properly connected. The insulation upon these coils should not be injured in any way, and all connections should be neatly made and insulated to correspond with those on the balance of the machine.

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*Milwaukee, Wis.

In aligning the yoke, the center of the armature laminations must be in line with the center of the pole laminations. If they are not thus lined up there will be a side or end thrust on the shaft.

After the yoke has been finally adjusted, shims are to be inserted between the upper and lower part of the sole plates, so as to take the weight off of the leveling screws. Drill and tap holes in the lower sole plate to receive the holding-down bolts for the stator, and bolt the latter securely in place.

(e) Grout in the sole plates, and after the cement has set, tighten down the foundation bolts and carefully check over the alignment of the entire machine.

If at any time the engine bearings are adjusted or realigned, the air gap between the stationary and revolving parts of the machine must be checked over and equalized. Otherwise, an uneven air gap will result, or the rotor may even rub upon the stator.

EITHER INSULATE OR GROUND THE GENERATOR

Most engineers favor the insulation of generators from the ground, wherever it is possible. Such insulation is generally provided by a substantial wooden frame or by wooden stringers under the rails, the wood being well filled and varnished to prevent the absorption of moisture. This method is feasible with small generators, but with heavy machines, or those direct-connected to steam engines or waterwheels, complete insulation from the earth is practically impossible, and in such cases it is better to ground the frame positively by means of a heavy copper wire. In other words, the frame of a machine should be either thoroughly insulated or thoroughly grounded, so that there will be no doubt about its condition.

The method of setting up belted machines is as follows:

(a) The rails should be placed in position, approximately leveled, and wedged up so that the weight of the machine will be distributed evenly.

(b) If the alternator is small and comes completely assembled, it can now be set upon the rails, carefully leveled and lined up with the driving pulley.

(c) If the machine is of a large size, and is shipped in two or more parts, place the base on the rails and set the stator in position, first making sure that the planed surfaces on the base and feet of stator are perfectly clean and properly oiled to prevent rust. Most of the larger belted machines are arranged so that the stator can be shifted to one side, to give access to the field and armature coils, and, when the stator is first set on the base, it is advisable to locate it so that it will be to one side of the field when the latter is placed in position. All bearing surfaces should be thoroughly cleaned before the shaft is lowered into place. If there are any rough or rusty spots on the journals, they should be removed with crocus cloth or fine emery and polished. The oil wells also should be cleaned.

When placing the rotor in position, the oil rings should be watched carefully to see that they do not get jammed and bent out of shape. After the rotor has been placed, the caps of the bearing pedestals should be put in position and bolted down firmly. The stator can now be put into place over the rotor and bolted down.

If there are any dowel pins in the feet of the stator frame they should be put in place before the cap bolts are screwed down. The bearings may now be filled with a good quality of mineral oil to the proper height as indicated by the oil gages.

(d) Put the pulley on the shaft and line the whole machine from the driving pulley. If possible, run the generator with a slack belt and adjust the alignment while thus running so that the belt remains on the center of the pulley and allows the rotor to oscillate freely in its bearings.

(e) Tighten down the foundation bolts and grout in the rails. When the cement has partly set, the surplus may be removed and the joints smoothed up with a trowel.

WHEN MACHINES ARE DRIVEN BY WATERWHEELS

The foregoing regarding belted machines applies, for the most part, to those driven by waterwheels also, except that the latter have no rails and the base is set directly on the foundation. In this case, the machine must be lined up accurately with reference to the waterwheel, so that the halves of the flange coupling will fit exactly. After proper alignment by means of wedges, the foundation bolts should be tightened and the base well grouted.

In setting any generator, previous to grouting in, it is well to use plenty of wedges under both inside and outside edges of the base so as to give a firm and even support. In some cases, where alternators are of large diameters and run at low speed, no base is provided. In this instance, the stator and bearing pedestals rest on sole plates bolted to the foundation in the same manner as in the engine type of alternators.

With small alternators the collector rings are mounted in place on the shaft and connected to the field windings. On large machines, especially those of the engine type, the rings are usually shipped by the manufacturers separately, and, in large machines, both hub and rings are split so that they can be put in place after the rotor has been mounted in its bearings.

The collector rings should be fixed securely in position so as to run true and connected to the leads from the field windings, making sure that all contacts are clean and bolted up tight.

With large engine-type alternators and also with some of the larger waterwheel-driven machines, the brush-holders are supported by a stand bolted to the base or to a bridge fastened to the sole plate. On smaller machines the brush-holder studs are supported by the bearing pedestals.

The brushes should be carefully fitted to the collector rings. This can be done by first using coarse sand or garnet paper finishing with a finer grade. While shaping the brushes, the paper should be held well down on the rings so as not to wear away the edge of the brush. Care should be taken to see that the whole surface of the brush end makes contact with the ring and that the finger presses squarely upon the opposite end.

The brushes should be adjusted by changing the position of the tension spring on the arm and should be such as to give a good contact on the ring. Too great a pressure improves the contact very little and causes excessive friction, wear and heating of the brushes and rings. Good judgment and careful attention will soon show the best pressure to be employed.

Preparations for Starting

The oil wells should be thoroughly cleaned before filling and the covers so placed that no foreign matter can drop into the bearings. When the machine is first started, it is advisable to draw off the oil at the end of each day's run, filling up with fresh until it is certain that all fine particles of grit or dirt have been washed out of the bearings. The oil thus drawn off may be filtered and used over again. It is advisable also to run slow for an hour or so and watch the bearings closely before attempting operation at full speed.

On account of not having a commutator, alternating-current generators are, generally speaking, easier to keep in good running order than direct-current machines. At the same time they must receive adequate and proper attention. It should be remembered that they frequently generate much higher voltages than direct-current dynamos, which renders it all the more necessary to keep them perfectly clean.

No dirt, copper or carbon dust should be allowed to accumulate on or near the windings, and, in plants sufficiently large to warrant the expense, it is advisable to install a compressed-air system so that all dirt can be blown out of the corners not otherwise easily reached. It is also advisable to give the armature coils and connections a coat of insulating varnish occasionally. In operation the collector rings should be kept lubricated with a small amount of vaseline or oil applied with a cloth, and the brushes should be so adjusted as to make good contact with the rings at all times.

Alternators in Operation

The field circuit should never be opened suddenly while current is flowing, but both main and field switches should be pulled when the machine is stopped.

Two machines should never be thrown in parallel when they are out of synchronism, as the excessive rush of current throws heavy strains on the engines and generators, and may cause considerable damage.

It should be remembered that alternators are designed for the voltage indicated on their nameplates. They cannot be expected to give potentials to any extent above normal with satisfactory performance of either exciter or alternator. Frequent attempts to raise the voltage an excessive amount have resulted in poor operation of both machines. Furthermore, the rated current output should not be continuously exceeded.

All bolts and nuts should be kept tight; electrical machinery should receive as much attention in this respect as steam engines, even though it is subjected to less vibration and stress. It is advisable to keep on hand at least one of each size of armature coils in case repairs are necessary. Also an extra set of brushes for both the generators and exciters.

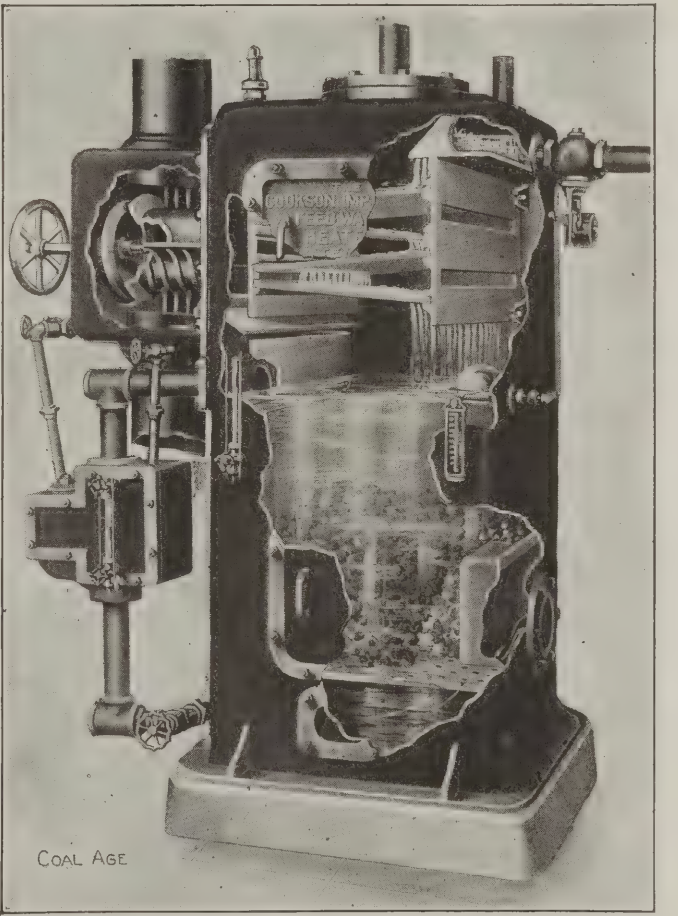
When machines are operating in parallel, and one is to be shut down, the load should first be reduced by throttling the engine or slackening the belt. The main switch should then be opened; resistance should next be cut into the field of the alternator to reduce the current therein. When this is done the field switch may be opened.

When a machine is run by itself, and is to be shut down, resistance should be first cut into the field of the alternator, thus lowering the voltage. The main switch can then be opened, and finally the field switch. The alternator field circuit should not be opened when full current is flowing, because the high induced voltage caused thereby may be sufficient to break down the field insulation.

In most large machines a grid resistance is connected to the field switch, so that in case the latter is opened the resistance is connected across the field circuit, thus forming a path through which the induced current can flow and prevent any abnormal rise in potential.

A New Feed-Water Heater

A new type of feed-water heater wherein the body is cast in one piece, giving greater strength, durability and a more handsome appearance, is being introduced by the Bates Machine Co., of Joliet, Ill., and is known as the Cookson one-piece heater.



The Cookson Feed-Water Heater

The substitution of a single casting for the customary built-up plate body does away with bolts and calked joints at all points save the oil separator, the manhole and handhole covers and the pipe fittings. In other words, there is no chance for leakage at the points, which, in any built-up heater, are most apt to give trouble from this cause. It is evident, also, that the more solid construction is practically indestructible and capable of safely withstanding the greatest back pressure that will ever be built up within the heater. The safety valve may be set to blow off at 25 lb. per sq.in. without danger of leakage or bursting plates.

This heater has large steam space, tray surface and filtering space, and the four large manholes and handholes make cleaning easy. The cleaning doors are conveniently located in front and back, and as the heater may be made right or left handed by turning it halfway around, it will fit into the plant without complications to the piping.

The oil separator is made in either of two types: First, extra large and with cutout valve so that all the exhaust is purified. Thus, a surplus over feed-water heating requirements is in best possible condition for re-use in heating or processing systems, while the cutout valve permits shutting off the body of the heater for cleaning. Second, standard oil separator which permits piping to the heater on thoroughfare or inducion principles and assures splendid oil separation from as much exhaust as is required for feed-water heating.

A steam trap and return opening are provided so that the heater may receive the returns from a steam heating system or not as desired. The fittings throughout are high grade and the flanges are furnished to meet the customers' requirements.

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September Meeting of the American Mine Safety Association

The annual meeting of the American Mine Safety Association composed of leading coal- and metal-mine operators, mining engineers, mine-safety engineers, and mine surgeons will be held in Pittsburgh, Penn., Sept. 22-24.

This association, which held its first meeting a year ago, has for its purpose a reduction of the number of accidents in the mines and quarries (3602 in the year 1911) and the alleviation of the sufferings of more than 60,000 men who are injured each year.

Following the recommendations of the Bureau of Mines in the last three or four years many mining companies have organized rescue corps and first-aid teams, and as a result a number of different methods of procedure following mine explosions and fires and in caring for the injured have developed. The men who gathered a year ago to form this association felt there was need for greater uniformity in the work of the rescue and first-aid crews, and at that time some important recommendations were made.

This second meeting which has been called by H. M. Wilson, of the Bureau of Mines, chairman of the executive committee of the association, promises to take up and discuss a number of the problems that have arisen in both the rescue and first-aid work. The members of the association declare that greater progress can be made in saving life and in reducing the seriousness of injuries by the adoption of the proposed standard methods.

Mr. Wilson, in discussing the association, said: "The object of the American Mine Safety Association is to promote the science of safety in mines and mining by the adoption of improved first-aid methods, and of logical modes of procedure in rescue and recovery work in mine disasters; to recommend the adoption of approved types of first-aid, mine-rescue and recovery appliances; to obtain and circulate information on these subjects; and to secure the coöperation of its members in establishing proper safeguards against loss of life and property from explosions, fires, or other causes.

The program will include a mine-rescue and first-aid contest at Arsenal Park on Sept. 22; in the evening a reception to the members and a motion-picture lecture on the mining industry.

On the second day the opening session of the association will be held in the morning and a report of the executive committee will be made on the proposed constitution of the society. In the afternoon there will be an explosion in the experimental mine at Bruceton, Penn., upon which occasion all members will be invited to be present.

On Sept. 24 there will be a business session and a selection of officers. In the afternoon members will visit the experiment station of the Bureau of Mines at 40th and Butler Sts., Pittsburgh, Penn.

The program in detail is as follows:

Sept. 22—10:00 a.m.	Meeting of Executive Committee in Building 9. Bureau of Mines, 40th and Butler Sts.
2:00 p.m.	Mine-rescue and first-aid contest, Arsenal Park, Pittsburgh.
8:00 p.m	Reception of members by executive committee and motion-picture lecture on mining industry.
Sept. 23— 9:30 a.m.	Opening session of Association. Report of executive committee, action on constitution. Appointment of nominating and other committees.
3:45 p.m.	Explosion in Experimental Mine, near Bruceton, Penn. Leave B. & O. depot. Smithfield and Water Sts., by special train. Explosion at 3:45 p.m., returning, arriving Pittsburgh 5 p.m.
8:00 p.m.	Nomination and other committee meetings.
Sept. 24—10:00 a.m.	Business session. Election of officers. Miscellaneous business. Adjournment.
2:30 p.m.	Visit Experimental Station. Bureau of Mines, 40th and Butler Sts., and other points of interest.

OUTCROPPINGS

Every little mine has troubles of its own.

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All Fools Day was probably made Apr. 1 because the labor agreements customarily expire on that day.

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Advantage is a better soldier than rashness—a finger's length in a sword may determine the victor.

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They might get King Nicholas, of Montenegro to settle the "button strikes" in the anthracite field.

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Between the suffragette and the socialist the Government is having a busy time. Why not dispose of both by pitting one against the other?

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Two libations of the liquor handled at an average mining-camp dispensary is guaranteed to make a canary bird sit up and spit in a bulldog's face.

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We often discover what will do by finding out what will not do; and probably he who never made a mistake never made a discovery.

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Those who measure up monthly yardage in coal mines should note that the London "Board of Trade" has found the standard yard to be two hundred and fifteen millionths of an inch short—another chance for the miners' union to kick.

EDITORIALS

West Virginia Labor Troubles

On page 123 we publish an authorized statement of the West Virginia Mining Association, claiming that operators and miners of competitive states incited the recent insurrections in the Southern fields.

The same statement has been made privately by West Virginia mine owners at various times in previous years when labor struggles have waxed hot, but never before, to our knowledge, has the charge of conspiracy been made on credited authority and in such a direct and public manner.

There is no doubt but that coal men in those states which have had to meet West Virginia competition have been greatly irritated by the success of their commercial rival in withstanding the encroachment of the miners' union. It is also easy to believe that these same operators in Pennsylvania, Ohio, Indiana and Illinois would be pleased to see the West Virginia fields thoroughly unionized. But is there anything unnatural or unlawful in such a desire? Do any of us delight in seeing our business rivals prosper at our expense?

Many times when strikes occurred in Pennsylvania, or one of the adjacent states, have the operators of the affected districts believed and stated that West Virginia owners were encouraging and aiding the miners? We are not prepared to vouch for the truth of these statements one way or the other. However, it is no secret that considerable ill-will exists between these two sets of coal owners. No one at all familiar with the situation is likely to believe that there is any fraternal bond between them. In fact this condition is one of the chief sources of weakness in the chain that binds the American coal industry together.

We are not convinced by the West Virginia charges of conspiracy.. The indictment as a whole lacks force. The statement that the miners bought rifles in a Charleston store for the "significantly low price of $1.98" is nothing unusual. In the last few years, a large part of the 500,000 rifles the Government had on hand when the Krag-Jorgensen type of firearm was adopted has been sold at auction, bringing from 41c. to $2.50 each. They have been retailed all over the country at from 95c. up. Not long ago the Siegel-Cooper Co. in New York regularly disposed of them at 95c. each.

It is also true that during recent years various European governments have been pouring vast quantities of rifles into this country at extremely low prices. Francis Bannerman, 501 Broadway, catalogs a five-shot, 41-caliber Italian Veterli at $1.48. The price of $1.98 mentioned, therefore, signifies nothing except that the Charleston dealer made some money.

West Virginia mine owners are as decent and as capable as any body of coal men in America. The public press has hounded them unmercifully, and in a majority of cases unjustly. Space writers have fattened their monthly income by supplying columns of falsely colored matter calcuated to hold these operators up to the public gaze as heartless robber barons. Demagogues everywhere have added their cry to the popular clamor.

Through it all the West Virginia owners have fought stubbornly for what they believed was right. We have admired their determination, although disagreeing with much of their policy. However, we are sorry to see them designate the operators of other states as being the chief cause of their trouble. We can't trample our neighbor's lawn and then with propriety "holler" when he walks on *our* grass.

West Virginia operators have chosen to fight a bitter industrial war. They are standing out against a worldwide social advance, not a local disturbance comprising the employees of a few mines. So far, due principally to the physical nature of their country, they have been fairly successful in their resistance to the demands of organized labor. Some day they will be beaten, not so much because their principles are wrong, but because the forces against them are so great. In the meantime, the West Virginia coal owners should not forget that the rules of every game apply equally to both sides.

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The Pension System

On June 7, we published a foreword on the pensioning of employees, a subject in which we are much interested. In it we referred to the "one dissenting voice of John A. Fitch," of the New York Survey, who regards the private pension system as a lariat flung over the head of labor.

It has been pointed out that Mr. Fitch does not stand alone in this view. We are not surprised at this; there are so many people in this smug world of ours who believe that any action of betterment by the employer is sinister and every neglect of improvement by him is a scandal. He is well chided both for doing and for failing to do.

An article in the *International Steam Engineer* in April, 1912, and another in the *American Economic Review* in June, 1913, both condemned the private pension. Moreover, Louis D. Brandeis in an article entitled, "The New Peonage; Discretionary Pensions" eloquently stated the same views.

Doubtless there were others, but we are entirely undismayed by any volume of condemnation. The facts are that a company which is willing to put a pension system in operation is usually not a gross oppressor. Three instances come to mind—the United States Steel Corporation and its many subsidiaries, the Pennsylvania R.R. Co. and the E. I. Dupont de Nemours Powder Co. These organizations all have pensions and are all noted for their fair and considerate dealings with their employees, for the mind that conceives a pension system is also able to plan other betterments, and can see the needs of humanity in a broad and sympathetic light.

The pensioning companies have to pay the scale and in addition contribute to the support of their workmen in their declining years. This they could only do under two circumstances; either they must receive as a result a better service from their workmen or they must part with a percentage of their profit.

In the first instance, the satisfaction of the workingmen is necessary or the anticipated increased efficiency is not secured and how can there be satisfaction if the company acts in an arbitrary manner? The pensioning corporation is at a considerable disadvantage, begging the workingman to give him the efficiency which will permit it to fulfill its generous promises without a heavy loss.

If, however, there is no competition and the public must pay the cost of the pension scheme which the operator has chosen to put in force, then it is clear that the pension could as readily have been pocketed by the corporation as handed to the workingman. If despite this fact the operator is willing to divide this profit with his employees, he is not likely to be niggardly and imperious in other matters.

In view of the growth of unions, it is safe to say that the unionized mining and railroad corporations have not even freedom to do right and certainly cannot contemplate the parlous pleasures of wrongdoing.

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President Wilson Declares Himself

In the face of a nation-wide protest, President Wilson has signed the Sundry Civil bill carrying the "rider" which exempts labor organizations from prosecution under the anti-trust laws. That the measure is now a law is to be regretted. But this point loses importance before the more significant fact that the President has so clearly defined his policy in this respect. Nor was this done without mature reflection. The bill was in his hands for some time before his signature was attached and he must have had the subject in mind long before then, since it was returned to Congress for reconsideration by President Taft during his tenure in office. Furthermore the better classes have consistently opposed it and the press of the country has generally attacked it.*

Mr. Wilson explains—or rather excuses—his approval of the bill on the grounds that "other appropriations supply the Department with abundant funds to enforce the law." As a matter of fact there are already more than sufficient applications for the funds mentioned and it is highly improbable that any of them will ever be used for the purpose under consideration.

A singular and rather ominous coincident occurred in the signing of the bill. On the same day which this was announced a party of nonunion miners in Ohio were forcibly evicted from the works by a body of union men. Possibly it is the state's duty to protect its local industries, but with a labor party in control, we doubt if the operators will receive much consideration in this direction.

On the other hand, interference with the production of a commodity used in interstate commerce is clearly an infringement of the anti-trust laws and therefore subject to the action of the national Government. We fail to see as yet where organized labor has proved that only the unionist has a right to work, and it is to be hoped that the President will find a means of diverting a portion of the "abundant funds" at his disposal to prevent a recurrence of such instances.

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*See "Coal Age," Vol. 3, page 693.

State Mining Laws

Probably at no time in the history of coal mining in this country have changes in the state mining laws been more numerous than at the present. We refer not only to those laws directly affecting the inspection of mines and the regulation of mining operations, but other laws of wider range and having for their ultimate purpose the establishment of greater harmony between mining interests of every nature.

The subject is a broad one and involves the safe and economical extraction of the coal, together with the transportation of the same to the various markets, and such a regulation of rates and facilities of shipment as will impose no burden beyond what is necessary in the several mining districts.

The matter of mine accidents is receiving special attention at the hands of legislators, and the great principle of due compensation to workmen injured in the performance of their duties is being patiently and, we believe, successfully worked out on a basis that will prove advantageous to employer and employee alike when unavoidable accidents occur.

In this connection, a suggestion comes from West Virginia where it has recently been put in practice, and which relates to making certain that every mine employee is or should be acquainted with the mining laws of the state. Recent copies of the mining law of West Virginia contain, on the reverse side of the perforated title page, a blank form of receipt, which is to be signed by the miner receiving a copy of the law, together with a copy of the rules and regulations governing the operation of the mines of the company by which he is employed. This receipt, signed by the employee and witness, is filed by the company, and is intended to forestall the claim of any employee, injured in the mine, that he was not acquainted with the law, mine regulations, or the particular danger to which he was exposed.

In reference to the printed copies of state mining laws, it is a good suggestion that these laws should be printed in small compact form of suitable size to be handled or carried about conveniently. A good size, which has been adopted by many mining states, is 3½x6 in., or 3x5½ in.

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Photography at Coal Mines

Still another instance of the importance of photography at coal mines is the case of a recent accident in a large boiler plant. The breaching attached to a single boiler gave way and let the smokestack down on to the boiler-room floor. The report of the mishap was accompanied by three photographs; one showed the boiler as it looked after the accident, and the other views showed how the breechings on two boilers of other types were secured. These photos explained the cause of the accident, which, of course, was the result of bad designing. The photographic report was shown to the boiler manufacturers, giving them as good an idea of what the trouble was as if they had sent someone there to make a personal examination.

Photograph outfits at mines are, therefore, not only useful, but extremely economical. Such apparatus does not cost much and will repay the initial expenditure in a short time.

SOCIOLOGICAL DEPARTMENT

Two Safety Devices

By J. E. Jones*

SYNOPSIS—Two substitutes of human actions, which make the employment of men unnecessary. The lever of the switch stand is turned by the motor and not by a spragger. The hands of the trip-runner do not hold the coupling link, but a dog is used which is tripped into action at the very moment when the cars collide. As is usual, the devices combine economy of labor with safety in operation.

⁂

The automatic mine switch here illustrated is simple and can be made by a mine blacksmith. There is nothing which can get out of order and all accidents resulting from the making of a "flying switch" are thereby avoided. We have had a switch stand of this type installed at one of our mines where a Whitcomb gasoline motor is used for haulage and though it has been operated for several months, it has given no trouble during that time.

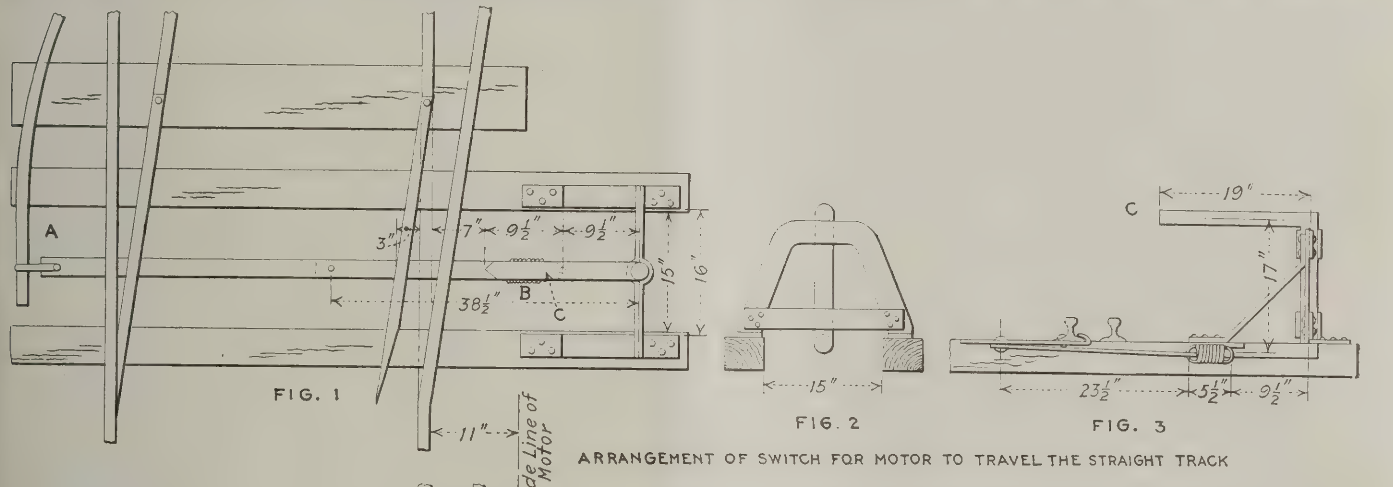

FIG. 1 FIG. 2 FIG. 3

ARRANGEMENT OF SWITCH FOR MOTOR TO TRAVEL THE STRAIGHT TRACK

Note: Spring B may be a pull spring as shown, or it may be a push spring
If used as shown, it must be stronger than spring A
Designed for 40 lb. motor rails. Either or both springs in Fig. 4 may be used

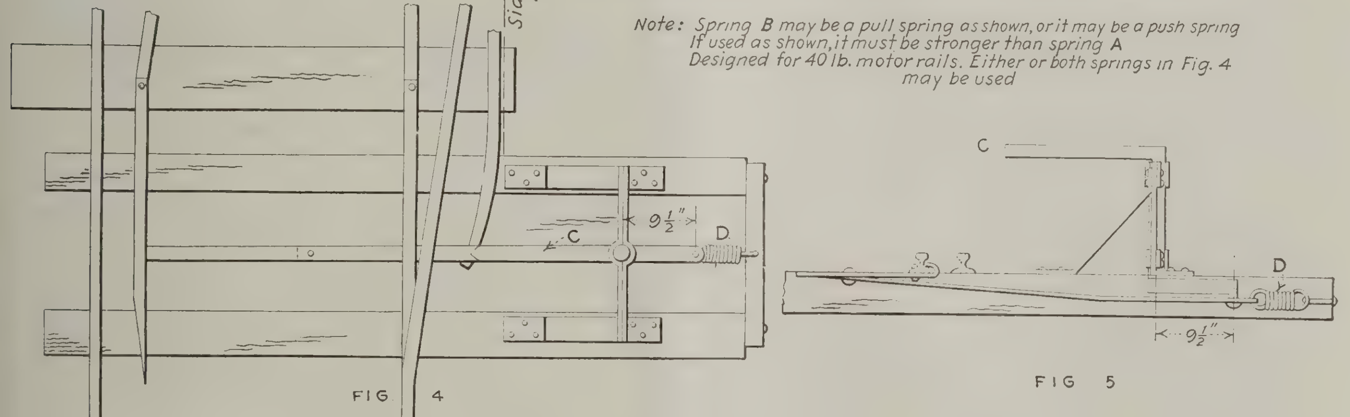

FIG 4 FIG 5

ARRANGEMENT OF SWITCH FOR MOTOR TO TRAVEL THE SIDE TRACK WHEN THE STAND CANNOT BE PLACED ON THE OPPOSITE SIDE

COAL AGE

The Switch and Stand

Switch Operated by the Motor

This mine switch is thrown in much the same manner as if operated by hand, but in this case the motor itself pushes the lever *C* and holds it in position till the locomotive passes over the points. These points are brought back into position after the motor has passed by means of a spring either such as is used on a common spring-latch, as *A*, or by a strong coil spring, such as *D*.

If a rail is used for a spring there should be a coil push-spring *B* in the connection between the stand and bridle to lessen the jar on the points, though this is not absolutely necessary. The parts of a switch of this kind must be made according to specific measurements so that there will be no unnecessary strain on the points or the stand. For the switch, here illustrated, the measurements were based upon a 38-in. gage and a point of contact between lever arm and motor 11 in. from the outside of the rail and 14 in. above it. The motor must be reasonably smooth on its sides or must be fitted with a strip of iron to hold the lever of the switch as the motor goes over the points.

In Fig. 1 it has been assumed that the locomotive

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*Oak Hill Coal & Mining Co., 1914 McCormick Building, Chicago, Ill.

always travels the straight track and in Fig. 4 the parting is arranged so that the motor passes onto the switch track and the cars follow the straight road. The stand is shown in this figure as placed on the same side of the track, though it could be removed to the other side. Owing to this change the points must be pushed over and not pulled. This kind of switch is only necessary where there are double tracks as at the shaft bottom, it not being wise to have the switch stand between the tracks. This automatic motor parting is especially adapted to making uphill "flying shunts."

Automatic Mine-Car Coupler

The second device is an automatic car coupler for which the mining industry has long felt an urgent need. It is strange that despite the long strides made in mining machinery that a device of this kind was not introduced long ago, especially since the railroad automatic coupler has been such a national success. The need for its introduction in the mines is hardly less apparent.

The coupler is simple, few in parts, and can be manufactured at a low cost. A successful mine-car coupler must embody the following principles. It must allow trips to pass around curves of short radius and it must not project beyond the extreme ends of the car. It must have sufficient slack so that the momentum of the moving cars at the front end of a trip may be utilized to start, one by one, the wagons which are not yet in motion. All these principles and other minor requirements are embodied in this coupler.

Detailed Description of Parts

The device is composed of three distinct parts; the coupler head, the hook and the three links. The head is a malleable casting so designed as to form a connection between the three links and the drawbar and also to serve as a seat for the trip or dog, on the action of which the automatic quality of the coupler depends. One of the links, that nearest the coupler head, is shaped like a D and is permanently attached to the head, which head fits over one end of the drawbar and is bolted to it by means of three bolts, one of these passing through the end belt of the car. The dog on which the big link rests ready for coupling is fastened to the coupler head by means of a pin upon which it is free to oscillate.

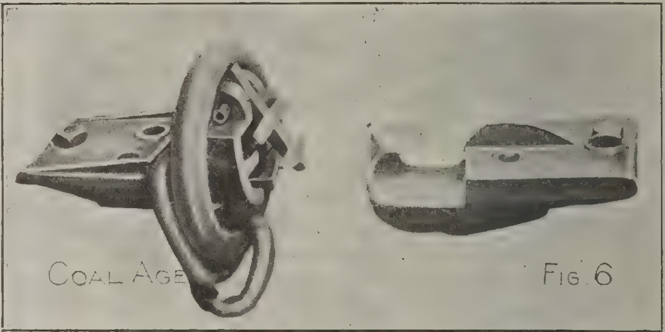
The hook is a malleable casting and is attached to the drawbar in a manner similar to the coupler head. This hook is designed to allow the big link to fall or slide into place when it is projected from head of the coupler by the oscillation of the dog. The form of the hook together with the leverage and weight of the big link make it practically impossible for the link to be thrown or jerked out of its position in the hook.

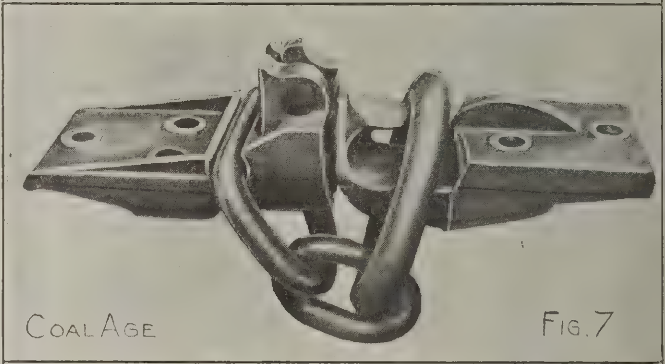
The three links are made of steel or of the best iron; the biggest is the coupling link which, when a trip is being made up, is hung on the dog at the top of the coupler head. The inside diameter of this link is 6 in., thus giving a play sufficient for all ordinary cars when on a reasonably straight track. The D link is slipped from the side into its groove in the coupler head. It is retained permanently in this position until a link is broken at which time the three links can be readily replaced. The small connecting link is roughly of an elliptical shape.

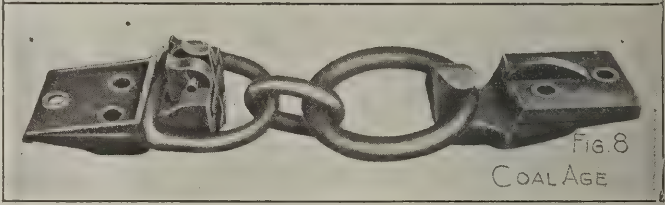
The Dog Which Replaces the Fingers of the Trip Runner

The dog is a malleable casting having a seat on the upper end for the big link and a projection to prevent that link from sliding back toward the car. The pin attachment passes through the dog at a point about one-third of its length from the upper end. The striking surface of the trigger end of the dog is increased by four side projections, two on each side at right angles to the motion of the cars.

The action of the coupler may be readily understood by reference to the accompanying figures. As the cars come together the hook of one car collides with the trigger of the other immediately the upper part of the dog is thrown forward and the end of the big link is dropped over the hook and, as the cars separate, works itself snugly into position. The cars are uncoupled by lifting the links out of the hook when trip is slacked. The big links can be hung on the coupler head ready for recoupling or can be allowed to trail on the ground.







Three Successive Positions of Coupler in Operation

Saves both Labor and Lives

The person coupling with this device need not jeopardize his life by placing his head and shoulders between the mine wagons. Time is saved in coupling up a trip because all the cars can be prepared beforehand for automatic coupling by hanging the big links from their appropriate dogs. It is not necessary for a driver or trip-rider to climb back along the trip to couple on cars, and wagons need not be pushed apart to couple or uncouple them. Coupler boys or men are not needed on partings or on the bottom. Thus not only labor but a cause of many accidents is eliminated. The weight of the castings for a 3-ton car is 17 lb.

No law has been passed requiring automatic couplers in mines, but it is likely that with their introduction will come legislation demanding that some such means be adopted to lessen the number of fatalities and injuries from mine cars.

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An Emergency Cage

G. S. Rice, mining engineer of the Bureau of Mines, has invented a collapsible hoisting frame to be used in emergencies when the regular cage of a mine is injured so severely as not to be available, which often happens during an explosion.

This invention he patented June 3, 1913, the number being 1,063,285. The invention may be used by "any person in the United States without the payment of royalty."

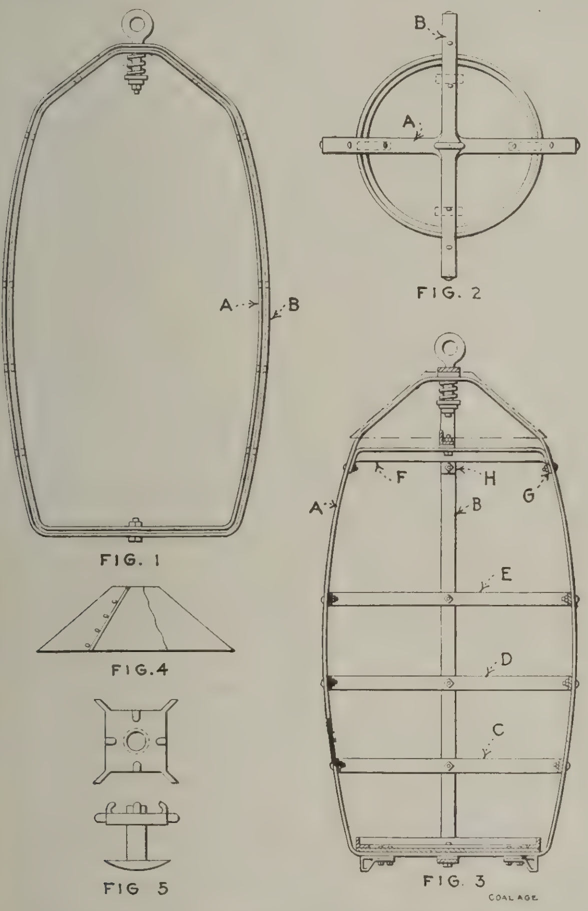

FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5

Details of Collapsible Hoisting Frame

As the inventor states:

> It frequently happens in case of mine accidents that the regular hoisting equipment may be so damaged or disarranged that it cannot be used. In such case the provision of an emergency cage which can be made ready in a few minutes will greatly facilitate the work of rescue parties and aid in saving the lives of many to whom even a short delay may prove fatal. To be suited to this purpose the cage should be so constructed that it cannot be upset by striking projecting timbers or other obstructions in the shaft, and should as far as possible guide itself past such obstructions, since the men, if wearing rescue apparatus, cannot see readily nor control the movements of the conveyance used.
>
> Such cage should be sufficiently strong to withstand any blows to which it may be subjected and should be so arranged that timbers and cloth for brattices or other supplies necessary for rescue work can be successfully lowered in it. It is especially important that the cage should be of such construction that it may be quickly assembled and readily taken apart again for the purpose of convenient storage and transportation, as it is often necessary to load these cages along with other rescue apparatus on railway cars not especially equipped for mine-rescue work. All of these varied requirements are met by the cage hereinafter described.

The Whole Cage Is Collapsible

In the illustration of this device, Fig. 1 shows the collapsed cage consisting of two bales or yokes *A* and *B*, one of which is smaller than the other. They are connected at the top and bottom by pivot bolts. Thus the two bales can be swung into a position at right angles to each other as shown in Figs. 2 and 3, and secured rigidly by the hoops *C*, *D* and *E*, which are bolted to the bales. If desired a flexible hoop or chain could be used in place of hoop *E* to make entrance to the cage less difficult. A hood, Fig. 4, is dropped over the top of the cage fitting loosely as a cap over the suspending bales.

A cross brace consisting of two angle bars *F* and *G*, at right angles with flattened end-portions *H* and *I* and a pivoted connection at their intersection is bolted to the frame members near the top of the cage. These may be rotated when detached from the bales so as to lie one within the other, thus economizing space for shipment.

The platform is supported from contact with the ground by four lugs. The hood can be removed whenever it is desirable to lower timber. The king bolt by which the cage is supported is arranged to have a swiveling movement so that the twisting of the cable will not turn the cage. A spring on the king bolt relieves the strain on the rope when the cage is started upward.

Bolts Provided with Wing Nuts

To facilitate the assembling of the cage a special form of bolt and nut illustrated in Fig. 5 may be employed. The heads of the bolts are rounded in order that they may not catch on obstacles in the shaft. The nuts are provided with wing projections which can be grasped by the hand like an ordinary wing nut or readily turned by a flat bar or like tool if a wrench should not be available. For the storage of these bolts and nuts when not in use a bag should be provided attached to some member of the cage so as to be always available when needed. Copies of the patent can be obtained from the Commissioner of Patents, Washington, D. C., by inclosing five cents.

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Appointments in Iowa

Gov. Geo. W. Clark has just reappointed the present state mine inspectors for another term of four years, beginning July 1, 1913. They are J. E. Jeffreys, 1st District, Albia; R. T. Rhys, 2d District, Ottumwa; and Edward Sweeney, 3d District, Des Moines.

The members of the Iowa State Mining Board, appointed for one year, are: E. M. Gray, president, Des Moines; H. W. Ladd, secretary, Madrid; T. L. Evans, Lockman; David Anderson, Ottumwa; and W. L. Jones, Colfax.

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Experiments have shown that the cartridges attached to rescue apparatus often become so hot when used, as to burn the skin of the wearer. This can be overcome by inserting a piece of asbestos between the cartridge and the skin.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 7.—Although not having the time to devote to the discussion of this subject that it deserves, I want to say that I do not believe in the use of mixed lights in a mine that generates inflammable gas in explosive quantities, even where there is a reasonably good ventilation. In mines of this character and where it is desired to obtain a better light than that given by the safety lamp, I believe the electric lamp recently approved by the Bureau of Mines, called the Ceag portable electric hand lamp, and the Hirsch portable electric cap lamp, can be substituted for the open lights, using the safety lamp for testing purposes only.

Rees H. Beddow,
State Mine Inspector.

Gallup, N. M.

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First-Aid Standardization

Referring to the article, "The First-Aid Muddle," Coal Age, May 17, p. 769, permit me to express regret that the writer of the article deemed it unwise to disclose his name. In reply to my inquiry you state that he is a "physician of repute." Had the article appeared over the author's name, I can assure you that some of the eleven reputable mine physicians who prepared the report on first-aid methods would have been pleased to have answered the article.

I may add that the matters tentatively passed upon by these surgeons at the conference held in Pittsburgh last September have been under consideration by a committee of mine surgeons and physicians which was then appointed for this purpose. This committee will report at the first annual meeting of the American Mine Safety Association, which will be held in Pittsburgh beginning Sept. 22.

On behalf of that committee and of this association, I hope that in the meantime "A Physician" will either disclose his name or accept this as a general invitation extended to him by the association to be present, participate in its deliberations, and aid in perfecting standards of first aid, thereby contributing something constructive toward this most important work.

H. M. Wilson,
Chairman.

Pittsburgh, Penn.

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An Open Letter

I have read with interest Mr. Powell's article entitled "A Gas Ignition Controversy," Coal Age, June 28, p. 985; and, although the matter is not of sufficient public interest to discuss it further, it seems unaccountable that the numerous statements made in his article were not brought out earlier in the discussion. As superintendent of the mine, Mr. Powell had ample opportunities for making a thorough inspection of the mine before the inquest. It is worthy of note that he states (p. 987) that pillars Nos. 76, 77, 78 and 79 were being drawn on the day of the disaster; and men were at work in Nos. 80 and 81.

These points are of the utmost importance, because, if men were at work on the pillars here mentioned, there were undoubtedly explosives and detonators at those points, and a cache of explosives was found after the third disaster, at the fourth cross-pitch up No. 79 chute.

Admitting the truth of these facts, the probability is that a fall of roof, explosives, detonators and coal dust may all be considered as operating to cause the first, second and third disasters, in this mine; and, further, that the third disaster was assisted by the ignition of marsh gas accumulated on the pitch. It can now be stated with confidence that the Bellevue disasters of Oct. 31 and Dec. 9, 1910, were not gas explosions; but, in view of the facts to which I have referred, they were coal-dust ignitions caused by a fall of roof on explosives and detonators. These fresh facts further corroborate what I have always claimed, namely, that the two first disasters were in no sense gas explosions.

James Ashworth,
Vancouver, B. C., Canada. Mining Engineer.

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The Liquor Problem in Mining

Some time ago the question of the liquor problem in coal-mining communities was discussed in several articles (Coal Age, Vol. 1, pp. 25, 56, 90, 192, 222 and 258) by C. L. Fay, then state secretary of the Y. M. C. A. mining work, in Pennsylvania. I should be glad to hear the opinions of men in charge of mines, on the effect and proper control of the drink habit among coal-mining employees. My observation leads me to believe that there is no doubt but that this habit has increased with the advance in wages, if not in proportion to the same.

There is no doubt but that the inebriety of coal miners affects not only themselves and those dependent on them, but is an absolute loss to the mine operators who employ them. Apparently, it is a difficult matter to control this habit where it has gained any ascendency. However, I believe that much could be accomplished if there was some general understanding in reference to the conditions under which employment would be given to applicants for work. Attention was drawn to this particular matter by H. D. Johnson, a firmer anthracite mine inspector, in discussing the miner's certificate situation (Coal Age, Vol. 2, p. 467). Mr. Johnson, at that time, advanced the idea of the mine inspector granting three grades of certificates, A, B and C, to miners having different qualifications and capabilities. He claimed that these certificates should be presented by miners when making application for work to any mine foreman, and that it would enable the mine foreman to give them such work as they are capable of doing.

In addition to this idea, I want to suggest that the mine foreman or superintendent should demand of every applicant for work a certificate of good behavior and sober habits, from his last employer. This certificate should state the time lost, if any, on account of drink. I believe that such a system would greatly improve conditions, and every step in this direction helps to increase the profits and place coal mining on a firmer basis.

A few years ago, a church holiday, a christening, birth, or death were the causes given for lost time; but now, all of these and numerous other insignificant causes, as, for example, a new litter of pups or kittens, arrival of a new calf, a youngster's birthday, etc., etc., are offered as sufficient excuse for idleness and drinking. A reference was made recently to the numerous holidays that interfered to so large an extent with the successful operation of a mine (Coal Age, June 28, p. 994).

I believe if the shipment of intoxicants into dry territory could be prohibited, it would greatly help the situation, and to this end we should all lend our influence with the hope of bettering the conditions and the work.

Subscriber.

Pittsburgh, Penn.

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Systematic Timbering

I have been very forcibly impressed by reading the resolution adopted by the Rocky Mountain Coal Mining Institute, at their recent meeting in Salt Lake City, as published in Coal Age, July 5, p. 17. The resolution reads as follows:

> Resolved, that it is the sense of this meeting that any systematic method of timbering which contemplates the placing of the supports at regular intervals, is not applicable to the character of the roof overlying the coal measures in the Rocky Mountain regions, and that the only safe method is to require timbers to be set to securely support the roof in each individual working place. It is further resolved that this institute use all fair means to prevent or repeal any legislation which would attempt to establish systematic timbering in the several states in which the institute operates.

As the resolution was adopted after the discussion of D. J. Griffiths' paper, in which he made a special reference to the subject of systematic timbering, it would be of interest to those who, like myself, have not visited mines in the Rocky Mountain region, if Mr. Griffiths would further explain why systematic timbering is not adapted to that region and how falls of roof and sides are to be reduced in mines without a regular system of timbering.

From the brief reference Mr. Griffiths makes in his paper entitled "How to Reduce Falls from Roof and Sides," Coal Age, July 12, p. 47, it seems to me he has not the proper idea of what is meant by systematic timbering. It is not altogether the fixing of props at certain specified distances apart; but it means the *minimum* number of props to be set at a certain *maximum* distance apart. The system provides that if more props are needed, they should be set, according to the judgment of the miner or the instructions of the mine official in charge. The system does not contemplate a hard-and-fast rule. It is generally agreed that any hard-and-fast ule in mining is impossible and dangerous. But, sys-em in timbering, when adapted to the general condi-ions in a mine, makes mining safer by limiting the distance at which props may be placed apart. This dis-ance is determined by the mine manager or foreman, who has the power to alter this distance according to the changing conditions in the mine.

I don't understand Mr. Griffiths' reasoning where he states that "to timber according to fixed rules, the standard of safe timbering would be lowered." As it seems to me, systematic timbering gives the mine manager and his officials a more efficient and effective control over this important work at the coal face than they could secure by any other means. When inspecting the roof, the foreman will still look for bad places between the props; but if the timbers are not set, the neglect would be detected at once.

In any other system of timbering, the miner commonly waits until the roof gives some indication, before setting a prop; and most miners take many chances under dangerous roofs. It is this that causes the large number of accidents at the face. On the other hand, where systematic timbering is adopted, the props must be set even if the roof gives no indication of needing such support. Where a systematic method of timbering the working face possesses a distinct advantage over any haphazard method is that it compels the miner to set a new row of timbers regularly as the face of the coal advances. He cannot neglect or postpone doing this because he thinks it is not required at the present time. If his timbers are farther apart than the maximum distance allowed, or farther from the face of the coal and an accident should occur, the man himself is alone responsible and cannot recover under any mining act.

I do not advocate being tied down to rules adopted in particular localities. For example, in France and Belgium, they nick into the face coal, at the roof, to make places for the cap-pieces and set the posts close to the face of the coal. In South Wales, the general rule is to set the props in diamond fashion, the posts in each alternate row being opposite each other.

In every case, the system used should be adapted to the particular conditions in the mine. It is reasonable to assume that it is safer to work by a *system* than in a haphazard manner. In sections where systematic timbering is carried on, the number of accidents has been reduced not only because more attention is paid to the roof under such system; but particularly because more attention has been paid to secure the roof in a systematic way.

I consider that the Rocky Mountain Coal Mining Institute made a mistake to pass such a resolution, even though systematic timbering would not benefit them. In view of the fact that the majority of mine accidents are due to falls of roof and coal at the working face, it should be our constant endeavor to adopt such methods as will tend to reduce, as far as possible, the number of these accidents. The resolution tends to weaken the confidence of those who are adopting a systematic method of timbering.

There is danger in assuming that any experienced miner will always timber his place in a proper manner when he is left to do this in a haphazard way, using his own time and judgment in performing the work. Where such practice is followed, the work of timbering is generally done after the box is loaded, and this too often proves to be a fatal mistake.

W. L. Morgan,
State Mine Inspector, 8th District.

East St. Louis, Ill.

Fires—A Warning

I have been much impressed recently with the large number of fires that have occurred within the last few months, as recorded in the news columns of COAL AGE. I refer only to the fires in connection with coal-mining operations. These have been so frequent and the property loss so great, to say nothing of the many lives endangered thereby, that I think it advisable to call special attention to the subject. Many of the fires that occur could be prevented if proper precautions were taken and suitable means at hand to extinguish a fire when first started.

My desire in writing is to bring before the minds of readers the seriousness of the matter, and impress upon them the importance of safeguarding the properties in their charge, not only by furnishing the necessary equipment and keeping this in condition for immediate use, but by the adoption of strict regulations in regard to the use of lights, the handling of combustible material, and the storage of the same.

The appended list is by no means complete, as representing the fires that have occurred at mining plants within the past few months, but is evidence of the destruction that is constantly occurring at mining plants and cannot fail to impress the candid mind with the importance of closer supervision at every turn.

PENNSYLVANIA

Carrolltown	Blaine Coal Co.	Tipple	$13,000
Archbald	Delaware and Hudson Co.	Fan	not given
Arcadia	Penn. Coal & Coke	Plant	$25,000
Pottsville	Alliance Coal Co.	Plant	not given
Stoneboro	Mercer Iron & Coal Co.	Eng. and boiler house	not given
Connellsville	Frick Coke Co.	Boiler-house	$15,000
Barnesboro	Hastings Coal Co.	Tipple	not given
Somerset	Consolidated Coal Co.	Power plant and tipple	not given
Bakerton	Sterling Coal Co.	Gigantic tipple	not given
Whiteside	Madeira Hill Coal Co.	Powerhouse	$15,000
Sharon	Filer Coal Co.	Tipple and boiler house	not given
Wilkes-Barre	Kingston Coal Co.	Plant	$100,000
Adrian	Jefferson & Clfd. Co.	Co. store	not given
Somerset	Bando Coal Co.	Store and tipple	$2000

WEST VIRGINIA

Moundsville	Parrs Run C. Co.	Tipple	5000
Fairmount	Consolidated Coal Co.	4 houses	7000
Crown Hill	Black Cat. C. C	Tipple	not given
Elk Ridge	M. B. Coal Co.	Tipple	$40,000
Mucklow	Paint Crk.	Fan house	2000
Terra Alta	Righter C. Co.	Bldg. and eng. rm.	not given
Norton, Va.	Norton C. Co.	Store	$25,000

OHIO

Neffs	Pitts. Belmont C. Co.	Mine bldgs.	25,000
Stillwater	Still. Coal Co.	Eng. house	not given
McArthur	Starr Hocking C. Co.	Plant	100,000
Crooksville	Standard Coal	Tipple	not given
Urichsville	Hiawatha C. Co.	Fan house	not given
Lisbon	Duquesne C. Co	Mine bldgs.	not given
Kenwood	Oliver Coal Co.	Power house	20,000
Kenwood	Oliver Coal Co.	Store	10,000

ILLINOIS

Verden	Royal Colliery Co.	Plant	100,000
Marion	Hocking Washed C. Co.	Bldgs.	not stated
Carlyle	Weston Coal Co.	Power plant	$50,000
Central City	Nelson Crk. C. Co.	Power plant and tipple	not given
Pekin	Tazewell C. Co.	Plant	not given
Galesburg	Star C. Co.	Mine bldgs.	$30,000
Duquoin	Brilliant C. Co.	Plant	5000
Browder, Ky.	Caldwell Coal Co.	Plant	$25,000

CHARLTON DIXON.

Banksville, Penn.

⁂

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Higher Inflammable Limit—By the continued addition of gas, the firedamp having ceased to be explosive, now becomes less and less inflammable. The mixture not only ignites less readily, but when ignited burns less regulary and quietly than did the same firedamp mixture, in the lower inflammable stage when less gas and more air were present.

The higher inflammable stage of the gas is more dangerous, in mining practice, than the lower inflammable stage of the same gas, because the slightest addition of air, which is liable to occur at any moment in the mine, causes the mixture to approach the maximum explosive point. The addition of air to firedamp in the lower explosive or inflammable stages makes the mixture less explosive or inflammable.

Another important distinction between the lower and higher stages of firedamp mixtures is the relative ease with which the flame cap may be detected in the two stages. While the flame of a safety lamp burns steadily and yields a good cap that is easily detected, in the lower inflammable stage; the lamp flame is unsteady and the flame cap generally hard to discern in the higher inflammable stage. The reason is probably to be found in the uncertain and varying amount of air in the mixture feeding the flame, which makes the gas continually approach the explosive point. The gas in this (higher) stage is said to be "sharp."

The following table will make the several stages of firedamp more clear; but it must be remembered the proportions of gas to air and percentages of gas given as marking the dividing line between the different stages or the inflammable and explosive limits are only suggestive and vary with the degree of purity of the gas; the volume, intensity and position of the igniting flame, and the pressure and temperature of the surrounding atmosphere.

FIREDAMP MIXTURES (METHANE AND AIR)

Lower Inflammable Stage	Explosive Stages			Higher Inflammable Stage
	Lower Stage	Maximum Point	Higher Stage	
		Proportion of Gas to Air		
1 : 40	1 : 13	1 : 9.57	1 : 5	1 : 2.4
		Percentage of Gas		
2.5%	7.14%	9.46%	16.67%	29.5%

The continued addition of gas thus renders the firedamp extinctive of its own flame and therefore noninflammable. The proportions and percentages given in the table denote more or less closely the limits of the several stages.

Flashdamp—This is a mixture composed almost wholly of marsh gas (CH_4) and carbon dioxide (CO_2), mixed in the proportion in which these gases diffuse into each. It is formed under special conditions, in mines, where carbon dioxide from the old workings of an abandoned seam becomes mixed with the undiluted marsh gas generated in the strata. The mixture is lighter than air and possesses the peculiar and misleading properties of extinguishing the lamp at the roof of the seam or the face of a steep pitch.

The Coal Age Pocket Book

Calculation of Composition of Flashdamp—According to the law of diffusion, gases diffuse into each other in the inverse ratio of the square roots of their densities or specific gravities. For example, the specific gravities of methane and carbon dioxide are 0.559 and 1.529, respectively; and the ratio of the velocities of diffusion of these two gases into each other is then the inverse ratio of the square roots of these numbers.

$$\frac{CH_4}{CO_2} = \frac{\sqrt{1.529}}{\sqrt{0.559}} = \frac{1.236}{0.747} = 1.65$$

which can be written 1.65 : 1; or 1650 : 1000. This ratio shows that when these gases diffuse into each other, directly, before dilution with air takes place, the mixture will contain 1650 volumes of methane for each 1000 volumes of carbon dioxide. The same result is obtained by stating the law thus: The ratio of diffusion is equal to the square root of the inverse ratio of the densities or specific gravities of the gases; or, as follows:

$$\frac{CH_4}{CO_2} = \sqrt{\frac{1.529}{0.559}} = \sqrt{2.735} = 1.653$$

A slightly different, though theoretically more correct result is obtained when the calculation is based on the densities of these gases, referred to hydrogen as unity (1). The process is as follows:

Methane (CH_4); $C = 1 \times 12 = 12$
$H_4 = 4 \times 1 = 4$

Molecular wt. = 16; density = 16 ÷ 2 = 8

Carbon dioxide (CO_2); $C = 1 \times 12 = 12$
$O_2 = 2 \times 16 = 32$

Molecular wt. = 44; density = 44 ÷ 2 = 22

The ratio of diffusion is then equal to the square root of the inverse ratio of these densities; or

$$\frac{CH_4}{CO_2} = \sqrt{\frac{22}{8}} = \sqrt{2.75} = 1.658$$

Calculation of Percentage Composition, by Volume—The mixture is estimated to contain

Methane (CH_4)	1658 volumes;
Carbon dioxide (CO_2)	1000 volumes;
Total	2658 volumes.

Percentage, by volume,

$$\text{Methane,} \quad \frac{1658 \times 100}{2658} = 62.38 \textit{ per cent.}$$

$$\text{Carbon dioxide,} \quad \frac{1000 \times 100}{2658} = 37.62 \textit{ per cent.}$$

$$100.00 \textit{ per cent.}$$

EXAMINATION QUESTIONS

Ventilation and Gases

Ques.—A certain mine is ventilated by an exhaust fan that reduces the pressure of the air in the fan drift, 14.56 lb. per sq.ft. The mine is situated at an elevation of 2500 ft. above sea level; and, at the time of observation, the reading of the barometer was 27.286 in. The measurement of the air in the intake airway showed a volume of 150,000 cu.ft. per min. entering the mine, at a temperature of 40 deg. F.; while the measurement taken on the return airway showed a volume of 162,700 cu.ft. per min. passing out of the mine, at a temperature of 70 deg. F. (a) What is the estimated volume of the gas given off in this mine per minute? (b) What is the percentage of gas in the return-air current?

Ans.—(a) In this case, the intake air is expanded both by the increase of temperature from 40 to 70 deg. F., and by the fall of pressure. The fall of pressure is given in pounds per square foot while the atmospheric pressure is in inches of mercury, and it is necessary to reduce these to the same denomination. Therefore, reducing the fall of pressure (14.56 lb. per sq.ft.) to its equivalent in inches of mercury,

$$\frac{14.56}{144 \times 0.4911} = 0.206 \textit{ in.}$$

Subtracting this fall of pressure from the given atmospheric pressure gives, for the pressure in the return airway, 27.286 — 0.206 = 27.08 in.

The absolute temperature on the intake is 460 + 40 = 500 deg. F.; and that on the return 460 + 70 = 530 deg. F. The pressure on the intake is 27.286 in.; while that on the return is 27.08 in. Since the volume of the air current varies as the absolute temperature and inversely as the pressure, the volume ratio is equal to the absolute-temperature ratio, times the inverse-pressure ratio. Then, calling the required volume of the return air x

$$\frac{x}{150,000} = \frac{530}{500} \times \frac{27.286}{27.08} = 1.068$$

$$x = 150,000 \times 1.068 = 160,200 \textit{ cu.ft. per min.}$$

The volume of gas given off in this mine is then 162,700 — 160,200 = 2500 cu.ft. per min.

(b) The percentage of gas in the return current is, then,

$$\frac{2500 \times 100}{162,700} = 1.5 \textit{ per cent.}$$

Ques.—What change of volume, if any, takes place at the moment of an explosion of marsh gas in air?

Ans.—At the moment of the explosion, there is no change in volume, since the two volumes of oxygen required to burn one volume of marsh gas, produce one volume of carbon dioxide and two volumes of water vapor; while the nitrogen of the air remains unchanged.

If, however, the temperature falls after the explosion, the water vapor may be condensed to water, which will occupy so small a space comparatively that it may be practically ignored; and the ten and a half volumes of gas and air concerned in the explosion become practically eight and a half volumes of carbon dioxide and nitrogen, causing a reduction of about 19 per cent. in volume, or, say one-fifth.

Ques.—If the air is short-circuited at the fan, will this cause the speed of the fan to increase or decrease?

Ans.—When the air current is short-circuited, the resistance of the mine is cut out; and, as a result, a large quantity of air rushes through the fan, owing to the fall of pressure in the fan drift. Then, since the work lost or absorbed in the fan itself varies with the cube of the quantity of air passing, there results a large loss of work in the fan when the air is short-circuited. Therefore, assuming the power applied to the fan shaft remains unchanged, the effective power available for turning the fan is decreased and the fan runs slower than it did before the air was short-circuited.

Ques.—What is the weight of 200 cu.ft. of earth having a specific gravity of 1.4?

Ans.—This earth weighs 1.4 times as much as the same volume of water. Since 1 cu.ft. of water weighs 62.5 lb., the weight of 1 cu.ft. of the earth is 62.5 × 1.4 = 87.5 lb.; and the weight of 200 cu.ft. of this earth is 200 × 87.5 = 17,500 lb.

Ques.—What is the weight of 400 cu.ft. of carbon dioxide (CO_2) at 60 deg. F. and a barometric pressure of 30 in.? The specific gravity of this gas is 1.529 and the weight of 1 cu.ft. of air, at the given temperature and pressure is 0.0766 lb.

Ans.—The weight of 1 cu.ft. of gas, at the given temperature and pressure, being 0.0766 lb. and the specific gravity of the gas, referred to air of the same temperature and pressure, being 1.529, the weight of 1 cu.ft. of this gas is 0.0766 × 1.529 = 0.1171 lb. The weight of 400 cu.ft. of carbon-dioxide gas, at the given temperature and pressure, is then 0.1171 × 400 = 46.84 lb.

Ques.—What constitutes firedamp; and what gaseous mixtures does it include?

Ans.—The term firedamp, in this country, applies to any inflammable or explosive mixture of gas and air. It is generally understood to refer to a mixture of marsh gas and air, in explosive or inflammable proportions; although it is known that other explosive or inflammable gases are present; and, in many cases, the firedamp contains certain proportions of extinctive gases, such as carbon dioxide and nitrogen.

The presence of these gases greatly modifies the character of the firedamp, the inflammable or explosive gases increasing and the extinctive gases decreasing the danger of the mixture. The presence of inflammable gases having a lower temperature of ignition than marsh gas, such as ethane, carbon monoxide, or sulphureted hydrogen renders the firedamp more easily ignitable and dangerous, as does also fine coal dust in suspension in the air of the mine.

COAL AND COKE NEWS

Washington, D. C.

The following statement has been officially authorized here by the West Virginia Mining Association:

The Paint Creek Collieries Co. and the Standard Splint and Gas Coal Co. which were operated as Union mines before the strike which began sixteen months ago have signed new contracts with the union, thus ending the long strike at these mines, which employ about half the total number of miners on Paint Creek. The contract includes the "check-off," under the terms of which every employee, whether willingly or unwillingly, is compelled to pay union dues. The other mines on Paint Creek will not concede the check-off. Thus the union does not extend its territory under the new contracts.

The settlement was made on a basis of 51 cents a ton for pick mining splint coal, which is 4 cents a ton less than the scale in effect when the strike began, and 29 cents for machine mining splint coal, a reduction of 2½ cents a ton from the rate paid at the time the strike began.

As a pick miner averages about 250 tons a month this means that the men, after 16 months of idleness and turmoil, have been compelled by the officers of the union to lose an average of $10 a month or $120 a year in wages in order that the organization may be enriched to the tune of $1 per head fortnight in dues through the check-off.

Or, to put the same thing in other words, the officers of the union have shown by this action that the organization is really interested in the miner only as a source of revenue for its own coffers. Adding the $24 a year in dues to the reduction in wages makes an average of $144 a year that the miners will lose through their long strike.

Why is Anthracite High Priced?

Investigation of the anthracite coal companies to ascertain the causes of high prices and prospective government ownership of mines is provided for in a resolution that will be introduced in the House next week by Representative Murray of Massachusetts.

The resolution will declare that the prices of anthracite coal are advanced at will by the operators and that exactions amounting to millions of dollars annually are now enforced from the public. It will set forth that an arbitrary increase of from 60 to 70 cents a ton has been made in the prices of coal in Boston within the last few weeks and that the price is now excessive.

It will further declare that these increases have not been due to advances in wages, as the operators have declared, but that they represent increased profits to the operators solely.

Mr. Murray will ask that the investigation be made by the department of commerce, but the house itself is to consider the question of government ownership.

Japan Supplies Army Coal

A Jananese firm, Mitsui Bussan Kaisha, has been awarded a contract for 80,000 tons of coal to be supplied to the army of the Philippines during the fiscal year which began July 1. The contract is said to be the largest ever awarded by the army in the Philippines, being 20,000 tons in excess of the amount ordered for any previous year. The price at which the contract was accepted included delivery of the coal at Manila Bay and amounted to $6.20 a ton for 20,000 tons of washed nut coal or lump coal, and $5.85 a ton for 60,000 tons of best cleaned lump coal. Two other bids were made, one being $7.70 a ton for Australian coal and the other $6.45 a ton for Chinese coal.

HARRISBURG, PENN.

The State Railroad Commission has held its last hearing for it is expected that Governor Tener will name the Public Utilities Commission next week, which will take over the rairoad commission. The Commission had about a score of complaints before it and most of these were turned over to the prospective commission to investigate.

The Public Utilities Commission will also take over the Bureau of Railroads, now connected with the Department of Internal Affairs, and the Bureau of Statistics which has been connected with this department, will be taken over by the new Department of Labor and Industry.

More Petty Strikes

The absence of union buttons from the overalls of four hundred employees of the Jermyn Nos. 1 and 2 mines, at Scranton, of Jermyn & Co., led to a strike on Thursday of two thousand men. The miners refused to enter the mines until the four hundred delinquents and nonunionists ornamented themselves with emblems showing their status in the union. District officials of the U. M. W. of A. are trying to straighten out the tangle.

"Button strikes" have also been called at West Nanticoke and the Baltimore No. 5 Colliery of the Delaware & Hudson Co., in Wilkes-Barre, the men refusing to work with miners who are not in good standing with the union.

In the Hazleton region trouble broke out at Jeddo No. 5 Colliery of the G. B. Markle Co., due to the company's refusal to pay a certain class of outside labor $1.50 a day, and raise the wages of patchers from $1.41 to $1.50, it is feared that this trouble will cause a general strike throughout this company's collieries. A strike has also been called at the colliery of the Brookwood Coal Co. in this region, the miners want 99c. for a car of coal and 50c. for rock; they now receive 90c. for coal and 25c. for rock, these prices prevail in skipping pillars. As a counter proposition the company agrees to pay the miners $2.47 and laborers $2.13. In other words the company demands that the men work on a consideration basis, eight hours to constitute a day's work. All coal mined in that time belongs to the company and will not allow of extra compensation. The men are determined to fight out this issue, and it is feared that the pump runners and engineers will be called out.

The week beginning July 21, a convention will be held at Wilkes-Barre, of District No. 1, at which time the miners will try to devise some plan that will make "button strikes" unnecessary, which will probably take up the greater part of the time of the convention period. In all probability it will pass a rule that buttons be issued monthly for dues and not quarterly as is the present case.

PENNSYLVANIA

Anthracite

Scranton—Another public-school building in Scranton has been seriously damaged as a result of a mine cave. While there is no danger of an immediate collapse of the building, steps will have to be taken immediately to check any further settling of the ground.

Wilkes-Barre—In an opinion handed down by Judge Fuller refusing a new trial in the suit of Shiffer and others against the Hudson Coal Co., it is stated as regards excesive coal royalty:

> The suggestion of hardship in being compelled to pay for more coal than can be mined, has been urged and ignored in all cases. In the present case the net hardship merely consists in paying, exclusive of interest, about $50,000 for about 100,000 tons of coal, making an average royalty of about 50c. per ton which is not inordinate in view of the profits derived from the business.

Carbondale—Charles Enzian, of the United States Bureau of Mines; E. R. Pettebone, chief engineer for the D. & H. Co.; James E. Roderick, Chief of the State Department of Mines, and several other engineers have been at Carbondale endeavoring to determine the best means of extinguishing the mine fire which has been raging there for several years. It covers an area of 60 acres and is located in the surface vein. The state recently made an appropriation of $150,000 with which to extinguish the fire.

Pottsville—The coal companies of this region, on Friday, July 18, issued orders prohibiting all "beer picnics" on their grounds.

Coal tracts of these companies which extend over the mountain ranges in this region have been the scene of hundreds of "booze picnics" the last few months, particularly on Sundays, and the companies have decided to end the orgies by notifying the coal and iron police to arrest all trespassers upon their property.

The large coal companies have taken part in the movement which is not much of a surprise as they have for years prosecuted speakeasies, and the Reading company has vigorously prohibited beer drinking in all its parks. Patrons who do not indulge in intoxicants will not be molested in their recreations.

Bituminous

The Pittsburgh Coal Co. has taken up the use of gas-proof under-cutting machines, eight of these machines being now in use. Two have been placed in the mine at Manown, two in Sunnyside, and four in the Galatin mine. It is said the coal company will adopt this style of machine for work in all of its mines, as the gas-proof feature promises to settle to a great extent the differences now existing between the men and the management on the use of safety lamps and electric machines in the same mines.

Pittsburgh—With the rise of water in the Ohio River 59 barges of coal were started for Louisville, Ky., by the Monongahela River Consolidated Coal & Coke Co. With the continued high stage of water a good deal of coal will be shipped down the river.

George C. Theiff, former president of the Monongahela River Consolidated Coal & Coke Co., and Rufus Crawford, have purchased 900 acres of Washington County land at a price said to be $800 an acre.

Latrobe—The West End Co. is seeking new power consumers in the Latrobe and Ligonier districts and within the past few weeks have contracted for the delivery of approximately 4500 hp. This is all new business and is said to represent a revenue of $90,000 a year. The West End extension into the Ligonier valley is bringing results in the way of power contracts.

Monongahela—An order is being promulgated by the Monongahela River Consolidated Coal & Coke Co., that no boys under 16 years should be employed at their docks and marine ways. This order was the result of the accidental drowning of two boys while at work at Brown's Station and is said to have been the suggestion of the factory-inspection department.

Indiana—Four men were instantly killed and two others badly injured when a mine-drainage shaft caved in at Ernest. The men were sinking a new shaft on the land of the Jefferson and Clearfield Coal & Iron companies at Ernest, which was to be used to drain the water from other mines.

WEST VIRGINIA

Charleston—It is stated that the strike upon the Paint Creek has been settled again by an agreement signed between W. L. Connell, of Scranton, president of the Paint Creek Colliery Co., and John P. White, president of the United Mine Workers of America, in which the miners win many of the demands for which they were contending, among them being the check-off and recognition of the union.

A special grand jury has been convened by Judge Henry K. Black, of the Kanawha County Intermediate Court, in order to make an inquiry into the riotous conditions that have prevailed in the Paint and Cabin Creek coal field for over a year.

KENTUCKY

Louisville—F. Pigent, of Paris, France, who was passing through Louisville on his way from New Orleans to Central City, Ky., where he has mining interests, became ill a few days ago, and was taken from the Louisville & Nashville train to a local hospital. An examination desclosed the fact that he was suffering from an abdominal trouble, and an operation will be necessary. It will probably be some time before the French mining magnate can proceed on his trip to the Central City district.

Earlington—The St. Bernard Mining Co. has just completed, at Earlington, Ky., the coal washer for its mines there, which has been in course of construction for more than a year. The foundations of the washing plant were laid in 1912, and the concrete reservoir which supplies it with water was constructed during the winter. The principal feature of the plant is a belt conveyor 162 feet long, which will cary the coal from the railroad tracks, about forty feet below the washer, into the plant proper, on an incline of about 30 deg. The plant has a capacity of 800 tons a day.

Hazard—The Hazard Light & Power Co., of Hazard, Ky., which recently completed a plant designed to furnish light and power to the town, including the numerous coal mining plants which have been opened up in that vicinity during the past few months, is about ready to furnish current to all customers. The work of making connections is proceeding, and the town will soon be well lighted. The company also manufactures ice, a luxury which is much appreciated by the citizens.

Frankfort—The Elkhorn and Beaver Valley Railway Co., of Boyd county, Ky., which is building a line connecting with the Chesapeake & Ohio, in Eastern Kentucky, has filed amended articles of incorporation at Frankfort, Ky., increasing its capital stock from $270,000 to $400,000. The articles were signed by George W. Stevens, president of the company, who is also president of the Chesapeake & Ohio Railroad Company. The road, when completed, will give an outlet for large properties, which are rich in both coal and lumber.

OHIO

After Sept. 1, 1913, the Ohio Mine Inspectors Department will have ceased to exist as a separate branch of the state government. By a new law passed last winter a number of departments having to do with mines, workshops and factories, engines, fire risks, labor arbitration and the like, are to be grouped under an authority known as the Ohio Industrial Commission. Greater economy and a more thorough coöperation for the public good along industrial lines are expected from this centralization of responsibility. As matters now stand, some of the departments overlap and in a measure conflict with each other. The commission consists of three members. While no authoritative announcement has been made it is expected that Chief Mine Inspector J. C. Davies and his corps of district inspectors will be retained with the new body. It is not the design of the law to cripple the efficiency. The office of chief inspector of mines was created in 1874 with Andrew Roy as incumbent.

Cincinnati—Application has been made to the Superior Court here for receivers for the Marmet Coal Co., a million-dollar corporation, whose coal lands are located mostly in West Virginia and Pennsylvania. The request was granted and Edwin Marmet, president of the company, and Charles W. Poysell, general manager, were named by the court as receivers upon furnishing a bond of $50,000.

INDIANA

Indianapolis—Word comes to operators in this city that a vein of coal 5 ft. thick was pierced by well drillers at 300 ft., near Newman, Ill., the first discovery of the kind indicating paying quantities.

Twenty-six general organizers of the U. M. W. of A. were at headquarters in this city this week, discussing the strike situations, particularly that in Virginia.

ILLINOIS

Pana—Judge McBride, of the Christian Circuit Court, has appointed Francis R. Roberts, of Chicago, and J. M. Taylor, of Taylorville, Ill., receivers for the Pana Coal Co., a $500,000 corporation, upon petition of the Continental and Commercial Trust and Savings Bank of Chicago, trustees. It is asserted that the Pana Coal Co. defaulted in the payment of the first installment of the bonds.

Chicago—A. R. MacKlay, special examiner for the Interstate Commerce Commission, has been taking testimony concerning the freight rates on hard- and soft-coal shipment between Chicago, Proviso and Elmhurst, which are the subjects of a complaint filed by the Hammerschmidt & Franzen Co.

New regulations for the distribution of coal cars have been issued by the Baltimore & Ohio R.R., to become effective Aug. 1. During extended periods of full car supply, mines will be given cars up to order, provided such cars are loaded and consigned promptly. Mine ratings will be based upon the month showing the highest average daily shipment of the total output of the operators during the preceding 12 months. Cars will be pro-rated on a tonnage basis with a 50-ton car as a unit. A record of car distribution of all mines on the Baltimore & Ohio lines will be kept in the office of the Superintendent, and the record will be open to inspection of authorized representatives of mine operators.

ARKANSAS

Harrison—Judge F. A. Youmans has appointed Hiram Butterfield a special master in chancery for several thousand acres of land in Marion County, together with mining machinery located on the property, in order to satisfy a judgment of $65,000 in favor of the Rhode Island Hospital Trust Co., of Portland, Me., which holds bonds of the White River Lumber & Mineral Co.

Little Rock—Tom Shaw, State Mine Inspector, has reported to J. C. Clary, State Commissioner of Labor, that he has been compelled to close down a mine at Bonanza and another at Jenny Lind, because of inadequate water supply, and the lack of precautionary measures against accidents.

OKLAHOMA

McCurtain—The McCurtain Mine Relief Committee having in charge the collection and distribution of funds to those rendered dependent by the explosion in mine No. 2 of the Sans Bois Coal Co., at McCurtain, Okla., on Mar. 20, have made public their report. It shows that a total of $55,177.63 was collected for the victims of which the Carnegie Hero Fund donated $15,000, the largest single subscription. The average amount paid to each dependent family was $923.89; the average amount paid to each dependent person was $286.40, and the average amount paid each injured person was $226.80.

KANSAS

Leavenworth—The north shaft of the Home-Riverside Coal Mining Co., the first mine to be sunk in Kansas, is to be closed permanently according to an order made by Judge Wendorfs of the District Court, who granted an application of the receivers to close the old shaft.

This shaft was sunk more than fifty years ago by the Leavenworth Coal Mining Co. Recently a fire in the mule barn made it impossible to work the shaft because of the danger to the miners. It is about 750 ft. deep.

COLORADO

Colorado Springs—The officials of the Curtis-Rapsen Coal Co. have abandoned the shaft of the Curtis mine, five miles north of Colorado Springs. It has been impossible to extinguish a fire which has been raging in the different levels of this mine.

MONTANA

Butte—The recent order of the Interstate Commerce Commission reducing coal rates between Sheridan, Wyoming, and adjacent points, and points in North Dakota, Washington, Idaho and Montana has aroused considerable opposition among the coal-mining interests of Carbon County, Montana. Evidence has been presented to Federal Commissioner Esch, of the Interstate Commerce Commission, tending to show that if the order is enforced, five of the principal coal mines of Carbon County will be forced to suspend operations, with the result that 1000 miners will be thrown out of employment. It is stated in the complaint that the cost of producing coal in Montana is one dollar per ton higher than in Wyoming because of labor conditions, and that under the new ruling the mines in this state would be unable to compete with those in Wyoming, due to the fact that coal producers in the latter state would be able to ship coal into Montana competitive territory at a rate of 10c. per ton lower than the local rates.

WYOMING

Cheyenne—Federal Judge J. A. Riner has dismissed eight or nine cases, charging G. J. Quealey, a wealthy operator of Kemmerer, Wyo., with fraudulent acquisition of coal land.

FOREIGN NEWS

Paris, France—The French government has selected the port of Papeiti, one of the Society Islands in the South Pacific Ocean, as a suitable port to serve as a French coaling station in view of the opening of the Panama Canal. This port was the selection of both the private and official commissions which have been investigating the subject.

Washington, D. C.—A prominent importer, who supplies the railroad and navy of European countries with coal and the general trade with grain, wishes to establish a permanent connection with American exporters of these articles. Coal briquettes are especially desired, but they must stand a chemical test in competition with the products of other countries. Prices should be quoted at port of destination.

Bremen, Germany—The total number of tons of coal exported from Germany during the first five months of this year amounted to 13,687,651 tons, an increase of 654,804 tons compared with the coresponding period of last year. Germany's best foreign customer is Austria Hungary, which took 4½ million tons of coal. The coal strike in Belgium was particularly advantageous to the German exporters as 150,000 more tons of coal were exported during that period.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines. The Analysis of Black Powder and Dynamite. By Walter O. Snelling and C. G. Storm. Bulletin 51; 78 pages, 6x9 in.; with numerous halftones, figures, curves and tables.

Department of the Interior, Bureau of Mines. Heavy Oil as Fuel for Internal Combustion Engines. By Irving C. Allen. Technical paper, 37; Petroleum technology, 5; 36 pages, 6x9 in., without illustrations. This paper is issued in response to the many inquiries regarding the supply of heavy oils and their use as fuel for steam raising and in internal-combustion engines.

PERSONALS

T. K. Webster, for many years president of the Webster Mfg. Co., has severed his connections with this company, and F. S. Shaw has been elected president in his place. The officers of the company at present are: F. S. Shaw, president; A. T. Perkins, vice-president and general manager; Alex. Kiskadden, vice-pres.; Charles S. Clarke, treasurer; L. H. Webster, secretary.

William Clifford, well known to mining men, has sold his mine-fan manufacturing plant at Jeanette, Penn., where he has been manufacturing the Clifford fan for a number of years. The reason given is that Mr. Clifford desires to retire to a less active life. It is stated that he intends to make a visit to England at the end of the month, returning in the autumn. He will retain his home in the park adjacent to the plant works, and will continue to pursue the scientific studies in which he has been engaged.

Governor Tener has announced the reappointment of John Birkinbine, of Cynwyd, Montgomery County, as a member of the State Water Commission, Mr. Birkinbine is the only member of the original commission named by Governor Pennypacker in 1905. He is one of the best known scientists of the country and an authority on hydraulic engineering. He has been president of the Franklin Institute, American Institute of Mining Engineers, the Engineers' Club of Philadelphia, and the State Forestry Commission, and is a member of many leading learned societies, in addition to being author of a number of notable works. He has been identified with many famous engineering enterprises.

OBITUARY

George Harrison, former state mine inspector, died recently at the home of his daughter at Caldwell, Noble County, Ohio, after an illness of nearly a year. He was attacked by paralysis last fall, and never recovered. He served as mine inspector during the Herrick, Pattison and Harris administrations, and during all but about six months of the Harmon administration. He succeeded in securing the enactment of a new mining code of laws. The office force of the Ohio State Mine Inspector attended the funeral.

CONSTRUCTION NEWS

Wheeling, W. Va.—Work was begun this week on the steel tipple of No. 6 coal mine of the Rail & River Coal Co.

Washington, Penn.—The Pittsburgh Coal Co. is now opening two new mines in Mt. Pleasant and Cecil townships in Washington Co. on lands which were at one time owned by George Washington, the first president of the United States. A force of men is at work at each opening, and it is expected that the work will be pushed so as to be completed by the time that the new railroad, which is being built reaches the mine.

Chicago, Ill.—The Forester Coal & Coke Co., of Duquoin, Ill., whose tipple was destroyed by fire on July 1, have just placed their order with the Roberts and Schaefer Company, Chicago, for a steel tipple which, it is claimed, will be the most modern and best equipped tipple in the State of Illinois. The equipment will include a Marcus patent picking table screen. No money will be spared to make the entire plant the very best that can be built, not only in regard to being fireproof and durable but also in the matter of preparing coal.

Cramer, Penn.—The Northwestern Mining and Exchange Co., one of the Erie subsidiaries, has announced that work will be commenced on the construction of two immense shafts at Cramer, Jefferson County. The shafts, according to specifications, will be the largest in this part of the Bituminous district. One will be 300 feet deep and the other 310 feet deep. The work of sinking these shafts will commence about the first of August. This will mean the building of a mining town at Cramer, which is now but a cross-roads.

NEW INCORPORATIONS

Kansas City, Mo.—The Grey-Bryan Coal Co. has increased its capital from $10,000 to $30,000.

Aurora, Ind.—The Pittsburgh Coal Co. of Aurora has increased its capital stock to $12,500.

Frankfort, Ky.—Joseph Walton & Co., of Louisville, have changed their name to the Pittsburgh Coal Co.

Chicago, Ill.—Bell Coal & Fuel Co. has been incorporated by Louis Metcoff, A. L. Greenberg and Eli Metcoff, with a capital of $5000.

Frankfort, Ky.—The Sturgeon Creek Coal Co., of Idomay, has been incorporated with a capital of $1000. The incorporators are H. G. Parrish, Walter Gourley, T. McGuire and D. W. Gourley.

Wheeling, W. Va.—The Wheeling Monroe Coal Co., of Wheeling, W. Va., has been incorporated with a capital stock of $25,000 in order to develop coal properties in Monroe County, W. Va.

Johnstown, Penn.—The Park Hill Coal Co. has been incorporated with a capital of $50,000. The incorporators are Harry Davis, of Conemaugh; T. J. Pearce, of Portage; E. T. Neelis, of Johnstown.

Chicago, Ill.—The Alkali Mine Co. of Chicago has been incorporated for $75,000. It is expected to mine and deal in mine products. The incorporators are John F. Hummer, J. Paul Dunne and Richard Klein.

Nashville, Tenn.—The Highland Coal & Lumber Co., of Davidson County, has been incorporated with a capital stock of $25,000. The incorporators are W. V. Davidson, M. F. Greene, Lucien Clark, M. M. Davidson and H. M. Greene.

Oklahoma City, Okla.—The Pomeroy Coal Mining Co., of McAllister, has been incorporated with a capital stock of $12,500. The incorporators are G. A. Miller, Ernest W. Schreiner, of McAllister, and Jacob Schreiner, of Oklahoma City.

North Lima, Ohio—The North Lima Coal Co., of North Lima, Ohio, has been incorporated with a capital stock of $10,000 to mine and deal in coal. The incorporators are: James Aspenwall, Hector Buxin, Thomas Murphy, Paul Koachway and Lucien Affrance.

Bentleyville, Penn.—Articles of incorporation have been taken out in Delaware by the Strange Creek Coal & Coke Co., of Bentleyville, Penn., to acquire coal and coke lands. The incorporators are James Stevenson, J. G. Richellson, of Bentleyville, and Charles R. Trew, of Charleroi, Penn. The capital stock is $200,000.

Springfield, Ill.—The Schniewind Coke Oven Co., of Hartford, Conn., has been granted a license to operate in Illinois. The capital stock is $500,000 and the incorporators are Vice-President Louis Wilputte, of New York, secretary, Robert C. Metcalfe, of Newark, N. J., and William H. Childs, of Brooklyn, N. Y. The principal place of business in Illinois is the Coal Products Co., at Joliet.

INDUSTRIAL NEWS

Johnstown, Penn.—Wm. Schaffer, of Somerset, has purchased the surface and the top vein of coal of the Harrison Lohr farm in Shade township, Somerset County.

Independence, Kan.—Attorney A. M. Parsons, formerly of Caney, now of Okmulgee, Okla., secured a lease on the Foreman farm, near Caney, and will immediately form a company to drill for coal.

Johnstown, Penn.—John Lochrie will within a few days begin work on the opening of a new mine over the hill from his present plant near Scalp Level, where he owns the coal under 200 acres.

Greensburg, Penn.—A coal deal is now on which will take up all the land on the north side of Crooked Creek, at Chambersville, Indiana County, which is one of the few tracts remaining unsold.

Waynesburg, Penn.—Georgia E. Rice and T. Riley Huffman, of Waynesburg, have closed a deal in which they sold 1000 acres of coal land in Belmont County, Ohio, to A. J. Pasie, of Pittsburgh. The consideration is $62,500.

Pottsville, Penn.—This township will profit by the new coal operation of the P. & R. C. & I. Co. at Mt. Laffee, where the immense coal strippings will lay bare the mammoth and other veins.

Winchester, Ky.—Slemp Coal Co. has sold to the Henry Coal & Coke Co., of Hazard, 2802 acres of coal lands, of which 641 acres is in fee and the remainder in mineral rights. The company will at once proceed to develop the property.

Myersdale, Penn.—The Keystone Coal Co. has moved a diamond drill to the Alex. Speicher farm, part of the Wilehlm tract in Elk Lick township to prospect for a seam of big vein coal supposed to underlie a portion of that farm.

Carbon Hills, Ohio—Three thousand coal miners, members of the United Mine Workers of America, marched to the Hawthorne & Floodwood Mines at Forest Junction in Essex County on July 18 and removed 100 nonunion miners from their work.

Fairmont, W. Va.—The Syndicate headed by the Fidelity Trust Co., of Baltimore, have disposed of more than $3,000,000 of the issue of $4,000,000 Elkhorn Co.'s 5% collateral mortgage bonds. It is expected that the rest of the bonds will be sold in a short time.

Ashland, Penn.—Gilberton colliery, an operation of the Philadelphia & Reading Coal & Iron Co., has suspended operations for four months, during which time a new breaker is to take the place of the present dilapidated structure. The colliery employs 500 men and boys.

Indiana, Penn.—Manor Real Estate & Trust Co., of Philadelphia, on Wednesday, completed the purchase of 434 acres of coal land in Green and Cherryhill townships, through their Indiana agents, Benj. J. W. Carskaddon and E. E. Davis, whose offices are in the Marshall Building.

Birmingham, Ala.—The Maryland Coal Co., which has recently opened the new mines in the Sipsey Coal fields expects to begin shipping coal by August 1. Recently the 'Frisco Railroad extended its branch line from Empire to the mine at an expense of more than $200,000.

Heber Springs, Ark.—D. M. McGraw, of Altus, superintendent of the Western Coal & Mineral Co., at Dennins, is here taking options on 10,000 acres of upland along the Missouri & North Arkansas R.R. Coal has been discovered there and this corporation is securing options with a view of prospecting.

Albany, N. Y.—Petroleum and natural gas are the only fuels that are mined in the state of New York. The value of these which was obtained in the year of 1912 was $3,220.67. There was a gain in the output of gas, which in volume amounted to 6,564,659 cu.ft., while the oil industry experienced a decline.

Somerset, Penn.—The initial first-aid meeting in Somerset County was held on July 16 on the baseball grounds. It was under the auspices of the Bituminous Committee of the State Y. M. C. A., and T. D. Dilts, of Greensburg, was in charge. Nine teams entered into the competition for the cup, medals and prizes which were awarded.

Pittsburgh, Penn.—An order has been granted by the United States District Court authorizing the payment of the wages of the miners of the Jenner-Quemahoning Coal Co. on July 26. The latter concern is a subsidiary company of the United Coal Co., which has been in the hands of a receiver for some time. The total amount of wages to be paid is $23,589.92.

Washington, D. C.—The first coal mine opened in the United States is about to resume operation. It was abandoned about one hundred years ago, and is situated in the Richmond Basin, Henrico County, Va. It was first opened in 1700 and continued working for 100 years, when it was believed that its coal had become exhausted. Recent explorations find a considerable amount of coal there, and work will soon begin.

Harrisburg, Penn.—The State Department of Mines is preparing to make a thorough investigation of the manner of drilling gas and oil wells through coal measures, in order to prepare laws for submission to the legislature of 1915, regulating such work. The inquiry will be of great importance to the Pittsburgh district, and probably will lead to devising of measures which will settle disputes of long standing.

Columbus, Ohio—The committee named by each side and approved by the commission which is investigating the systems of weighing coal for the purpose of determining miners' wages in Ohio, are as follows: Miners: C. W. Savage, Columbus; William Roy, Klee; Percy Tetlow, Washingtonville; Lee Hall, Cambridge; William Greene, Coshocton; John Moore, Columbus. Operators: E. A. Cole, Columbus; W. H. Haskins, Coshoctom; J. H. Pritchard, Columbus; D. J. Jorden, Cleveland. These committees will be present at all sessions of the commission.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite quiet but steady. High prices still ruling on soft coal. Heavy shipments to the Northwest causing a shortage in the East. Resumption of mining in West Virginia is not relieving the pressure for coal. Labor shortage growing worse.

The domestic grades of hard coal are moving off in good shape under the restricted production now in effect. There has been a fair demand for a July delivery and some improvement is noticeable. However large percentages of the steam grades are going into storage and individual operators are making some concession on the regular company circular. There is a great deal of uncertainty over the new Pennsylvania state tax on anthracite.

Some new record prices for bituminous have been paid in New England for small tonnages required to fill out cargoes; such prices cannot, however, be considered the market although it shows what a strong position the sellers hold. Operators continue adhering strictly to their policy of not quoting for future delivery and there does not appear to be any weak spot in the trade that can possibly lead to a slump. The heavy demand in the West and Northwest has more than made up for any unsteadiness as a result of the resumption of work in the West Virginia field. As a matter of fact West Virginia operators are pressed for any kind of coal while the Pennsylvania companies are entirely sold up on everything but the very lowest grades. The latter operators have had practically a full car supply, due to the slack anthracite trade, much of the hard-coal equipment being diverted into the bituminous service.

Mining in the Pittsburgh district continues at maximum capacity. Dealers agree that the business has never been so good at this season, and it is now impossible to contract at the prevailing circular. There is little new buying but the demand on contract is more than sufficient to cover the production. The settlement of the West Virginia labor trouble has not had any apparent effect upon the local situation. At some of the adjoining points conditions are so hard that considerable uneasiness is felt. Nobody has sufficient coal and even producers are being forced to buy in order to fill out their contracts.

There is a tendency to increase prices in Ohio; one of the best features of the trade there is the heavy domstic demand but manufacturers are also taking a large tonnage. There has been a heavy movement from the mines into the Hampton Roads market but there is still a shortage and prompt tonnages command a ready premium. There are no unusual surpluses in the Southern market and the trade is apparently capable of absorbing the full production; it is anticipated that this district will see one of the most severe car shortages in its history if there is no improvement.

There is an upward tendency in prices on nearly all grades in the Middle Western markets. The inadequate labor supply is making it difficult to handle the coal at destination and the car shortage is becoming steadily worse; indications are that the situation in this latter respect will be acute this fall. No change has occurred on the Eastern coals in this market, as a result of the settlement of the West Virginia labor controversy.

BOSTON, MASS.

Producers are well supplied with orders and prices continue hard, particularly for prompt delivery. Uncertainty making it difficult to buy for future delivery. Pennsylvania operators benefiting by the release of cars in the anthracite service. Hard coal picking up.

Bituminous—Prices on Pocahontas and New River continue firm, especially for spot shipment. Detention still prevails at the loading piers but another week will probably see tonnage being cared for in better fashion. Some of the shippers have been obliged to go into the market for small amounts to help load steamers and as high as $3.15 has been paid this week for purchases of that kind. All the agencies are well supplied with orders, in fact too well supplied for July and August, and there is small chance of quotations being any easier at least for weeks to come.

The Georges Creek situation does not vary much from that at Hampton Roads. While steamers and vessels have been loading at Baltimore in shorter time yet there is not much improvement from a week ago. The volume of business on this grade is large and the shippers are expected to have difficulty in meeting the market requirements

In Pennsylvania there is an increasing disposition not to close further business for deferred delivery. Operators are willing to sell at the market their current output but they lose interest when prices are asked for September and October. A slight spurt in the New England demand for Pennsylvania coals is occasioned by the release of certain anthracite transportation to freight soft coal, while the hard coal trade is temporarily dull. Quite a tonnage has been placed in this way lately to replace the shipments of Southern coals that would normally come to this market in July.

Anthracite—While slack early in the month, there is now a good demand for hard coal for shipment on July prices. Stocks are large, but as fast as room is made the dealers are asking for further shipments. Such cargoes, however, are pretty well assorted and the pinch over stove size is not being felt for the present.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.45	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.35@2.70	2.60@2.90	2.92@3.02	
New York*	2.65@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.15
Providence†				3.88@4.00
Boston†				4.00@4.10

*F.o.b. †On cars.

NEW YORK

New York quotations on soft coal experienced a further advance. Still inquiries for contracts. Shortage due to heavy shipments of West Virginia coal into the Northwest. Anthracite dull and quiet.

Bituminous—The local soft-coal market is, if anything, in a stronger position than last week. The shortage is becoming so pronounced that competing companies are endeavoring to place orders with each other. There has also been more than the usual number of inquiries for contracts during the past week.

One of the principal causes for the hard local situation is due to the fact that shipments from West Virginia are light, most of this coal being diverted into the North and Northwestern markets. Another important influence is the short supply of labor. Mines generally are attempting to make the highest possible production they can, but the shortage of miners is proving a serious handicap. One large Pennsylvania company reports a shortage of fully 30 per cent. The New York market has strengthened to such an extent during the week, that it is necessary to advance quotations for the first time in several months, the trade now being hard and firm on the following basis:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—The hard-coal market is quiet and dull, and production at the mines was further reduced during the week. Stove coal is the only grade in any demand at all, while pea and buckwheat are being stored in considerable tonnages, although not so much as was the case before the production was curtailed.

The car supply is excellent; in fact, there is such a surplus of equipment, that some is being diverted into the bituminous trade, much to the benefit of the Pennsylvania shippers into the New England market. Labor is in fair supply and fully up to requirements. We continue quoting the New York market on the following basis:

		Individual		
	Circular	Lehigh	Scranton	Schuylkill
Broken	$4.80	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.05	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.05	4.90	4.95	4.90 .....
Chestnut	5.25	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.70

PITTSBURGH, PENN.

Mining up to maximum capacity with movement mostly on contract. Coke buyers refuse absolutely to meet the $2.50 price of the producers and the situation is tense. Both sides are holding out firmly and furnaces are being forced to bank or buy soft coke at relatively high prices.

Bituminous—Mining operations continue at practically their maximum; there is little new buying but the production is well absorbed by contract requirements. Slack continues in active demand, so that the concessions from the regular figure usually so frequent at this time of year are now almost absent. Car and labor supply are fairly good. The Pittsburgh district is not particularly disturbed over what appears to be the final settlement in the West Virginia labor difficulties, although it has been held that a considerable part of the prosperity in this district has been due to the curtailed output in West Virginia. We continue to quote prices as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The market has been almost stagnant the past week, as refers to actual transactions, but the market position has been highly interesting, a tense situation being presented by the absolute refusal of several furnaces to pay the $2.50 price demanded by operators. Such furnaces are looking for coke, and have purchased several lots of soft coke, at relatively high prices. As already reported, there have been several bankings of furnaces and it is believed that others will do likewise rather than pay the $2.50 price. There is not a sign of weakening in the position of operators, there being little coke to be found for prompt shipment at the figure, and none offered at a lower price. It is doubtful whether there will be much movement in the market until the question of August requirements comes up. This will open up the case with respect to the furnaces which paid $2.50 to secure a July supply. We quote: Prompt furnace, $2.50@2.60; contract furnace, $2.50; prompt foundry, $2.85@3; contract foundry, $2.85@3, per ton at ovens.

There has apparently been sufficient restriction of output to meet the situation presented by slightly decreased pig-iron production, and by the abstention of several operating furnaces from taking their normal tonnages. The "Courier" reports production in the week ending July 12 at 390,470 tons, an increase of 57,000 tons over the preceding week, but 18,000 tons less than the average in June, and shipments at 11,274 cars, an increase of 1609 cars, the shipments carrying 388,876 tons, an increase of 56,248 tons.

PHILADELPHIA, PENN.

Some price cutting by individual hard coal operators. Steam sizes in long supply but domestic grades are moving off well under the restricted production. Uncertainty over the new state tax continues. Bituminous remarkably strong.

Compared with the corresponding period last year, the anthracite coal business in this vicinity presents anything but a favorable outlook. The summer months always see a marked falling off in the demand for coal, and this year is no exception. It is understood, however, that with the curtailed production, the companies are moving off practically all of the domestic coals, some of course, going into stock; but the steam sizes still continue to be far in excess of the demand, and are added to the already large quantities of these grades in stock. Individual operators are reported as cutting prices anywhere from 15 to 25c. on the various sizes, the extent of the concession varying according to the demand at the time of the sale.

The Pennsylvania State tax still continues to be discussed. It has not as yet been decided by the dealers here in what way they will handle it. Some talk of an advance of 10c. per ton in the ruling price for egg, stove and chestnut sizes, and 5c. on pea, which is approximately the amount of the tax, but up to the present time, no decisive action has been taken. It is understood that some of the large companies contemplate increasing the price of the coal, rather than adding the tax to invoices as a separate item. It is also stated that one or more of the various interests may institute proceedings to test the legality of the new law. As yet, nothing seems certain, except that the consumer will ulimately pay the tax.

In every direction, one hears nothing but good of the bituminous industry. New contracts are being taken at considerable advances over quotations made six weeks or two months ago for the same business, and a postponement of purchases from one day to another, is likely to have the effect of an advance of anywhere from 10 to 15c. Buyers seem to realize this, and are accepting quotations for spot deliveries without any special canvassing of the market for better prices. The trade is in marked contrast with existing conditions for years past at this season of the year. It is really the only industry that can be said to indicate a prosperous condition, both as regards demand and prices, and operators generally do not look for a let down in the near future.

BALTIMORE, MD.

The heavy demand from the West and Northwest has more than taken up any slackness in the local situation. Better grades almost entirely out of the market. Consumers who failed to contract in the spring are now hard pressed.

This is the most active June in the history of the local coal trade. The heavy call from the West and Northwest has more than made up for any inclination to sag in the Eastern field as a whole. West Virginia operators are now pressed to get any decent kind of coal, while in Pennsylvania producers are sold up on all but the worst grades and are now busy filling their contracts.

The city board of awards has finally decided to allow the various departments to buy independently. Because of this ruling the Georges Creek Coal Co. withdrew its bid for the first installment of a bulk contract, or 40,000 tons.

There is already an advancing market in West Virginia. Slack remains low in price by reason of heavy screenings to supply the three-quarter demand at the lakes; otherwise the minimum is now $1.05. About the same condition exists for low-grade coals in Pennsylvania, while the better varieties are now hard at around $1.40. Interests which came in grudgingly during March and April at from $1.15 to $1.25 for the season are now congratulating themselves.

Anthracite business is not at all brisk, and there is the usual summer complaint from dealers. Some of the mines have notified agencies here of curtailment of production for a time, but there is sufficient coal of all grades to meet any demands.

TOLEDO, OHIO

Steam coals are in strong demand and coal dealers appear to be well sold up. Lake movement continues heavy and stronger than in previous seasons. Railroad movement good, but some congestion.

Domestic trade has been a little slow during the past week, due partly to the fact that all the farmers are busy with crops and partly because of the difficulty experienced in securing men to unload coal. Steam coal is in strong demand and locally, coal men are practically sold up on Pocahontas. The lake movement continues strong and boats are being loaded as fast as the equipment is able to take care of them. The lake movement is considerably stronger than it has been other seasons at this time.

The railroads throughout this section are in much better shape than they were a year ago when the congestion occured. There are some complaints at Detroit, which is short of yard space, a condition which cannot easily be remedied because all available space has been taken up. This greatly affects the Toledo traffic situation because it is depended upon to take care of the cars for which there is no yard space in Detroit. The congestion is not likely to be so bad as last year, however, as the railroads have been adding materially to their equipment and the Lake Shore improvements have added greatly to the trackage.

Prices quoted in Toledo are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.50	2.50	....	....
Nut	1.80	1.20	2.25	1.50	2.50	....	....
¾ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.50	1.10	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

BUFFALO, N. Y.

Impossible to contract at the prevailing circular. Situation so tight that considerable uneasines has developed. Many operators forced into the open market to fill out their contract obligations. Car shortage developing.

Bituminous dealers agree that they have never seen such conditions in their trade. While jobbers complain that they are much less in control than are the operators they are doing their share of business. Consumers are in no sort of control.

It is out of the question to get contracts, either from jobbers or operators at current prices. Some are asking an advance and other are refusing to consider them at all. It is risky for a jobber to make a contract at any price unless he has the coal assured. There are bituminous operators belonging to the Buffalo trade, out begging for coal to fill their contracts, as they have given up all expectation of producing coal required from their own mines.

Nobody is really well supplied and it is a long time since there has been any coal waiting on track for a buyer. Conditions are so hard that considerable uneasiness has developed. If it eases off gradually back to the normal there will be no trouble, but if there is a slump it will carry a lot of people with it. Many causes for the unusual situation are suggested, but, of course, it is either the actual consumption or the expected consumption that has brought it about. In the East, at least, there is no accumulation of coal in consumers' hands and there is no chance for it until conditions change. An increase in the car shortage is everywhere reported.

Quotations are therefore firm, with sizes still somewhat stronger than slack at $2 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack. Allegheny Valley prices are about 25c. lower than Pittsburgh. There is still much of the former refusal to pay asking prices for coke, which is quotabe at $4.85 for best Connellsville foundry.

The real activity in anthracite is in the lake trade. Locally the buyer who does not lay in his supply by June is going to wait until fall for it. The rail lines are fairly active, though it is reported that there are not many orders ahead. The trade is entirely of the hand-to-mouth order. The Pennsylvania tax controversy has spoiled most of the trade that existed last month.

The shipments by lake are the heaviest in the history of the trade, the only question being whether the upper-lake market is to be satisfied before the lakes close. For the week the shipments were 201,600 tons.

COLUMBUS, OHIO

Activity still characterizes the local coal trade. The demand for all grades remains good and prices are well maintained. No cutting of quotations is necessary to stimulate buying. The prospects for the future are good in every respect.

One of the best features of the trade is the good demand for domestic grades. Stocking on the part of consumers has started much earlier than usual and as a result retailers are placing large orders both for immediate and future deliveries; retail stocks are generally light although dealers are making every effort to increase them.

Lake trade is also one of the active departments of the market. The Northwest is still demanding a large tonnage and chartering of bottoms is going on for the remainder of the season. The tonnage on the docks of the upper lake ports is being moved steadily and there is no especial congestion reported. Dock prices remain the same at the level fixed earlier in the season. So far the Hocking Valley docks at Toledo have loaded 1,310,000 tons of coal since the opening of navigation. The steam business is also one of the steady features of the trade. Factories, especially those in iron and steel lines are taking a good supply of fuel. There is a tendency to increase the requirement of many factories and railroads are taking their usual supply.

The car supply in most of the Ohio mining districts has been good. In eastern Ohio it is estimated that the production has been almost normal and the same is true of the strictly domestic fields and the Hocking Valley district. In the Pomeroy Bend the output is estimated at 85 per cent. of normal.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.60		$1.60	$1.60
¾ inch	1.45	$1.20	1.40	1.40
Nut	1.25		1.35	
Mine-run	1.25	1.10	1.25	1.20
Nut, pea and slack	0.60		0.65	0.60
Coarse slack	0.50	0.70	0.55	0.50

HAMPTON ROADS, VA.

Heavy movement in from the mines, but there is still a shortage and prompt tonnages are commanding good figures.

Dumpings over the various piers during the past week have been good, but not as heavy as expected. There is still a shortage of coal although conditions are improving somewhat, and it is hoped that the heavy accumulated vessel tonnage will shortly be loaded and away; large shipments of coal are now coming in from the mines.

Such suppliers as had any free coal during the week have been asking from $2.90 to $3 a ton, but it is not believed that any sales were made at over $2.95. Any sales made during the week have been for immediate movement where vessels were in port and it was imperative that they be gotten out quickly. Foreign shipments have been about normal and coal has moved to Havana , Panama, Para, Manos, Rio de Janeiro and one or two other South American ports.

LOUISVILLE, KY.

Demand from the Northwest sufficient alone to keep the trade steady. Large tonnages being stocked for the winter trade. New equipment on the L. & N. R.R.

With the near approach of fall, the market is naturally becoming stronger. The heavy movement into the North and Northwest continues unabated and is of sufficient volume to keep the local market steady in itself. Both the steam and domestic grades are strong.

In the western Kentucky field the market is growing steadily firmer and there appears to be a shortage developing on pea and slack. Some sales are reported at 60 to 65c. with rumors of even higher figures. This situation will probably be relieved, however, when the movement of domestic sizes bcomes more regular.

The Louisville & Nashville R.R. is introducing some large hopper bottom equipment, that is causing considerable trouble in the trade; unloading is greatly delayed and cost of same materially higher. It is stated that the company anticipates replacing all their old equipment with this new type so that dealers would do well to prepare for it.

BIRMINGHAM, ALA.

No unusual surpluses and the trade is readily absorbing the full production. Car shortage becoming steadily worse and promises to be more acute this fall than for years.

There has been no change worthy of mention in the local coal market. At present prices the trade seems to absorb all coal offered. Reports from various ports supplied by Alabama coal indicate that there is no unusual surplus on hand at these points; in fact, the amount of coal on car service is reported to be at a minimum. It is believed that labor troubles of a serious nature, which have threatened from time to time, have blown over and that all uneasiness of delay from this source during the summer has disappeared.

There is still a serious car shortage on several roads with no hope in sight for improvement. Unless the unexpected happens in this line, those in closest touch with the coal situation say that before the close of the coming winter there will be one of the worst car shortages ever experienced by this district.

The coke market is apparently unchanged, but it would not be surprising should the furnace-coke situation show weakness at any time.

INDIANAPOLIS

Recent advance in quotations has stimulated buying, consumers seeking to cover before another rise occurs. Strike settlement West Virginia does not appear to be affecting the local situation.

Local dealers are wondering what effect the reported settlement of the strike in Virginia will have on coal prices, if any. They gave that as the reason for the 50c. advance in prices here the first of the month and their customers are asking if the 50c. will be taken off again, now that the miners have agreed to go back to work. They are also wondering if they will be able to get Virginia coals any easier and in any larger quantity. The opinion seems to be that there is small likelihood of a reduction. The retail trade is good for July. The advance in prices has stimulated consumers of the domestic grades to lay in supplies before another raise occurs. Wholesalers say that while the usual July quietness prevails with them, the number of inquiries grows and indicates a considerable stir in orders later on. The demand for steam coal by the industries is up to the average and the thresher trade is about at its height.

Indiana has comparatively little use for the hopper car. In Indianapolis, for instance, there is not one yard that has elevated tracks. This situation may change soon, as the city has begun action requiring elevated tracks on all lines entering the city, and the work has been completed at important points. This may lead to the big yards putting in facilities for handling the hopper car. Another thing that may induce them to do this is the growing scarcity of labor for unloading flat cars. The demurrage bills against the yards have never been so big. Where some years ago the cost of unloading was 6c. and 7c. a ton, it is now 10c. and 15c., and at times it goes to 20c. The following are retail prices in this city:

Anthracite, chestnut	$8.00	Hocking Valley lump	$4.50
Anthracite, stove and egg	7.75	Luhrig lump	4.50
Anthracite, grate	7.50	Luhrig washed egg	4.75
Pocahontas, forked lump	5.50	Cannel	6.50
Pocahontas, shoveled lump	5.00	Linton No. 4 lump	3.25
Pocahontas, mine run	4.00	Linton No. 4 egg	3.25
Pocahontas, nut and slack	3.50	Indiana washed egg	3.50
Blossburg	5.50	Brazil block	4.00
Jackson (Ohio)	5.25	Indianapolis lump coke	6.00
Kanawha lump	4.50	Indianapolis crushed coke	6.00
Kanawha egg, nut	4.50	Connellsville lump	7.00
Pittsburg lump	4.50	Citizens' egg coke	6.00
Raymond lump	4.50	Citizens' nut coke	6.00
Winifrede lump	4.50		

DETROIT, MICH.

Slack in the strongest demand for this period it has been for years. Other grades quieter except Pocahontas which is in short supply.

Bituminous—The number of cars on track has dropped off materially during the past few days and there is a most unusual shortage of fine coal, which was in such long supply a few weeks ago; slack has not been in such sharp demand at this period of the year for a number of seasons. It is stated that a number of the large operators are unable to supply their customers and the latter are being forced into the open market, creating a strong demand and a general hardening of prices. Hocking slack is strong at 50c. f.o.b. mine, while No. 8 cannot be had at less than 70c. On the other grades the market is quieter than last week with the exception of Pocahontas which continues scarce; for August delivery lump and egg is quoted at $2.50 but is not in great demand at this figure. The smokeless coal is entirely sold up for July and what the situation will be in September it is difficult to say.

Big consuming interests that held off contracting with the intention of going through a good part of the summer in a low-priced open market and then closing in when quotations began to advance are now in bad shape. Not a few are already buying at prices in advance of what they could have contracted at for the entire year.

The local market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.45	....	$1.50	....	....	$2.50	$2.25
Egg	1.45	....	1.50	....	....	2.50	2.25
Steam lump	1.25	....	....	....	....	....	....
¾-in. lump	1.10	$1.10	....	$1.10	$1.10	....	....
Mine-run	1.00	1.00	1.00	1.00	1.00	1.50	....
Slack	0.80	0.85	0.50	0.70	0.70	1.20	....

Anthracite—There are uniform reports from all dealers of an active business in hard coal; the outside demand from different parts of the state is mostly responsible for this condition.

Coke—The decline in this product still continues. High sulphur, Connelsville, is now being quoted at $2.10, and 72-hr. at $2.70 to $2.80. Semet Solvay is selling at $2.75 with gashouse at $2.65. The local furnaces are mostly closed down so that the demand for coke is light.

CHICAGO

Prices showing a strong rising tendency. Labor so short that it is difficult to unload cars promptly. Car situation becoming steadily tighter and a severe shortage this fall seems inevitable.

A rising market and a shortage of labor are the chief features in the local situation. There has been an upward turn in the price of almost every kind of domestic coal and there will be an advance, Aug. 1, on all Illinois coal, ranging from 10c. to 25c. a ton; there will also be an increase on the cost of Hocking grades of 15c. a ton.

Retail dealers find it unusually difficult to obtain sufficient help to unload their cars. The farmers are offering fancy prices for laborers and they are flocking to the harvest fields. Another complication is the increasing shortage in cars. Several of the Western roads are well equipped to handle a large coal tonnage, but many others are short of equipment with the result that the situation is steadily becoming worse. Several of the lines have requested shippers to put in as much coal as possible in storage now, as a widespread congestion of freight traffic in the fall seems inevitable.

Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$1.97@2.07	$2.55	$2.27	
Egg		2.55		$4.05@4.30
Steam lump	1.82@1.87		2.07	
Mine-run	1.77@1.82	$2.20@2.30	1.87	3.55@3.65
Screenings	1.57@1.62	1.85@1.90	$1.57@1.62	

Coke—Connellsville and Wise County, $5.25@5.50; byproduct egg and stove, $4.85; byproduct, nut, $4.75@4.85; gas house, $4.50@4.60.

ST. LOUIS, MO.

The situation has continued to improve during the past week. Prices on nearly all grades have advanced. Mines closed for the summer are not due to open until the first of September.

Improved conditions in the local coal situation have been apparent for the past week, as there has been an advance in price on all grades of coal, with the exception of screenings and Carterville nut. Standard lump advanced and all other domestic coals followed, and indications are that the increase will continue weekly until the middle of September or the first of October, when a high point will have been reached.

With the screenings market taken away, there will be an over-production of this grade, which will demoralize the market and force the operators to get more money for other sizes. Up to the present screenings have been the main stay of the local market, and all other grades have been gaged by the prices on them. This power will not affect the Carterville market as much as the Standard, but it will have some influence.

The only advances in coals for the first of July were on some of the Franklin County grades. Contrary to prophesies made in the early part of the season, there seems to be an overproduction of anthracite for the St. Louis market, and a great deal of it is being rejected on account of being off-grade, although the operators claim that St. Louis is the only point where they are having trouble of this nature.

The coal movement from the mines has been free and there is little complaint, except as to equipment. The railroads have been buying hopper bottoms and as few of the local yards are fitted to handle these, the cause for complaint is easy to be seen. It is probable, however, that most of the yards will be equipped for hoppers in the course of a few months.

The fifty-five cars a day of screenings that a St. Louis jobber had been commissioned to buy for several years past for the Union Electric Light & Power Co. and the United Rys., have been dumped on the market on account of the Keokuk electric power, and this has demoralized the steam market. Carterville dropped from 95 to 90c. down to 60 to 65c. in the course of ten or twelve days, and Standard screenings have fallen off about 15c. a ton. As the demand for lump increases the production of screenings does likewise and the price will go down correspondingly.

Several mines that have been idle for the summer months will not start up until the first of September, so that conditions for the next four or five weeks will not be as bad as they were a year ago when mines for the most part started up on Aug. 1.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.87½
3-in. lump	....	....	$1.20	....
6-in. lump	$1.25 @ 1.35	....	1.30	1.00
Lump and egg	....	$2.00	1.30	....
No. 1 nut	1.00 @ 1.15	....	1.05	0.87½
Screenings	0.60 @ 0.65	....	....	0.80
Mine-run	1.10	....	....	0.75
No. 1 washed nut	1.40 @ 1.50	....	....	....
No. 2 washed nut	1.25 @ 1.35	....	....	....
No. 3 washed nut	1.15 @ 1.20	....	....	....
No. 4 washed nut	1.10 @ 1.20	....	....	....
No. 5 washed nut	0.80 @ 0.90	....	....	....

OGDEN, UTAH

Believed the summer stocking is being neglected, which may result in a serious shortage in the fall. Mines working short time as a result of the slack demand, but the market is being well maintained.

May, June and July have presented conditions in the coal market that have puzzled the operators. In previous years, these three months have always been termed the "storage period" and coal has, as a rule, moved freely to the trade; the railroads have always reduced the freight rate, and the operators made a similar reduction in the mine price, so as to induce the dealer and steam coal user to lay in a supply of coal. This year, the railroads refused to lower the freight rate and while the operators made their customary reduction with an additional discount to take care of the usual concession in freight rate, the fact that the roads offered no inducements seems to have lead the dealer to believe it would not be necessary to store coal this year. Further, there has been considerable agitation in regard to a permanent freight rate reduction, and this in connection with the general belief that there is an abundance of coal, has caused shipments during the storage period to be small.

Every year there is a bad car shortage at the Wyoming and Utah Mines during September, October and November, and it is during this period that the bulk of the coal stored is delivered to the consumer. When compared with the same period last year, it is estimated that 35% of the amount of coal is in storage, which means that the balance of 65% must be shipped during the fall and winter when the demand is greater than the production.

There has been a good market for nut and slack coal, due to the small production of lump. Nut coal is preferred to the lump during the summer months, and as the mines have been working short time the market has consumed practically all the slack produced. The sugar factories in the Inter-mountain territory have commenced to store some coal, which has given a little encouragement to the market. Indications are that there will be an increase in the mine price Aug. 1.

Present quotations for shipment to Nebraska, Kansas and California are: Lump, $2.50; nut $2; mine-run, $1.75; slack, 90c. To Utah and the Northwest: Lump, $2.25; nut, $1.75; mine-run, $1.75; slack, $1.

SPOKANE, WASH.

Some new contracts in the Rocky Mountain region.

The contracts for the six educational institutes in Idaho were awarded to the United States Coal Co. at the following figures: 450 tons of No. 1 lump for Albian delivery at $7.65, the price last year having been $10; Pocatello delivery, 575 tons of No. 1 lump at $4.40, as compared with $4.75 last year; 225 tons of No. 1 lump for Gooding delivery at $5.90, as compared with $7.50 the year before; for St. Anthony delivery, 1500 tons of No. 5 mine-run at $4.25, as compared with $4.40 last year; for Lewiston delivery, 550 tons of Roslyn lump at $7 per ton, as compared with $8.50 last year; for Moscow delivery, 200 tons of No. 1 Kinsmur lump at $6.90, as compared with $7.65 last year; for the same delivery 1000 tons of Roslyn lump at $6.25, as compared with $6.35 last year.

PORTLAND, ORE.

Market at the low point of the year. Preparations for the opening of the Panama.

This is the quiet season of the coal business here and there is little doing, except in preparation for the business that will follow later in the year. Apparently no coal will be imported here this year from Australia, but supplies will come from Washington, Wyoming and Utah. Every effort is being made to prepare for a large volume of shipping upon the completion of the Panama Canal and with this shipping will follow a considerable increase in the demand for bunker coal.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of June, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas.......	2,215,970	15,163	1,231,133	1,232,716	90,555
Tug River.......	214,854	2,485	217,339	178,091	39,248
Thacker.........	272,930	12,835	285,765	208,741	77,024
Kenova..........	74,944	15,802	90,746	72,557	18,189
Clinch Valley				133,128	11,662
	1,778,698	46,285	1,824,983	1,825,233	236,678

Shipments of coke entirely from the Pocahontas field, were 96.138.

COAL TRADE NEWS

The Smoke Nuisance in New York—The Court of Special Session recently declared Section 181 of the Sanitary Code, providing for the elimination of smoke, to be "unconstitutional and unreasonable." The case involves some 100 complaints lodged against the New York Edison Co. Health Commissioner Lederle expressed himself as much disappointed with the outcome and stated that if an appeal was not successful that a new ordinance would have to be introduced or all suits of this character suspended.

New Equipment on the Louisville & Nashville R.R.—The L. & N. are replacing their old equipment with new hopper bottom cars at the rate of 60 per day; about 3000 of the new cars will be put in commission immediately and the road plans to eventually replace all of their equipment with this new type of car. It is what is known as the "battleship" type and has a capacity of 110,000 lb. as compared with 80,000 to 90,000 lb. for the steel gondolas.

Heavy Coal Traffic—Total coal shipment through No. 4 Lock for the first six months amounted to 105,000,028 bushels, an increase of 27,000 bushels over the same period in 1912. There are also more than 6000 cars of coal a day being handled by the Pennsylvania R.R.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending July 19:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products...........	87	87	87	87	87
American Coal Products Pref........	109¼	109¼	109¼	109¼	109¼
Colorado Fuel & Iron..............	30	26¾	29½	41½	24½
Colorado Fuel & Iron Pref..........	....	....	155	155	150
Consolidation Coal of Maryland......	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales...........	195	190	190	....	....
Island Creek Coal Com............	49	48	49	....	....
Island Creek Coal Pref............	79½	79	79	....	....
Pittsburgh Coal..................	17	15⅞	17	24⅜	14½
Pittsburgh Coal Pref..............	81	77½	81	95	73
Pond Creek.....................	17¼	16½	17	23¾	16½
Reading........................	160⅜	156½	159⅝	168⅞	151⅜
Reading 1st Pref.................	....	....	86	92½	86
Reading 2nd Pref.................	87	86	87	95	84
Virginia Iron, Coal & Coke.........	39	37	37⅞	54	37¼

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s.........	95	96	93⅝	June '13	93⅝	99⅛
Colo. F. & I. gen. 6s............	..	..	107¼	June '12	..	
Col. Ind. 1st & coll. 5s. gu.........	80	81	79⅞	79⅞	77½	85
Cons. Ind. Coal Me. 1st 5s........	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s.........	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s........	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s.......	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s........	..	86	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s......	73	78	76	June '13	76	80
Tenn. Coal gen. 5s..............	99¼	99⅞	99⅞	99⅞	99¾	103
Birm. Div. 1st consol. 6s........	100½	101¾	101	April '13	101	103
Tenn. Div. 1st g 6s..............	100¼	101¾	100¼	100¼	100¼	102
Cah. C. M. Co. 1st g 6s.........	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s..............	..	..	..	.....	..	..
Victor Fuel 1st s f 5s............	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s........	92⅛	92⅞	92¼	93	92	98

Burns Bros.—Regular quarterly dividend No. 2 on the preferred stock of $1.75 payable Aug. 1 to holders of record July 1.

FOREIGN MARKETS

GREAT BRITAIN

July 11—Admiralties are very scarce for prompt shipment. For smalls the demand is quiet and with an ample supply, the tendency is rather easier.

Quotations are approximately as follows

Best Welsh steam......	$4.92@5.04	Best Monmouthshires..	$4.20@4.26
Best seconds...........	4.56@4.68	Seconds................	4.08@4.14
Seconds................	4.32@4.44	Best Cardiff smalls	2.52@2.58
Best dry coals..........	4.32@4.56	Seconds...............	2.28@2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

INDIA

A recent issue of the "Colliery Guardian," London, England, says editorially:

> With the readjustment of Bengal's boundaries and the creation of the new province of Bihar and Orissa, the more important coalfields now belong to the new province; figures for production will, therefore, embrace both provinces. We understand from the "Statesman" (India), of May 28, 1913, that the production in Bengal during 1911 of 11,468,904 tons has risen in 1912 for Bengal, with Bihar and Orissa, to 13,429,566 tons, an increase of 17 per cent. For the whole of British India, excluding native states, the production advanced from 12,048,726 tons to 14,044,368 tons.

FOREIGN TRADE OPPORTUNITIES

The United States Counsellor Service reports opportunities in foreign coal markets as follows: complete details regarding different items can be obtained on application to the Bureau of Foreign and Domestic Commerce, Washington, D. C., by giving numbers.

South America—A counsel in this country reports that a company in his district is interested in American coal and briquettes. The coal should be hard and weather well since the fine grades sell at a large discount. Full particulars including analysis of the coal with prices f.o.b. both the United States ports and ports of destinations should be given. **No. 11,248.**

Europe—Counsellor in a European country reports the construction of a plant for the manufacture of cement which will have an initial consumption of 35,000 tons of coal per annum the first year and 70,000 tons the second. **No. 11,324.**

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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2081-B

Realize *Your* Vision Of Success

By M. E. Harder

The Weekly Ad-Talk Page

Despite the fact that we are so often reminded that there is nothing new under the sun, it still remains that wonderful regions are continually being discovered and explored "at the top o' the world."

At the top of the world in a physical, intellectual and commercial sense. Far above the noise of cities and the thoughts of little men are realms hitherto undreamed of by the masses and unrealized by the few who dared to dream.

The quest for the unknown and unrealized, the desire to expand—to climb—is a universal and eternal one.

The world today is still talking of the recent return of Dr. Sven Hedin from a four years' trip through the unexplored and unmapped regions of the great Himalaya Mountains. Alone, the only white man in his band, traversing districts of which no man had ever known, for two years never seeing a European, yet, sure of the course he had passed over, with the courage born of confidence in his means of guidance, he pressed onward, to the completion of a stupendous self-assigned task. His means of guidance, telescope and sextant, small in themselves, yet in his accustomed hand, infinitely reliable!

Building cautiously, surely and steadily, a man, by preserving absolute faith in a trustworthy yet seemingly insignificant medium as compared with the greatness of his achievement, has reached a goal and proclaimed his success to the world

The great pioneers of today, however, are not those who search the uttermost parts of the earth, or who tread carefully the paths of thought marked out in ages past by great original thinkers to the proclaiming of a new philosophy.

The great pioneers of the present are those who, finding themselves in a busy, nervous, over-crowded commercial world, conceive an idea by which they may rise from beneath the feet of the hurrying masses.

Those whose guiding telescope and sextant are hard, earnest *study.* Study of organization, of appliances, of methods—hard thought on every lesson learned in school, in books, in the field or in technical papers. Of all these means, technical papers are probably the most useful because of their up-to-the-minute news value. In these papers the editorial sections are weekly bulletins of means for improving your work, while their selling sections are equally efficient bulletins of *appliances* for *accomplishing* these improvements. So *read* your technical paper—from front cover to back—and *think.*

COAL AGE

Vol. 4 NEW YORK, AUGUST 2, 1913 No. 5

The gross payroll of a small coal-mining concern averaged about $10,000 dollars a month. Deducting rent, commissary stoppages, etc., the actual amount of cash paid out was about $5000 dollars monthly. The man in charge of the payroll was an old-line timekeeper who had been with this same concern for years. Whenever there was a change in the wage schedule, he familiarized himself with it, and although he was supposed to rate his payroll each month from the wage sheets, he seldom did this, but instead would write in rates on the current roll from the previous one, or from memory.

One day the superintendent in looking over the roll, which he didn't do often, happened to notice that rockmen were being paid $3.05 a day. On asking the timekeeper to refer to his wage sheet, he found that the correct rate was $3.50. The timekeeper could offer no explanation other than that he must have written it $3.05 instead of $3.50. On looking back it was found the incorrect rate had been paid for several months and as a result, many men had left the employ of the company.

Of course, the unfortunate timekeeper had to admit he had been rating each roll from the previous one without referring to the wage sheets. Much of his rating was done from memory. This is a common fault of the average timekeeper who feels that because of his long service and familiarity with conditions, he knows rates well enough to make up his payrolls, extend time, etc., without checking each rate against the wage sheets as approved by the superintendent and management at the time wages were fixed. This instance was only another case where "Familiarity bred contempt."

How many auditors and superintendents of coal-mining companies are careful enough about the serious business of accuracy in payroll methods, and in the use of preventive measures to safeguard the rating of rolls, extending of time, etc., so that the cost sheets reflect the actual expenditures of the company?

Would it not be easy with some concerns for the man who knows how, to beat the company by working as a weigher, and without even exciting suspicion, run two or three dummy checks worth $40 or $50 apiece to him every month. How could he do it? By having one or maybe two confederates to draw the money—not on regular paydays, but through the medium of back-pay statements, for as a rule the identification of men who draw back pay is given far too little attention and the man who is onto the game could use this method.

PAYROLL LEAKS are too often the source of loss. The following suggestions may help:

1. Make the timekeeper rate his payrolls from rate sheets approved by the superintendent and executive officials.

2. Make the mine foreman approve each payroll after it is closed and before it is paid, both as to number of men and rates allowed.

3. Don't let the timekeeper pay off or have a hand in it. If he is honest he won't want to. If he is not honest, the fact that he can make up the roll and pay it off is all the opportunity to be crooked that he needs.

4. During the time of pay, have the foreman present to identify the men and don't hand one man another's money.

5. After the pay hour, have the foreman look over the undistributed envelopes and make note on each as to whether the man who did not draw his money actually worked.

6. On settling back-pay items secure a complete identification of the men paid through this channel.

It is safe to say that if these simple rules are followed closely, at least a few common losses will be avoided. At the same time the men will be pleased to feel that care is taken to see that they are compensated for all they do, and that the payroll work is both accurate and preventive of rascality.

The Matanuska River Coal Field by Districts

By W. R. Crane*

SYNOPSIS—The Matanuska field appears to vary greatly in value, the Youngs Creek district having seams of unworkable thickness. The thickest bed is on Eska Creek and this is 15 ft. thick. The coal lies on an extremely uneven bed and has been ripened like the Bering River coal by igneous intrusions.

⁂

Chickaloon Creek is the largest tributary of the Matanuska River, its course being for the greater part of its length slightly east of north. Aside from draining a large area of mountainous country, it has as its source the Chickaloon glacier, which, however, furnishes but a small volume of the water of this stream, as is shown by the clearness of the current.

The principal occurrence of coal in this locality is at the Watson Camp, about 1½ miles above its junction with the Matanuska River. See Fig. 2. The coal outcrops at this point along a steep bank some 100 ft. high. The dip of the coal beds is quite variable, ranging from 40 deg. to the vertical and in one instance at least a reversed fold appears to have been formed.

CHICKALOON FIELD HAS 55 FT. OF COAL

According to Dr. Martin[1], and I have verified the statement myself, the number and thickness of the coal beds occurring at this point are as follows: No. 1, 5 ft. 4 in.; No. 2, 4 ft. 10 in.; No. 3, 8 ft. 9 in.; No. 4, 5 ft. 6 in.; No. 5, 9 ft. 4 in.; No. 6, 2 ft. 6 in.; No. 7, 10 ft. 10 in.; and No. 8, 2 ft. 8 in., making an aggregate of 49 ft. 9 in. Not all of the beds listed are of sufficient value to work at least throughout their full extent, owing to variable thickness and the occurrence of shale partings and other impurities. Further, a large amount of impure coke occurs at this point; a coal bed affected by the intrusion of a diabase sill, is shown in Fig. 3.

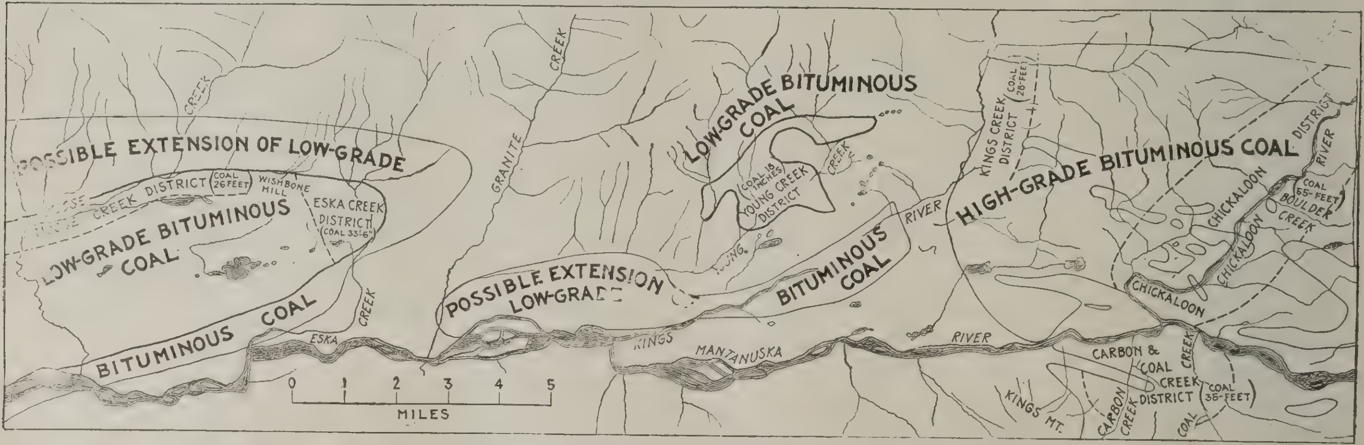

FIG. 1. THE COAL FIELDS OF THE MATANUSKA RIVER AND ITS TRIBUTARIES

FIG. 2. WATSON'S CAMP IN CHICKALOON CREEK, A BRANCH OF THE MATANUSKA

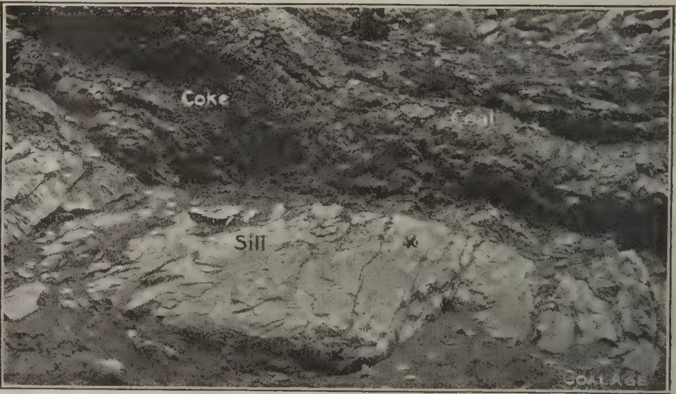

FIG. 3. THE DIABASE SILL UNDER THE COAL BED HAS COKED THE COAL

These coal beds constitute the bulk of the coal so far located in the Chickaloon Creek district, and make a most attractive showing as to amount, also a number of them are of excellent quality and in such condition as to warrant extensive exploration and also, probably, commercial development.

Another 4-ft. coal bed is reported as outcropping on the banks of Chickaloon Creek, some 26 miles above the mouth of Boulder Creek.[2] The total amount of coal in this district is then very close to 55 feet.

IGNEOUS INTRUSION MADE THESE TERTIARY COALS MATURE

While many occurrences of igneous intrusions in the form of sills following the lines of stratification are to be found in this field, and particularly in this locality, the only instance observed where a sill (more properly called a dike) cuts across the intervening strata between beds is to be found here. See Fig. 4. This occurrence is of peculiar interest in that it shows that an intrusion may be encountered at any time in the process of mining, although the coal bed worked may be apparently free from such irregularities. This is especially to be feared where a sill is known to occur in the strata either above or below the bed worked. Aside from changing the character of the coal, even transforming it into coke, what is fully as bad would be the weakening of the rock formations by fissuring and burning.

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*Professor of mining, Pennsylvania State College, State College, Penn.

[1] U. S. Geol. Surv., Bull. No. 289, pp. 20 and 21.

[2] U. S. Geol. Surv., Bull. No. 289, p. 25.

Probably no part of the bituminous-coal area has been subjected to such extensive rock movements as at this locality in the Chickaloon Creek district. The rock and coal strata stand at high inclinations, even being folded so abruptly as to be crumpled up, while to add to the general disturbance the igneous sills have been intruded, badly burning and consequently weakening the formations. See Fig. 5.

Tunnels driven to intersect the highly inclined coal beds show the strata standing either vertically or nearly so, and further demonstrate that they have been weakened and loosened to such an extent that water entering the tunnels in some instances finds more or less ready exit through the strata to the level of the creek.

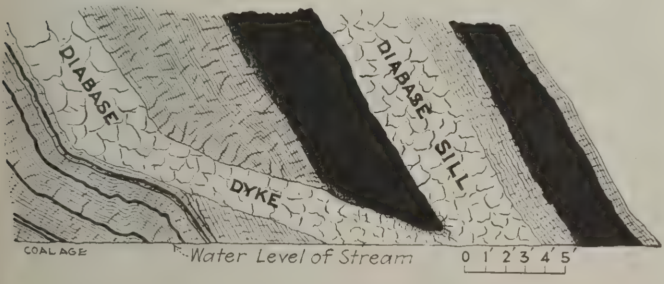


FIG. 4. A DIKE IN CHICKALOON DISTRICT

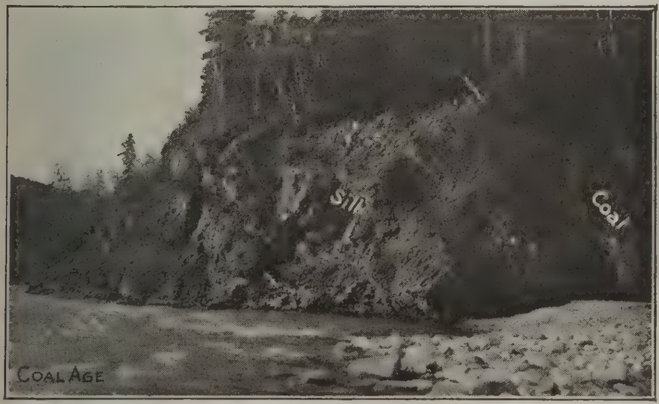


FIG. 5. VIEW SHOWING DIABASE SILL AND STEEP PITCH OF STRATA

Another irregularity observed both in the coal beds and the top-rock is shown in Fig. 6. In this particular instance, the mass of foreign material occurs in the middle of a coal bed and its appearance suggests that a mass of molten iron had at one time run into the coal. It is yellowish-red in color, more or less seamed and contorted as though it had forced its way through an irregular opening or crevice. It is not, however, of igneous origin as the condition of the adjacent coal shows, but was undoubtedly deposited with the coal and its associated strata. As an impurity in the coal, it could readily be separated, but when it occurs in the top-rock, its smooth, undulating surface presents no bond or connection, and is, therefore, a decided element of weakness and danger. The fall of large masses of top-rock exposing such an irregularity, demonstrates the ease with which the rock separates from it. See Fig. 7.

The most common irregularities occurring in this district are the shale partings, the majority of which are several inches in thickness, although many are much larger.

As would be expected from the disturbed condition of the formations, the coals of this district are soft and friable, resembling in this respect and to a marked degree the coals of the Bering River coal field.

THE KINGS CREEK DISTRICT

Kings Creek lies about five miles to the west of Chickaloon Creek, and the coal locations occur from 9½ to 9 miles above the junction of this creek with the Matanuska River. The character and occurrence of the coal of this locality, as previously mentioned, resemble very closely those of the Chickaloon Creek district.

There are four distinct and apparently separate coal beds outcropping in this locality, two on the east side of the creek and two on the west side. It is possible that one or two of these beds may be extensions of the other outcrops, but owing to the disturbed condition of the beds and extensive coverings of slide and moss, it is difficult to correlate them accurately. However, the thickness of the beds, beginning with the one furthest up the creek, is as follows: 6 ft., 10 ft., 2 ft. and 10 ft. The two last mentioned are separated by some 16 ft. of shale. If these outcrops are of separate beds the aggregate thickness of coal in this locality is 28 feet.

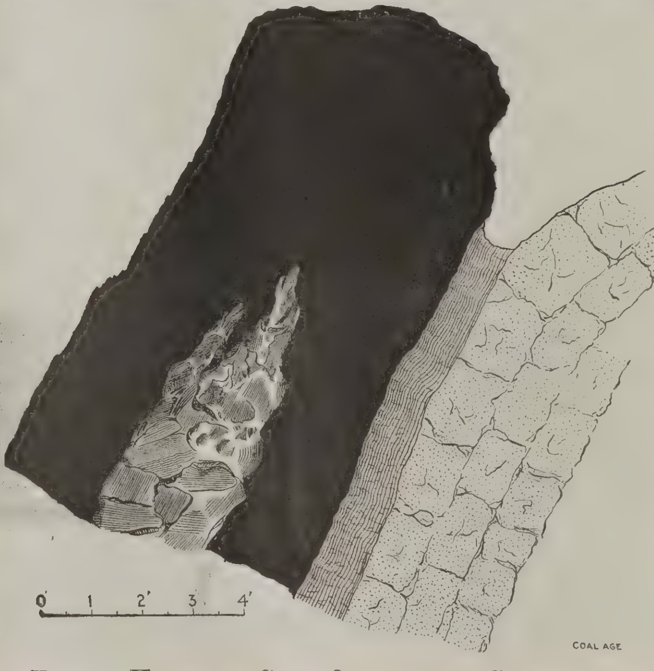


FIG. 6. HORSE IN COAL OUTCROP ON CHICKALOON CREEK

The coal occurring on the east side of the creek is very soft and friable, while that on the west side is stronger and would probably mine into lumps of fair size.

On the east side of the creek, the coal beds outcrop on a cliff which is capped by a flow of igneous rock varying in thickness from 20 to 50 ft. See Fig. 8. An igneous sill, together with the flow, have coked a large part of the coal beds. However, the action of the heat does not seem to have been uniform throughout the coal seams as portions of the beds at certain points and the entire beds at other points have not been affected. A section of one of the coal beds that has been changed to coke below and but slightly altered above is shown in Fig. 9.

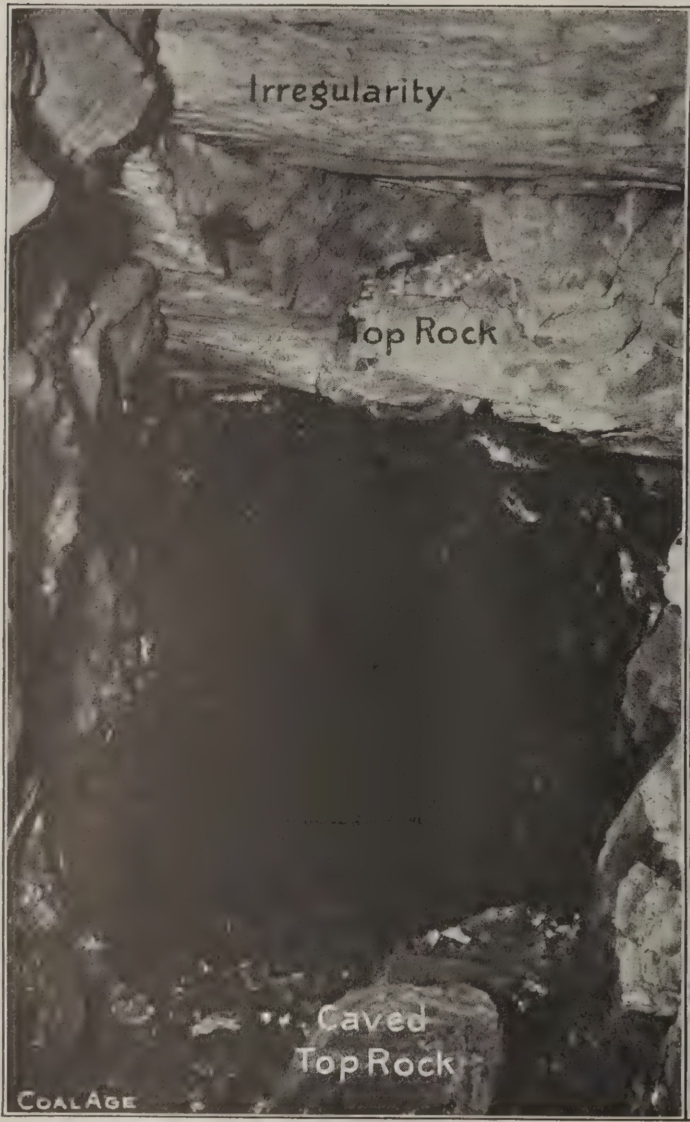


Fig. 7. Interior of Tunnel Showing Irregular Masses of Foreign Material in Roof

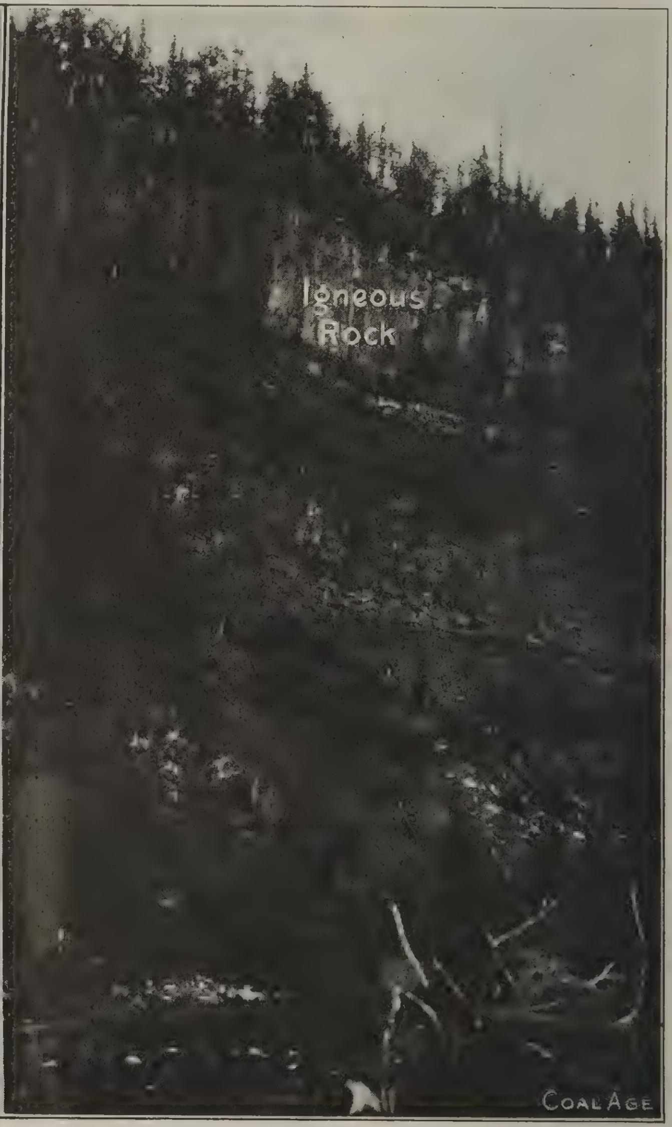


Fig. 8. A Volcanic Flow Capping Coal-Bearing Strata, Kings Creek Valley

Aside from the diabase sill and igneous flow, the principal irregularities and those of most frequent occurrence are shale partings. These are highly bituminous and of considerable thickness and when associated with the coal often resemble it so closely as to render their separation from the coal difficult.

The Youngs Creek District

There is little of interest to be said regarding the occurrence of coal on Young's Creek. The locality where coal occurs is about 3 miles west of the coals previously described on Kings Creek and 3½ miles above the junction of Youngs with Kings Creek.

The only coal found on this stream are two thin beds, 12 in. and 6 in., respectively, and separated by about 15 ft. of shale. The coal beds occur in a synclinal trough with a dip of 20 deg. The coal is, at least in places, of inferior grade, for it contains numerous nodules of clay and pyrite.

While not associated directly with coal beds, an interesting geological feature was observed, namely, a dike of igneous rock cutting beds of shale and sandstone. See Fig. 11. The shale is highly bituminous and contains small bands of coal, which appear to be of a low grade. The dike has intersected the formation approximately at right angles with the stratification, although without any material disturbance or distortion of the strata. To one side of the main body of the dike a small stringer of similar material occurs, the course of which is very much less regular than that of the large dike and indicates the termination of either a branch of the former or an entirely separate one.

The often noted tendency of fissures to assume parallelism with lines of stratification on traversing bedded deposits, is evident in the case of this small dike. Further, two isolated masses of igneous material also occur close to these dikes, being probably branches of the larger one, which cut the strata at these points, the connection with the dike either having been eroded or occurring in the strata beyond the face of the section. In either case the connection is invisible.

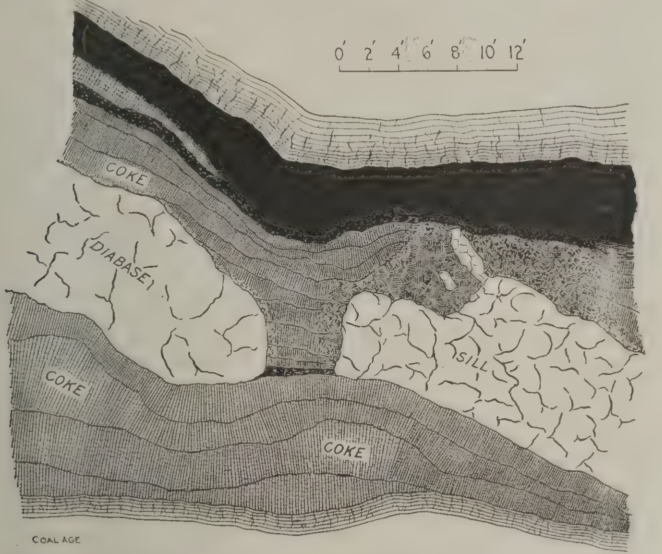


Fig. 9. Diabase Sill and Natural Coke in Coal Bed in Kings Creek

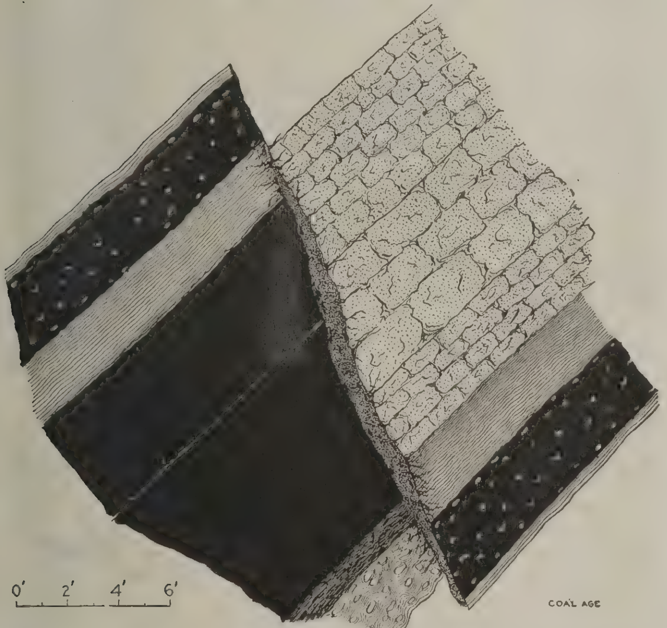


Fig. 10. Fault on Moose Creek, Showing Displacement of Beds

Mention is made of these dikes in this connection as they occur at no great distance from the coal beds in this district, and also occur in coal-bearing strata; they might, therefore, as likely be found cutting the coal beds as intersecting the barren beds adjacent.

The Eska Creek District

The coal occurs on Eska Creek some 8 miles west of the Youngs Creek field, being 3 miles above the junction of Eska Creek with the Matanuska River.

The coals of this locality are bright, but lack the luster of the fuels of the Chickaloon and Kings Creek districts. They are of good appearance and are hard, mining in large, blocky masses with the production of only a moderate amount of small coal. There are, however, numerous dull bands in the coal beds, that look suspiciously shaly.

The various coal beds occurring in this district proceeding from that of the lowest elevation upward are as follows: No. 1, 7 ft. 6 in.; No. 2, 7 ft.; No. 3, 3 ft. 8 in.; and No. 4, 15 ft. 4 in., giving an aggregate thickness of 33 ft. 6 in. of coal. The last coal bed mentioned, or No. 4, is separated into two benches by a 12-in. parting, and further is associated with three other coal beds of 2, 3 and 3 ft. in thickness, but separated from one another by shale partings ranging from 3 to 15 in., in thickness, and from No. 4, by a parting of 12 in. of shale and impure coal.

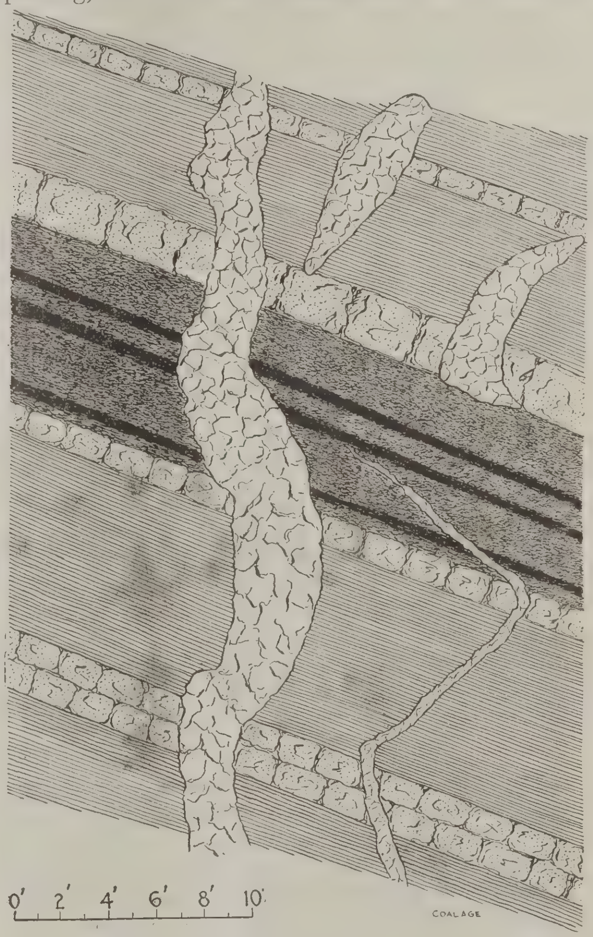


Fig. 11. Dikes through the Coal Seams in the Youngs Creek Field

Numerous partings of shale and impure coal, both in and associated with the coal, constitute the principal irregularities noted.

The coal beds lie in a gently pitching synclinal trough, the dip of the lower or down-stream side of the beds being 40 deg. to the northwest, while on the upstream side of the trough the dip is 30 deg. to the southeast. The pitch of the trough is into the bank, a bad condition of affairs owing to the difficulty of keeping the working free from water if it should flow in from the creek.

The Moose Creek District

Coal is found on Moose Creek, about 5 miles west of the Eska Creek locations, and at a distance of 4½ to 6 miles above the junction of Moose Creek, with the Matanuska River. The outcrops of the coal beds occur on the cliffs and steep bank of the east side of the creek.

The coals are of similar grade to those of Eska Creek, but hardly of equal value, according to analysis. They are, however, hard and firm, as is demonstrated in one instance by the uncovered outcrop extending into a swift mountain stream with little appreciable disintegration.

The number and thickness of coal beds occurring in this district, beginning with the first outcrop encountered on passing up the creek, are as follows: No. 1, 1 ft. 7 in.; No. 2, 1 ft. 9 in.; No. 3, 3 ft. 6 in., No. 4, 11 ft., and No. 5, 8 ft., giving a total thickness of 26 ft. The coal given in Nos. 1 to 3, inclusive, occur in the same section but separated by partings of shale and impure coal, with other stringers of coal of a few inches in thickness, interstratified throughout the section. The 8-ft. bed is also badly broken up by partings, which would seriously affect mining. The 11-ft. bed is remarkably free from partings, containing but one of 1 in. thickness. The beds Nos. 4 and 5 are the workable coals of this district, but stand at high inclinations, particularly the 11-ft. bed.

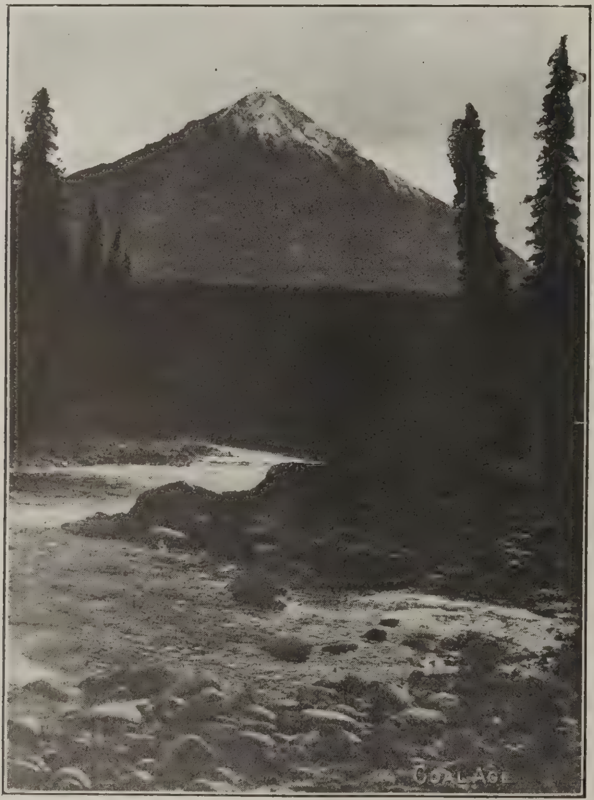


Fig. 12. Kings Mountain in the Matanuska Coal Field

The only irregularity noted in this district aside from the numerous partings of shale is a fault, which cuts the 11-ft. coal bed some 12 to 14 ft. above the level of the creek. See Fig. 10. This fault cuts across the stratification of the rock and coal strata at an angle of 80 deg., and consequently in the opposite direction to the dip of the strata, which below the fault plane dip 45 deg. to the southwest, while above the fault plane the dip is to the southeast. The displacement of the strata is practically the full width of the coal bed.

Directly above the 11-ft. bed of coal occurs another seam, which contains nodules of iron ore and is more or less disturbed, but the ore is of no economic importance.

The coal bed occurring furthest down the creek dips into the cliff at an angle of about 35 deg., and outcropping as it does but a few feet above the level of the creek soon passes below water level, which would permit much water to enter the workings by seepage if developed by openings at or near the creek.

The Carbon and Coal Creeks District

This district lies on the south side of the Matanuska River and almost directly opposite the junction of Chickaloon Creek with the Matanuska. It embraces the whole coal-bearing area and not only that adjacent to the two creeks, after which it is named, but all coal occurrences to the east and west.

The coal of this locality is similar in character to that found in the Chickaloon district. It is but natural to expect then that the coals have suffered considerable disturbance such as folding and faulting and the intrusion of igneous sills. The inclination of these coal beds throughout this district varies from 40 deg. to 75 deg. The effect of the igneous sills in coking the coal is not as extensive as across the river in the Chickaloon district, the zones affected varying from a few feet up to 14 to 16 ft.

The number and thickness of the coal beds occurring in this locality, beginning with Coal Creek and proceeding up the Matanuska River, are as follows: No. 1, 5 ft.; No. 2, 8 ft. 6 in.; No. 3, 7 ft. 6 in.; No. 4, 7 ft.; No. 5, 6 in.; No. 6, 6 ft. 6 in., giving an aggregate thickness of 35 ft. The three coal beds, Nos. 4, 5 and 6, are closely associated, being separated by shale strata varying in thickness from 4 to over 40 ft. Further the coal beds in all cases are broken up into benches by shale partings, some of which approach a foot in thickness.

⁂

Battery Renewals

Speaking before the Coal Mining Institute of America. H. H. Clark, electrical engineer of the Bureau of Mines, said:

An important item in the cost of upkeep of portable electric mine lamps arises from the deterioration of the battery plates or elements. This is most noticeable in storage batteries having lead plates. The natural depreciation of these is hastened by overcharging or overdischarging or charging at too high a current. Another trouble that is experienced with the acid batteries is the destruction of the contacts by the acid electrolyte. Even in nonspillable batteries and those using gelatin electrolytes, a certain amount of acid often gets upon the contacts, and rapidly corrodes and destroys them. Much of this trouble may be eliminated by designing the battery properly, but it may be prevented even more completely by exercising care to keep the batteries clean and the terminals occasionally wiped off with vaseline or some similar substance.

Storage batteries which make use of other electrodes than lead and other electrolyte than sulphuric acid are not materially injured by overcharging or overdischarging and do not give trouble by the corrosion of the contacts. All that the bureau has ever tested, however, have shown a more rapidly decreasing voltage curve than the lead batteries, which means that the candlepower of the lamp when the battery is first charged will be much higher than it will be near the end of the discharge.

The McAlester Coal Field in Oklahoma

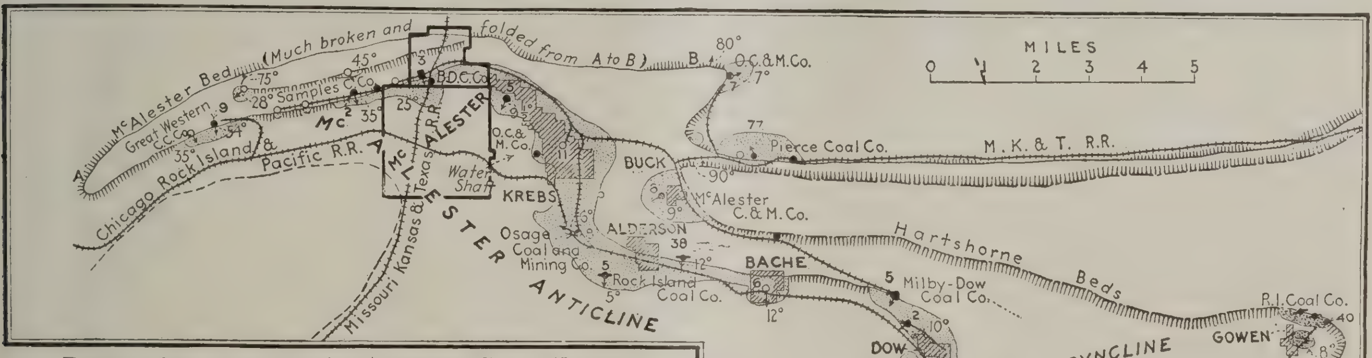
By Geo. M. Brown*

SYNOPSIS—The McAlester and Hartshorne coals are two of the highest-grade fuels west of the Mississippi. The seams are relatively thin, however, and are worked under comparatively heavy cover. There is considerable gas and the coal is quite explosive in character. Shooting off the solid is practiced.

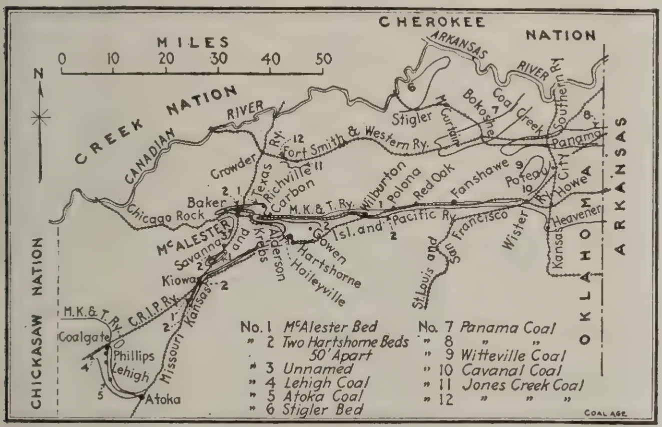
⁂

When the United States Geological Survey finished its work on the segregation of the coal lands in the Choctaw Nation, it established the following points:

"The coal should be of a quality and hardness to create a demand for its use for commercial purposes."



Detail Map of the McAlester Coal Field



General Coal Map of Oklahoma

"It should be thick enough to be worked successfully."

"Its structure or position and depth should assure profitable mining."

Geology

In accordance therewith governmental reports indicate four workable beds of coal in the McAlester district having a total area of approximately 67,000 acres, and a tonnage of 460,000,000. Of this area 30,400 acres are at present unleased, and the remaining 36,700 acres are being worked by various coal companies, who pay a royalty of 8c. a ton into the treasury of the Choctaw Nation.

Of the four workable seams in the McAlester district, the lowest is known as the Lower Hartshorne Vein. It outcrops in the district for fully 50 miles, and has a thickness ranging from three to six feet. The coal is clean and free from impurities. The roof is a hard, compact shale, locally replaced by sandstone. The floor is shale or clay. Similar in quality and character of roof and bottom, is the Upper Hartshorne bed lying about 50 feet above the Lower seam. Both of these veins will average about 4½ ft. in thickness.

The McAlester Vein is found about 1250 ft. above the Hartshorne horizon. It has a much longer outcrop in the district, and the coal is much more accessible. The quality is better, and there is less sulphur than in the Hartshorne coals; it is also much harder and slightly thicker.

All three of the foregoing coals are excellent for coke making. The fourth vein is the highest in the district, and lies to the southwest of McAlester. Its development has been limited because of the better advantage of the other veins.

PROXIMATE ANALYSES OF COALS IN THE McALESTER DISTRICT*

Seam	Moisture	Vol. comb.	Fixed carbon	Ash	Sulphur
Lower Hartshorne......	1.36	39.48	53.87	5.29	2.36
Upper Hartshorne......	1.43	38.15	50.76	9.66	1.38
McAlester	1.91	37.26	56.44	4.39	0.72

*United States Geological Survey Reports.

As shown on the accompanying map, there is a wide fold entering the southeast part of the district and bearing northeast. This is called the Kiowa syncline. Near Dow, it sweeps eastward to Gowen, forming a nearly flat basin near Hartshorne, at depths of 500 to 600 ft. North of the Hartshorne basin we find the upward fold known as the McAlester anticline, which bears due west to the Krebs district. It then deflects northward to the north side of Krebs, and then west to the vicinity of Baker, about five miles west of McAlester.

At Buck, on the Hartshorne seams, the fold bears sharply eastward, the coal dipping northward from 45 deg. to 90 deg. The McAlester seam, however, being farther from the axis of the fold, has a dip of only 15 deg. to 20 deg. The north pitch of the McAlester seam

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*Engineer, Osage Coal & Mining Co., McAlester, Okla.

Mine No. 5 of the Osage Coal & Mining Co., and Mine No. 40 of the Rock Island Coal Mining Co.

is badly twisted and broken from Baker to Mine No. 7 of the Osage Coal & Mining Co., and is economically worthless.

At Baker, as shown on the map, the McAlester seam dips 54 deg. Two miles east of this the dip is 35 deg. In North McAlester the dip has decreased to 25 deg., and at Mine No. 5 of the Osage Coal & Mining Co., it is only 9½ deg., bearing almost due south. At Krebs we find a wide sweep in the fold, so that the coal at Mine No. 8 is pitching 6½ deg. toward the northwest. Just west of Alderson the fold turns again, and at Mine No. 5 of the Rock Island Coal Mining Co. we find a dip of 5 deg. southward; further east it varies in magnitude and direction as indicated by the arrows.

The early development of the field was in the district near Krebs, and fully a dozen slopes and several shafts were in operation at one time. The slopes were only driven a few hundred feet, and the shafts were sunk with regard only to present easy profits. Affairs went well at that time, but carelessness resulted in water breaking through from the outcrop, and in severe squeezes.

Gas and dust explosions were common, too, in the early days; the real danger of McAlester coal dust was only too well shown in the terrible explosion at No. 11, Krebs, in 1892. Ninety-six men were killed.

Bolen Darnell Coal Co.'s Mine No. 3

Mines and Mining Conditions

Mining in the district has become more settled in recent years, and now we find the following companies working mines:

The Osage Coal & Mining Co. is operating two shafts, Nos. 5 and 8, and one slope, No. 7, near Krebs. However, all the coal is obtained from slopes and planes inside of the shafts. The output is about 1200 tons a day.

The Rock Island Coal Mining Co. is operating slope No. 38, and Shaft No. 5, at Alderson, Shafts 7 and 8, at Hartshorne, and a group of slopes at Gowen. Of the latter, No. 40 is the largest producer in the state. The total output of the company will amount to about 3200 tons a day.

The Great Western Coal & Coke Co. operates a very steep slope at Baker. The pitch is 54 degrees.

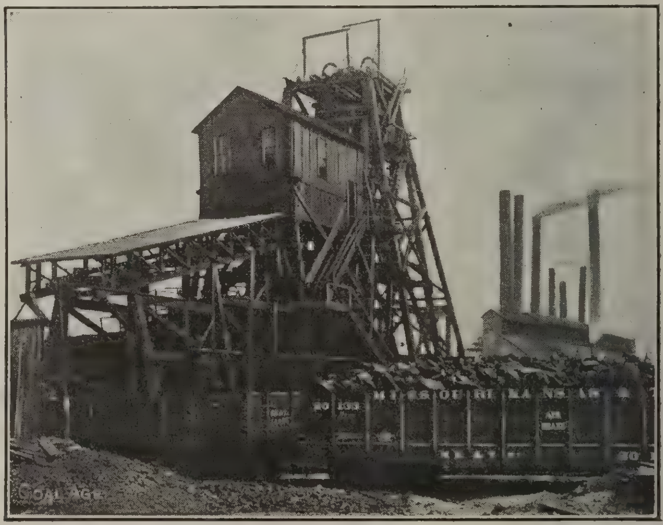
The Bolen Darnell Coal Co. operates slopes at McAlester and Craig.

The McAlester Coal & Mining Co. operates one shaft at Buck.

The Hailey Ola Coal Co. has a shaft mine in Haileyville.

The Milby Dow Coal Co. operates Slope No. 5 and Shafts Nos. 2 and 9 at Dow; No. 9 is one of the most complete plants in Oklahoma.

Besides those listed, there are several individual operators working along the outcrops of the Hartshorne and McAlester seams.



McAlester Coal & Mining Co.'s Mine No. 6

Mining in Oklahoma has the following conditions to meet: Gassy mines, very explosive dust, shooting off the solid, heavy overburden, excessive use of blasting powder, unwise legislation, and strong labor unions. Plenty of air, and much sprinkling has reduced the gas and dust dangers a great deal. Much can yet be done, however.

Shooting off the solid presents an interesting problem.

Mine No. 9 of the Milby Dow Coal Co., on the McAlester Seam at Dow, Okla.

Everybody knows its dangers, and the mine inspectors are strongly against it, but the unions stand directly opposed to its being abolished. Let an operator install an electric shot-firer, and immediately the miners want a deeper hole and more powder, and little they care what the result to life and property is. Injuries from falls of rock have increased 25% since shooting off the solid gained a foothold in Oklahoma.

COAL-MINING STATISTICS IN THE McALESTER FIELD*

	1909	1910	1911	1912
Tonnage	1,049,717	1,038,519	681,665	791,310
Number employed.....	3,178	3,094	2,923	2,933
Number killed........	37	18	13	11
Number injured	53	39	28	43
Number killed per 1000 employed......	11.6	5.8	4.5	3.75
Number killed in U. S. per 1000 employed..	4.00	3.92	3.73	3.15
Number killed per 1,000,000 tons.......	35.2	17.3	14.7	13.9
Number killed in U. S. per 1,000,000 tons...	5.79	5.66	5.48	4.29
Number kegs powder used	64,980	60,722	38,327	45,108
Tons of coal per keg..	16.2	17.3	17.7	17.5
Other explosives, in pounds	....	30,993	47,574	47,129

*This table has been prepared from the annual reports of the mine inspectors. The figures for the United States are quoted from the report on Coal Mining Statistics by Frederick W. Horton, of the Bureau of Mines. The death rate for the field is high. Less coal per keg of powder is being shot from the solid, and more explosives than ever before are used. The use of black powder is declining, however, and at present many mines are installing machines and using the permissible powders. This, it is believed, will reduce the amount of explosives, and increase the production of the district.

Recently a petition was filed by the miners for a referendum vote on that part of the recent legislative act known as Section 18, which prohibits solid shooting, limits the diameter of the bore hole, and specifies undercutting. It is noteworthy that other states are fast doing away with solid shooting, and that mining men in this district, who expressed themselves against the practice a few months ago, are now most earnestly urging the referendum. However, the operators are fast installing machines, and the future seems to promise nearly all machine coal.

Heavy overburden is a cause of much worry and efficient recovery is a big problem. Let us note here a few shafts whose depths are: 555, 600, 487, 530 and 660 ft. Within all these there are slopes whose bottoms reach depths ranging from 750 to 1000 ft. Longwall has been successfully tried in this field.

The mining laws are sometimes very much of a handicap and some parts need revision. Employers' liability acts are sometimes unjust, and the labor unions as a whole completely disregard contracts. More rigid inspection and stricter discipline will help matters much in this field.

Nearly all of the coal in the McAlester field is prepared by passing it over shaking screens. As a rule four sizes are made. The slack passes through a $\frac{5}{8}$-in. screen, the pea through a $1\frac{1}{4}$-in. screen, the nut through a $2\frac{1}{2}$-in. screen. A glance at the following table will give an idea of the distribution of the sizes:

The Osage Coal & Mining Co.'s Washer and the Great Western Coal & Coke Co.'s Mine No. 9

PRODUCTION OF COAL IN 1912—SHORT TONS

Lump	Nut	Pea and slack	Run-of-mine	Unclassified
261,857	78,106	194,673 (36.4%)	213,294	43,380
		Machine-Mined Coal		
14,563	2,180	8,040 (32.4%)	43,830	

Some parts of the various seams are more friable than others, and at some mines, a slack percentage of from 38 to 50% is often reported. Machines will, no doubt, lower this amount greatly and obviously will render the coal-preparation problem much easier to solve.

Mechanical Details of a Gasoline Motor

By R. O. Hodges*

SYNOPSIS—Because no power house is needed for the operation of a gasoline motor, it is customary to dispense with the services of a capable mechanical engineer. It must be remembered, however, that such a locomotive is a power house on wheels. Many parts of the engine, radiator and transmission cannot be copied from the automobile owing to the severity of the service. The article shows how the mechanical details have been modified to meet mining conditions.

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The gasoline mine motor possesses certain advantages not present in any other form of haulage. Its flexibility is extreme. It can go wherever the rails are of sufficient weight to carry it. It does not require trolley wires, rail bonding, a power plant, or a pipe line, or even a charging station, and it can do several hours' work without needing a fresh supply of gasoline and water. In many cases the smaller motors will run for an entire eight-hour shift with one filling of gasoline. The motor has the same pulling capacity in relation to its weight that is possessed by any other form of traction haulage. It can go just as fast, if not faster, than either electric or compressed-air motors, and it is quite easy, under ordinary mining conditions, to prevent any leakage which would cut down its efficiency.

A Power Plant on Wheels Needs the Attention Given to One in a Power House

In regard to the endurance and reliability of gasoline mine motors, our experience has been contradictory. Many of our locomotives have been operated since they were installed at a low repair rate and have been as reliable as their owners could desire. A few have been expensive and not at all reliable. Some of these failures have unquestionably been our own fault. Even with the best intentions in the world, every manufacturer occasionally lets material or workmanship which is not up to standard pass through his shop, and this danger is greatly increased when the machine which he is manufacturing is as completely new as is the gasoline mine motor. Others of these machines did not give steady service owing to the fact that a motor requires intelligent attention at regular intervals, and this provident care was not given it.

It must be remembered in comparing this type of haulage with the other and better-known systems, that we have a complete power plant mounted on four wheels, and that in other installations power is being utilized in a substation on wheels but being manufactured in another place. If the same amount of attention were given the gasoline mine motor that is given to the entire power plant in a compressed-air or electric installation, its endurance and reliability would be fully equal to if not in excess of that of either of the other two systems.

But the gasoline motor is so convenient and so easy to slide into a mine and set to work that people are apt to get a motor and start it to run and keep it going just as long as it will turn a wheel. Naturally, with such treatment, wear, after a certain length of time, becomes rapid and breakage is ultimately inevitable. As the motors are becoming better understood, and the few parts which require attention are being discovered by the operators, the repair accounts are decreasing and the days during which the motors are out of service are becoming fewer.

The locomotives on every railroad are inspected by skilled men, at the end of every trip and necessary repairs are made immediately. If the gasoline motor happens to get an inspection once a week, it is fortunate; and I have known of cases where the locomotive was expected to run for five or six months without repair or adjustment of any kind. A day's work expended on the motors once a month will yield long returns in the way of low repair accounts and extreme reliability.

The Traction Qualities of a Gasoline Motor

These motors can pull as much coal as any locomotive of equal weight. We provide two speeds in each direction, which are approximately four and eight miles an hour, the low speed being used for starting the trip and for extremely heavy hauls on hard grades. Most of the work is done on high gear, under normal conditions, and owing to the flexibility of the engine, the speed of eight miles an hour is in many cases exceeded.

Another feature which makes the motor of considerable pulling capacity is the fact that it is quick and handy. In order to reverse the motor it is only necessary to move one lever about 12 in. Many times I have seen the motors run in one direction, when light or without a load, and then on the reverse lever being thrown over into the opposite side the motor would slide along the rails and the wheels turn rapidly in a direction opposite to that in which the motor was going.

Advantages of 4-Cylinder Opposed Horizontal Engines

We use a 4-cylinder, double-opposed, horizontal engine. This arrangement is not common, but we think we gain several advantages from this type of construction. In the first place, we are able to reduce materially the height of the motor without decreasing the size of the engine. In the second place, a double-opposed horizontal engine is better balanced than one of the vertical type. Third, we are able to oil the pistons with less danger of oil smoke than with the splash system used in automobiles, which has not proved well adapted to underground work. Fourth, and most essential, by using the horizontal opposed engine, we are able to get at all working parts by removal of the top without its being necessary to run the machine over a pit or to remove the entire engine from the frame.

Cooling by Direct Contact with Water

Next to the engine toward the front end of the machine is the fan. In our experiments with the original motors we tried to use the ordinary automobile type of

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Note—Third part of an article read before the West Virginia Coal Mining Institute June 24, 1913, at Morgantown, W. Va., entitled "Gasoline Motor Haulage in Mines." The first part entitled "History of the Gasoline Mine Motor" was published July 19, Vol. IV, p. 80, the second entitled "Solutions of Two Gasoline Motor Problems" appeared July 26, Vol. IV, p. 118.

*Mechanical engineer, Geo. D. Whitcomb Co., Rochelle, Ill.

radiator, but we found that in order to be efficient, the elements of the radiator must be thin, and with the shaking and jarring of the motor and the constant danger of pieces of coal or slate striking various parts of the mechanism, it was utterly impossible to keep this radiator from leaking.

We therefore abandoned the radiator and put, on the two sides of our machine, a modified cooling tower. Water is pumped into the upper part of this chamber and drops down in the form of a spray. Through this water shower the air blows, forced by the fan which I have just mentioned. This gives us a cooler which cannot be overheated, and in which the parts are few and of great strength. The system is easy to take apart and clean. All passages are of fair size and contrast favorably with the restricted air channels in the automobile radiator. The device is bolted together so that a man with a monkey-wrench can take it apart, clean it, and put it together again without trouble, this construction contrasting to advantage with the automobile radiator which can be repaired only by an expert with the use of a soldering iron.

Reversing Gear

The bevel pinion engages with two bevel gears which it drives, of course, in opposite directions. These revolve loosely on a common shaft. A friction clutch is provided for each gear, and when either of these is in action, the shaft is rotated in the direction in which the bevel gear to which it is thus attached is revolving. In this manner by putting one friction clutch or the other in operation we obtain our forward or reverse motion. These friction clutches are of the disk type, the alternate disks being filled with holes in which are inserted small plugs of cork. These extend about $\frac{1}{32}$ in. beyond the surface of the large disk and are the only things which are in contact with the intervening steel plates.

Through the action of a force pump and spray heads these disks are constantly bathed with oil. We tried every known form of cone clutch and were unable to find any that would stand the extremely severe service expected, and not until we came to this cork-insert disk clutch did we find one which would stand the severe strains for any reasonable length of time. Under normal conditions the cork-insert disk clutch lasts a long time.

How the Speed Is Regulated

Keyed on to this same shaft are two spur pinions of different diameters which each engage with spur gears running loose on the secondary transmission shaft. These gears engage with that shaft through jaw clutches, these clutches being interlocked with the friction clutch so that they cannot be disengaged or engaged unless no power is being transmitted through the mechanism. In this way we get two speeds in each direction. From the secondary transmission shaft we chain down to the front axle with double chains and from the front axle we chain back again to the rear axle.

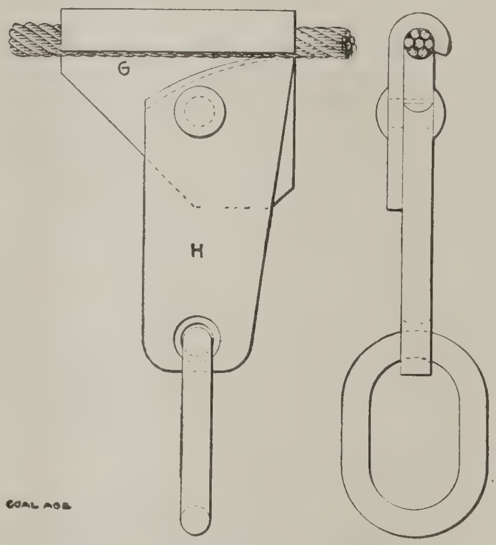
I do not know of a single part of the motor that has given more complete satisfaction from the very first than this chain drive. It seems to be durable and to give but little trouble, which could not be said of the *gear* drive to the front axle, which was used in some of the earlier motors. If the chains do happen to break, the cost of replacement is not excessive, as a full set for the 6-ton motor can be purchased for less than $40. Although some of the machines have been in use two or three years, we have had practically no sprockets to replace, those originally furnished still being in service.

We believe that the gasoline motor offers a means of haulage advantageous in so many ways and usable under so many conditions that its advent is almost revolutionary. It can be used, we believe, anywhere in a mine where there is a reasonable current of air. Its cost of installation is limited to the cost of the motor and is usually about one-third to one-half the cost of the installation of any other form of traction haulage.

Clutch for Inclines

Upon an incline of the Gerhard mine in the Saar district, Germany, is used a cable clutch which was designed by Josef Scherer, of Louisenthal. It is described in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1.

On the grades of 20 deg. and more, the cast-iron clutches with edge clamping arrangement did not give good service. They often broke under the heavy strains put upon them, letting the cars free and causing considerable damage. This led to the use of the clutch here described, which, because of its simplicity and strength, seems to be a good one.



Front and Side Views of Clutch

This rope clamp consists of the wrought-iron housing *G* and the lever *H*. Housing and lever are pivoted together by a strong rivet. On the lower end of the lever is a link for the attachment of the car.

After the lever has been turned backward by hand, the housing is hung on the cable. As the car is started its weight pulls the eccentric edge of the lever tight against the rope. When the car has reached the loading station at the foot of the incline, where its weight no longer has an effect, the clutch is automatically released and can be taken off without further ado. The price of the Scherer clutch, homemade, is about 45c. The rights in the invention are understood to be secured to the mine management.

Meeting of Southern Appalachian Coal Operators' Association

The annual meeting of the Southern Appalachian Coal Operators' Association was held in Knoxville, Tenn., July 25, with an excellent attendance. Several matters, such as markets, freight rates, car supply, etc., were discussed, with the best of good feeling and mutual benefit to all.

The members of this association are coöperating to make a success of the First-Aid Field Day, which is to be held in Knoxville, Sept. 20. It is said that teams from more mines have been entered for this contest and more prizes of greater value have been offered than for any field day ever held in this country.

The annual meeting was highly satisfactory and harmonious. The association is a compact organization which is doing valuable work for the field as a whole, thereby benefitting each individual operator. This is due probably in no small part to the officers, who are zealous men of keen foresight and large ideas.

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The Illinois Mining Institute

At the recent Mining Conference, held at Urbana, Ill., May 10, 1913, the following committee of five were appointed to arrange for a meeting to consider the organization of a mining institute in Illinois: J. D. Peters, Chicago-Carterville Coal Co., Carbondale; A. S. Allard, Bunsen Coal Co., Westville; H. H. Stoek, professor of mining engineering, University of Illinois, Urbana; Joseph Pope, district president U. M. W. A., Springfield, and Martin Bolt, chief clerk, State Mining Board, Springfield.

At the call of this committee, a meeting was held in the parlors of the St. Nicholas Hotel, Springfield, June 24th, and attended by a large number of mining men from all parts of the state. The meeting was called to order by Mr. Bolt, who was made temporary chairman. Oscar Cartlidge, manager, Mine Rescue Station, Springfield, was selected temporary secretary.

The following committee was appointed to prepare a plan of organization: John H. Ross, superintendent, Superior Coal Co., Gillespie; W. S. Burris, state mine inspector, Danville; and Geo. S. Barrowman, mine manager, Eldorado.

The committee prepared a plan for organization, which was presented at the afternoon meeting. Later a constitution was prepared and adopted. The following officers were then elected: President, John P. Reese, general superintendent, Superior Coal Co., Gillespie; first vice-president, Andrew Fletcher, superintendent, Taylorville; second vice-president, Robert Eadie, sub-district president, U. M. W. A., Cantrall; secretary-treasurer, Martin Bolt, chief clerk, State Mining Board, Springfield.

The following were chosen as an Executive Board: A. J. Moorshead, Madison Coal Corporation, St. Louis, Mo.; Gorden Buchanan, Chicago; Harry Fishwick, miner, Springfield; Thomas Moses, superintendent Bunsen Coal Co., Westville; H. H. Stoek, professor of mining engineering, University of Illinois, Urbana.

It was decided to hold the next meeting in November, at a time and place to be designated by the Executive Board. The outlook is bright for a successful meeting and a large membership. Short addresses were then made by the following gentlemen: David Ross, secretary, Bureau of Labor Statistics, Springfield; Walton Rutledge, mine inspector, Alton; Hector McAlester, mine inspector, Streator. The president, John T. Reese, made a very interesting talk, in connection with the work of organization, which closed the meeting.

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Alabama Coal Operators' Fifth Annual Outing

Special Correspondence

The Alabama Coal Operators' fifth annual outing to the coal mines of Alabama was held at Marvel, Ala., July 26. A special train left the Birmingham depot at 9 a.m., returning at 6:30 p.m. About 600 tickets were presented on the train and quite a number of guests drove into Marvel from the camps near by.

The following program was carried out:

10:45—11:15. Inspection of mine operations, town and commissary of the Roden Coal Co.

11:15—1:30. Morning session in Roden Co.'s auditorium.

1:30—2:30. Barbecue served in school hall.

2:30—4:30. Afternoon session in auditorium.

At both sessions in the auditorium moving pictures were sandwiched in between the addresses. The films were furnished by the Bureau of Mines and are the same as those shown in various parts of the country.

George F. Peters, president of the Climax Coal Co., of Maylene, presided at the meetings in the auditorium. The first paper of the session was presented by Frank Crockard, vice-president and general manager of the T. C. I. & R. R. Co. entitled, "What a Coal Operator Can Do to Provide for the Welfare of Employees and Their Families." The paper covered a wide range of topics, namely; ice and water supply, flies, mosquitoes, garbage, bath houses, food preparation and supply, education, stoves for school houses, sanitary drinking fountains, etc.

Great strides have been made in Alabama along these lines during the past two years, and as Mr. Crockard and his company have always taken the lead in this work, his address received close attention.

The second address of the morning session, "The Commissary; Its Indispensability and Purpose," was given by B. F. Roden, president of the Roden Coal Co.

There is much discussion in Alabama at the present time as to the desirability of the mine commissary; one side seeing in it only its possibilities as a "gouger" of helpless employees, while the other faction is equally positive that the improvident could not exist without it. Mr. Roden's paper was a temperate convincing exposition from the latter standpoint. One point was especially dwelt upon; namely, under the present garnishment laws of Alabama, the mine commissary is indispensable to many miners' families. Mr. Roden also emphasized the fact that if all companies would prohibit their operating officials from soliciting for the commissaries, the employees would soon get away from the idea that they are being coerced into trading there.

The last paper of the morning session was presented by L. M. Jones, of the United States Bureau of Mines, on

"Prevention of Haulageway Accidents." This paper was largely a summary of Miners' Circular No. 11, by the same author, issued by the United States Bureau of Mines. Three principal causes for such accidents were emphasized, namely: narrow roadways, lack of sufficient number of holes along haulageways for men to reach in case of danger, and trolley wires where workmen must travel.

One Way to Reduce Accidents

At the afternoon session the first paper was presented by C. H. Nesbitt, chief mine inspector of Alabama, on the subject of "Value of a Safety Inspector and Instruction for Each Coal Mine." As only one company in Alabama has so far deemed it necessary to employ safety inspectors, the paper was timely. Mr. Nesbitt referred to the fact that in 1912 over 50% of all fatal accidents in Alabama occurred at the working face, and "upon investigation it was found that a majority of these fatalities could have been avoided if proper instruction and supervision had been given." He also referred to the wonderful record made by the H. C. Frick Coke Co. in reducing accidents at its mines through the introduction of safety inspectors and instructors.

Discussion of Mr. Nesbitt's paper was given by E. Flyn, chief inspector of the T. C. I. & R. R. Co. Mr. Flyn made the rather startling statement that 80% of all accidents coming under his observation were attributable to carelessness, and most of them could have been avoided by proper supervision and instruction.

The last paper of the meeting was given by J. J. Rutledge, of the United States Bureau of Mines, on "Coal Mine Ventilation and the Removal of Gas." Most of the paper dealt with the subject from an elementary standpoint, but during the reading, several interesting experiments were mentioned. Mr. Rutledge stated that Mr. Williams, of the Bureau, has recently made some experiments in mines in the State of Illinois to determine the efficiency of stoppings, and the results were startling. Efficient fans were rendered almost useless by leaky stoppings. He also mentioned results obtained last winter by installing outside air courses to heat the air to about the temperature of the mine, by means of exhaust steam from the fans just before it entered the mine intake proper. He suggested that beneficial results could be obtained in mines where falls of roof were common by reversing the process in summer; that is, cooling the ingoing air to the temperature of the mine.

Printed copies of the papers presented were not distributed in advance, as had been done in previous years, and as a result discussions were almost lacking.

The size of the auditorium at Marvel (it is used as a church on Sunday, and often during the week picture shows are given), as well as the size and design of the public school, were commented on by all who saw them on this day for the first time. Surely the day of pleasureless mining camps in Alabama is passing.

In conclusion I wish to suggest that an excellent opportunity to illustrate the workings of sanitary measures was overlooked. During both sessions in the auditorium buckets of lemonade were passed through the hall and *all* of the members assembled were supplied through a *single* drinking cup. After the excellent description of sanitary drinking possibilities by Mr. Crockard the lone cup gave some of us the creeps.

Coal Washing in Kansas Not Profitable

By Barry Scobee*

The only coal washer in the mining district about Pittsburg, Kan., or in the whole state for that matter, is not a paying proposition from the standpoint of washed coal. It used to be, but the situation was changed by the development of the gas and oil fields which adjoin the coal district on the west.

The plant here referred to is owned by the Wear Coal Co., of Pittsburg, and is situated seven miles northwest of that town in the heart of what now is the newest district, just being opened up. In reality there are two washers, but they stand side by side and are owned by the same company.

The Only Coal Washery in Kansas

Washer No. 1 was put up in 1908, and No. 2 in 1910. At that time the oil and gas fields were at the height of their prosperity and output. This caused the demand for coal to decrease until the market was overloaded with mine-run stuff. What fuel was sold did not bring the price the operators thought it should, and as a consequence the Wear people decided to wash their coal, hoping the cleaned product would sell fairly well in competition with gas and oil.

The capacity of the first washer was 125 tons an hour. The coal sold so well that in 1910 washer No. 2 was put up, it being in capacity equal to the first. Both ran nearly all the time, and the demand for the cleaned slack often was greater than the supply. The washed coal found a market for itself in a district hitherto supplied only with dirty slack.

During the past 12 months, oil and gas in Kansas have lost much of their importance. Many authorities claim that the present wells cannot supply the demand. As a consequence, coal is again coming into its own in all this section of the country, and it is no longer necessary to wash the coal to get a good price for the product. Operators claim that more money can be made on unwashed coal, and as a result, the Wear company's washeries are idle most of the time. The coal is generally sold as it comes from the ground, except that most of it is screened.

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The Manchuria Ry. Co. operates five coal mines, which give employment to 7000 Chinese laborers, who work for 25c. per day. The output is 300 tons for each mine per 24 hours. Though the coal is bituminous, anthracite methods of mining are used, as the seam is too thick (125 ft.) to make bituminous methods practical.

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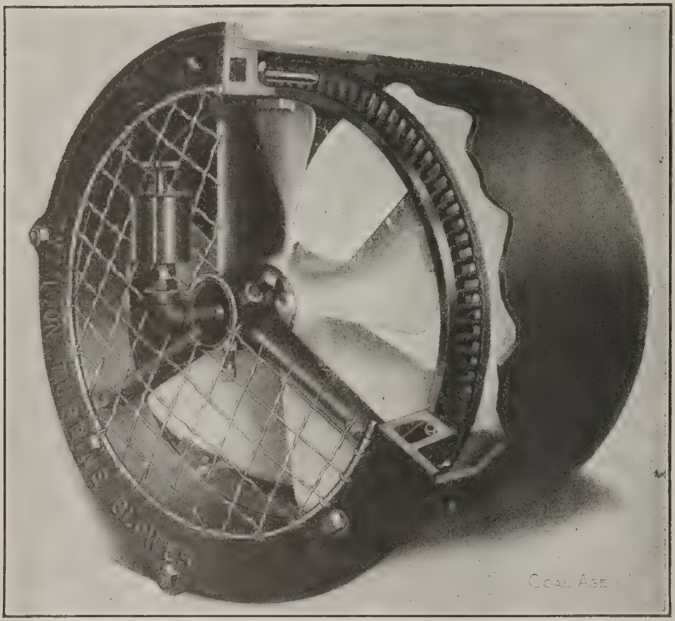
*316 East Eighth St., Pittsburg, Kan.

POWER DEPARTMENT

Improvements in the Typhoon Turbine Blower

The Typhoon turbine blower made by the L. J. Wing Manufacturing Co., of New York, which is familiar to many colliery power-house men, has recently had some important improvements embodied in its construction. These consist mainly in largely increasing the strength of the blading of the turbine and in mounting the rotating parts upon suitable ball bearings which absorb both the radial and thrust stresses.



Showing Improved Type of Turbine Blower

As is well known, this type of blower consists in mounting a single-stage turbine upon the rim of a highly efficient propeller type of fan. The construction of the turbine, in its improved form, is particularly interesting. The sherardized steel turbine blades are cast into a tough bronze ring upon their inner ends. The outer ends of the blades are bent over in an L-shape and are all welded together by means of an oxyacetylene flame. This method of construction renders the entire blade ring practically a unit and absolutely immune from the trouble which was formerly so frequently encountered in turbine construction, namely, the throwing of blades.

The rotating unit, consisting of the fan and its driving turbine, is mounted on two separate ball bearings placed a few inches apart. The bearing, as a whole, is entirely inclosed so that it is impossible for dust or dirt to get into it. The lubricant used is a soft mineral grease fed through a grease cup. The exhaust steam from the turbine mixes with the air supplied by the fan and has the effect of reducing considerably the amount of clinkers. This is an important consideration with many coals, as a high sulphur content or a fusible ash will ordinarily rapidly form clinkers of large size.

In the accompanying illustration, the outer casing of the machine has been cut away in order to show the interior parts. In ordinary practice, this casing is built into the setting walls of the boiler and thus takes up no additional floor space. The machine is at present manufactured in three standard sizes, namely 12, 16 and 20 in. The amount of air furnished varies, of course, with the size of the fan and its speed of rotation. The particular advantages gained by the employment of this blower are increased capacity or the utilization of fine or low-grade fuels, which would otherwise be unburnable. A draft pressure equivalent to 2½ in. of water may be easily obtained with one of these machines.

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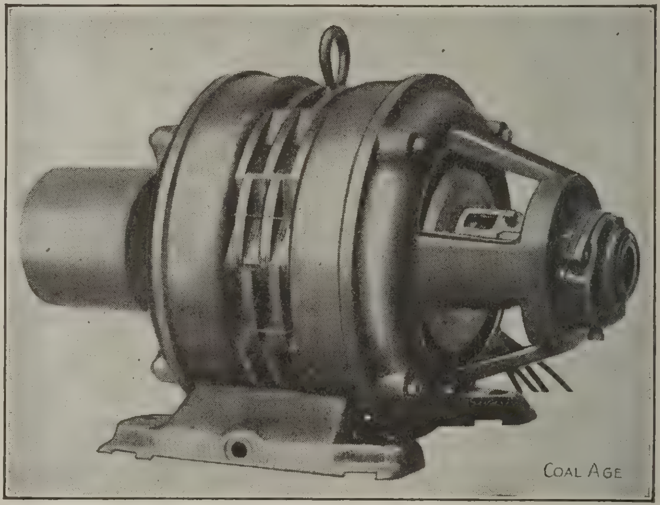
A New Westinghouse Single-Phase Motor

The Westinghouse Electric & Mfg. Co. has placed on the market a new line of single-phase motor made in capacities of from 2 to 10 hp. and suitable for the majority of constant-speed applications within their capacities.

This machine is of the repulsion-starting type and when up to speed, runs as an induction motor. For most applications, it can be connected directly to the line, but where low starting current is desired, a rheostat can be used.



New Single-Phase Motor

The frame is so designed that it combines great strength and radiating capacity with minimum weight and over-all dimensions. The laminations are riveted together under pressure and pressed-steel end plates are riveted to the unit thus formed. The foot, or base, is of pressed-steel plate securely riveted to the end plates. This use of pressed steel marks an important step forward in the design of large single-phase motors.

The bearings are large and dust-proof. The rotor coils are form-wound and arranged to permit excellent ventilation. The commutator is of the radial type with undercut mica segments. The shaft can be pressed out of the rotor without disturbing the windings or commutator.

Each motor can be arranged for operation on either 110- or 220-volt circuits.

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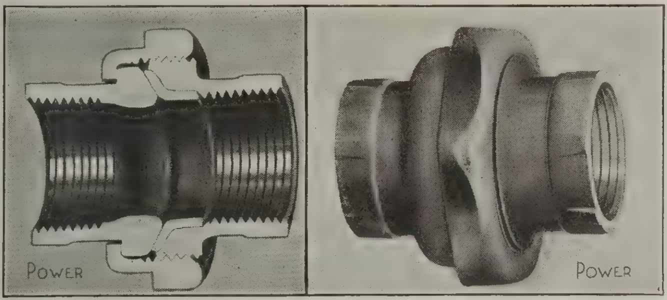
Mark Cold-Drawn Steel Union

This union is made seamless from cold-drawn flat-strip steel. Each union is treated by a sherardizing process, to render it immune from rust and corrosion, says *Power* of June 10, 1913. This process consists of heating the parts with zinc dust in a retort, which causes the zinc to penetrate a short distance into the metal and also leave an exterior coating. As the threads are cut before the treatment, they are protected against corrosion without altering their sharpness and fit.



Sectional and Exterior View of the Mark Union

The Mark union, which is manufactured by the Mark Mfg. Co., Chicago, Ill., consists of three main parts, male and female ends, which are joined by coupling nuts. A brass ring *C* fits between the coupling ends as shown. The union is threaded to Briggs' standard for pipe threads and carries the same taper as the pipe. The expansion and contraction of the union under heat and cold is practically the same as that of the pipe.

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Turbine Pumps with Electric Drives

Progress in the manufacture of high-grade material, and its use for high-speed rotary machines, has occasioned a continual increase of such speeds. For electric drive with alternating current and a frequency of 50 cycles per sec., a limit is reached at 3000 r.p.m. Such a speed is today often employed for motors driving centrifugal pumps, turbo-blowers and compressors. Indeed, for small rotary machines of this type such a speed is often insufficient, so that a steam turbine is frequently substituted.

The difficulties arising in the mechanical construction of high-speed motors have readily been overcome in the light of experience in the building of turbo-generators. Problems remained, it is true, in the design of rotor-collector rings and brushes, as well as short-circuit and brush-lifting devices, but today these obstacles have been surmounted. Alternating-current motors can be built and used which run at 3000 r.p.m. and deliver over 1000 hp., yet are as reliable as motors of 1500 r.p.m.

In driving these high-speed motors underground in mines containing firedamp, the ordinary safety precautions answer, so that since such machines are frequently mounted near the loading station, and, hence, are in the ingoing-air current, it suffices, if inclosure be necessary, to make only the collector rings gas proof.

Experience in general has taught that high-speed pumps, the efficiency of which is generally somewhat better than that of sets which run at the lower speed of 1450 r.p.m., but whose cost and space occupied are much less, can be employed advantageously only for pumping pure water. Sand, ashes, etc., as well as acid water, are decidedly destructive to pumps running at high water velocities. Therefore, it is best to use high-speed sets only for perfectly clean water, or where first cost is important, or when, as in the case of auxiliaries, for example, they are to be run only at intervals.

Finally, it may be asked whether the high potential motors may, under some circumstances, be successfully and reliably employed in wet places, as, for example, in sinking. Practice has shown that motors can hold their own even under such conditions, but it is advisable, in case they run intermittently, to maintain them constantly somewhat warm by keeping the field in a circuit at a suitably low voltage. For this purpose a small transformer may be provided, the low potential side of which has several contacts, so that the voltage may be readily adjusted to the heating requirements of the motor. If this machine should become so wet from dripping water that it is inadvisable to connect it with a low potential circuit, there can be placed around it a considerable number of incandescent lamps to dry out most of the dampness by their radiation.

Note—Translated by E. P. Buffet.

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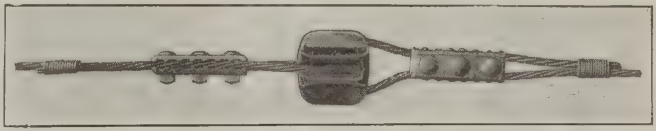
A New Porcelain Strain Insulator

A new porcelain strain insulator of remarkably high strength, both mechanically and electrically, has just been placed on the market by the Westinghouse Electric & Mfg. Co., of East Pittsburgh, Penn. The manufacturer recommends these insulators for use on 1500-volt direct-current railway work and on 2200-volt transmission lines, a class of service for which porcelain insulators have been seldom used in the past.



Strain Insulator, Showing Method of Application

It is claimed that the insulators will stand more strain than any cable used in line construction that will pass through the hole. They are of the interlinking type which makes it impossible for cables to separate even if the insulator should become shattered.

The glaze is of a dark-brown color, which does not attract the attention of those mischievously inclined. Sharp corners, which would be apt to chip have been avoided, and the shape of the grooves is such that the wires lie naturally in them. A large creepage distance is provided which makes it suitable for high voltages.

The smallest size of these insulators has a flashover voltage on rain test of over 13,000 volts, and the larger size, over 20,000 volts. The tensile strength of the larger size insulator is over 23,000 lb., and its dimensions are only 5x4½x4½ in.

Transformers for Outdoor Service

Special Correspondence

SYNOPSIS—The demand for small-capacity transformers for installation out of doors has greatly increased in the past few years. The principal difficulties encountered are the radiation of heat due to transformation losses within the windings and the introduction of the high-tension cables. This article tells how both of these obstacles are overcome.

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Almost since the dawn of the electric era small lighting transformers of comparatively low potential have been installed out of doors and have satisfactorily withstood the service, their superior design and construction making them proof against the action of the elements. But, no effort was made at that time to develop a line of high-tension power transformers for outdoor service, owing to the demands for power then being confined to centers of population where the main stations and substations were located.

Recently, however, owing to the fact that it is often desirable to tap a high-tension line where the load is not sufficiently great to justify building a substation, high-tension transformers of all capacities and for any commercial voltage, have been designed for outdoor service.

An impetus has been given to this development by the phenomenal demand for electric power made by would-be consumers, located in the country along high-tension transmission lines, who realize the advantages of electricity for both power and light, but who do not require enough current to justify the expense of a substation.

The installation of the apparatus out of doors obviates the necessity of constructing new buildings or enlarging an existing station to provide room for the new equipment, and so may greatly reduce the cost of expansion. Yet, it is probable that very few persons outside of those connected with the design or sale of power transformers realize the rapid progress that has been made in the use of these instruments in outdoor service and the excellent records for reliability that those installed have made.

The familiar pole-type transformer, used on city distribution circuits, having a potential of from 2300 to 4000 volts, is comparatively simple to design for outdoor service, on account of the relatively low voltage. Standard transformers in capacities of from 1 to 100 kv.-a., are readily obtainable for this class of service, and all sizes embody practically the same construction with the exception of the tanks.

The core for these transformers, as built by the General Electric Co., is made up of four magnetic circuits of equal reluctance placed in multiple. Each circuit consists of four legs arranged to form a rectangle, one of these legs being built up of two widths of punchings, in such a manner as to form a tenon on the outside of the leg.

When the four circuits are assembled with these four legs together, the latter interlock to form a central leg upon which the winding is placed. The core, when viewed end-on, has the form of a cross. This construction brings the oil in contact with an unusually large part of the surface of the core and coils, so that undue heating of these parts is not possible under normal load or reasonable overloads.

As a result of the use of a thick mica shield between the primary and secondary windings, the highest degree of safety, which is the most important characteristic of a transformer, is obtained. This mica shield is designed to withstand a potential of from 15,000 to 20,000 volts and is practically indestructible when used on circuits having voltages around 2500.

An abundance of ducts and channels, through which the circulation of oil is maintained, results in uniform temperature throughout the transformer and eliminates the detrimental effects of unequal expansion in the coils with consequent rubbing and injury to the insulation.

All live terminals are located below the surface of the oil to prevent surges or lightning discharges from arcing over and short-circuiting the coils, or grounding to the tank.

The impedances of transformers of the same size vary but slightly, so, when such instruments are operated in multiple, each takes its proper share of the load.

The use of a special alloyed steel in the cores of these transformers has brought the core loss down to a minimum value with a consequent low loss when the transformer is slightly loaded and, as this steel is non-aging, there will be no increase in the core loss after an indefinite period of operation.

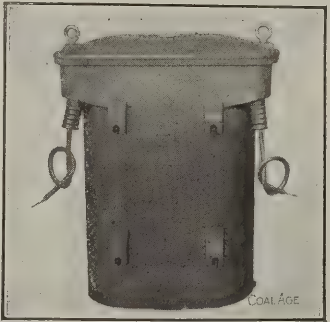

Fig. 1. A 10,000-Volt, 5-Kv.-a., Type H Transformer

Transformers below 25 kv.-a. capacity are placed in smooth cast-iron tanks. Above this size these receptacles are corrugated in order to obtain sufficient surface for radiation of the heat generated within the transformer due to the losses. The largest two sizes, if made of cast iron, would be too heavy and bulky for suspending on poles, so they are made of corrugated sheet steel. For operating on poles in the open and on the walls of buildings under the eaves, the tanks that contain these transformers must be weatherproof.

The cast-iron covers are, therefore, provided with overhanging edges and the joint between cover and tank is sealed by a gasket, effectively preventing the entrance of moisture and dust. The cover is securely fastened to the tank by two eyebolts, which also serve as a means of lifting the transformer. With eyebolts, the cover can readily be removed without the use of a wrench.

The primary bushings have thick walls and the portion which extends beyond the transformer is hemispherical in shape, so as to give a long creeping distance from the primary conductor to the frame. The rounded surface is not fractured or chipped, as it would be if the bushing had sharp corners.

Power transformers, 100 to 500 kv.-a., for distributing potentials, (2300-600), and all transformers above 6000 volts up to 500 kv.-a., employ a different type of construction than the distributing transformers above described. Here, the straight two-legged core-type construction is employed. The core consists of two vertical legs connected together at the top and bottom by yokes, thus forming a rectangle.

Cylindrical coils and insulation cylinders are placed concentrically over the two vertical legs of the core, the high-voltage winding being outside those of the low-voltage, and separated therefrom by oil ducts and the above mentioned insulating cylinders.

Two Methods of Cooling

Power transformers for all voltages may be self-cooled or water-cooled. In self-cooled transformers, the heat arising from the losses in the instrument itself is dissipated into the surrounding air by providing a tank with sufficient external radiating surface to limit the temperature inside the transformer to a safe value.

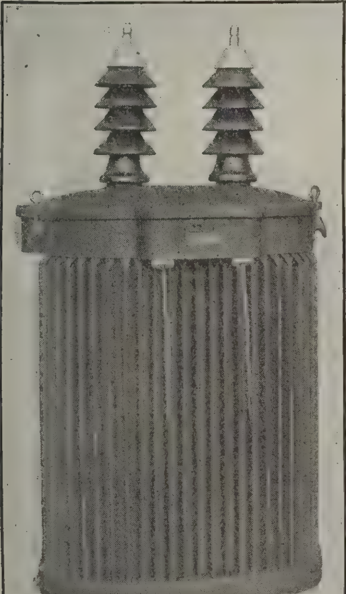

Fig. 2. A 33,000-Volt, 20-Kv.-a. Outdoor Transformer

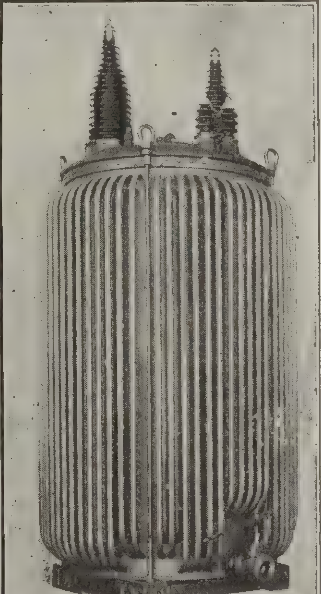

Fig. 3. A 110,000-Volt, 100-Kv.-a. Self-Cooled Outdoor Transformer

The tanks for these transformers are made from sheets of steel corrugated under great pressure and electrically welded together. A base and rim are cast directly to the corrugations, the joint between them being an actual weld. This forms a rigid one-piece tank which, when supplied with a suitable cover and gasket, is readily adapted for outdoor operation.

The main difficulty, however, in designing high-voltage transformers for outdoor use is encountered in bringing the leads out of the tank. In transformers below 17,500 volts, this is easily accomplished by leading them through porcelain bushings set in, or underneath, the rim around the top of the tank. For potentials above 17,500 volts this method is unsafe, so the leads are brought straight out through openings in the cover and protected from the weather by a porcelain covering, built up of several petticoats.

In water-cooled transformers, the heat generated by the losses in the transformer is artificially extracted from the oil by circulating cold water through a seamless coil of pipe placed in the upper part of the tank and submerged in the oil. The expensive corrugated tanks for radiating the heat are, therefore, unnecessary, so a plain steel tank is provided. Transformers in these tanks are suitable for outdoor operation when equipped with porcelain petticoat leads, brought out through metal bushing holders.

Transformers having a capacity greater than 500 kv.-a. are built of the shell type, i.e., the core surrounds the windings, which is in direct contrast to the core type, where the windings surround the core.

Self-cooled, shell type transformers are not built in capacities much above 3000 kv.-a., because of the large and expensive tank construction necessary to obtain sufficient radiating surface.

The extra radiating surface necessary for self-cooled transformers above 750 kv.-a. is obtained by compounding the corrugations, i.e., two plain corrugated sheets are welded together to form one large corrugation. This tank has about 65% more radiating surface than those of plain corrugated construction.

Another type of receptacle for large capacity, self-cooled transformers is known as the "tubular" or "pipe" tank. This consists of a boiler-plate tank having the ends of a double row of vertical steel tubes welded into it at the top and bottom, thus providing a natural circulation for the hot oil from the upper to the lower portion of the tank through these external pipes, where the heat is quickly dissipated. These tanks are very efficient.

The majority of transformers above 1000 or 1500 kv.-a. are water cooled. The tanks for these machines are made from heavy boiler plate, being round for single-phase transformers and elliptical for three-phase units. They are perfectly plain and smooth, having no corrugations or pipes, which are unecessary in this type of equipment.

All these various tanks are designed for outdoor use when furnished with a suitable cover, gasket and leads.

Three large water-cooled transformers, 2750-kv.-a. each, have recently been designed for outdoor operation on a 110,000-volt circuit. These are in successful operation at the present time. Some 1000-kv.-a. self-cooled transformers in tubular tanks are also operating satisfactorily outdoors on a 110,000-volt circuit.

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A Heavy Illinois Producer

The following is the record for the new Staunton Coal Co.'s mine located at Livingston, Ill. (T. G. Hebenstreit, superintendent) for the year ended June 30, 1913:

The total production of the mine for the year was 848,721.1 tons, the actual working time being 212 days and 7 hr., making the average hoist per day 3986 tons. The total tonnage produced since October, 1904, amounts to 4,531,844.55 tons. During the month of June of the current year the mine worked only 9 days and produced 36,992.5 tons, making an average of 4110 tons per day. A breakdown in the hoisting engine, early in February, so restricted the production, that the average daily hoist for the first half of the month was only 3494 tons; had it not been for this accident, the production for the year would have averaged 4000 tons per day.

From data available at the present time, this is the record production for the state, and it is probable that no other mine will show such a tonnage. It is a noticeable fact that high-capacity mines are increasing in Illinois, while the smaller producers are on the decrease.

The Mine Fan

By Berton Braley

(Written expressly for "Coal Age.")

I am the lungs of the mine,
I am the guard against death;
The air in the workings grows stale
And the faces of miners grow pale
When I cease to take breath.
So I whirr and I whirr and I whirr
Till the chambers and entries below
Feel the dust-laden air all astir,
And the lamps, which were faint and ablur,
Shine out with a livelier glow,
Proving my worth as they shine,
I am the lungs of the mine.

I am the lungs of the mine,
I am its safety, its life,
In all of man's underground strife
With the heat and the damp and the dust,
I am his trust.
The uttermost depths of the mine,
The furthermost heading of all
Are under my thrall;
And the wind that goes sweeping so free
Through the gloom
Of each runway and room
Is from me.
So the damps and the gases they flee
On the wings of my breath;
And I shield men from death
And I give them the vigor to dare
The bowels and depths of the earth
For the coal that is there!

O my song is a deep-noted purr
As I whirr and I whirr,
Doing my task as I sing,
Keeping the workings astir
With the flood of pure air that I bring;
And the deadlier air I remove,
And thus do I prove
My value, my worth,
To the men who go under the earth
With the lights on their foreheads ashine,
For I am their life and the breath
That guards them from death,
I am the Lungs of the Mine!

A New Deputy Mine Inspector

House Bill No. 206, introduced by Representative Spogen and passed by the last legislative assembly of the State of Montana, provides for the appointment of a deputy coal-mine inspector, to be under the supervision of the state coal-mine inspector and defines his duties, qualifications and salary. The bill has since been signed by the governor; but, as yet, no appointment has been made to fill the new position. Joseph B. McDermott is the chief mine inspector of Montana.

The bill is as follows:

Sec. 1. The governor, by and with the advice and consent of the Senate, shall appoint one deputy state coal-mine inspector. The said deputy state coal-mine inspector shall be selected from among the list of names certified to by the county examining board for mine foreman, fireboss or mine examiner, as having successfully passed the examination for mine foreman and been granted a certificate of competency as such by a county examining board, in Montana.

Sec. 2. He shall have like powers and duties as the state coal-mine inspector, but shall be under the supervision, and subject to the orders of, and report to the state coal-mine inspector any and all acts pertaining to the inspection of mines, investigation of accidents, scales, wash houses and other duties of the deputy state coal-mine inspector; and shall reside in and perform the duties of deputy state coal-mine inspector, in the districts assigned to him by the state coal-mine inspector. The deputy state coal-mine inspector shall receive a salary of twenty-one hundred ($2100) dollars per year, and all necessary traveling expenses. He shall file with the state treasurer, a bond in the sum of five thousand ($5000) dollars, approved by the governor, for the faithful performance of his duties.

Sec. 3. This act shall be in full force and effect from and after its passage and approval.

Increased Coal Production in Colorado

Coal mining as an industry began in Colorado in 1864, when a production of 500 short tons was recorded. In 1876 the production reached, for the first time, a total exceeding 100,000 tons, and six years later, in 1882, according to the U. S. Geological Survey, it had attained the million-ton mark. Since that time, the increase has been almost uninterrupted. The production exceeded 3,000,000 tons in 1890; ten years later it had grown to over 5,000,000 tons, and in 1910 it exceeded 11,000,000 tons; but in 1912 it fell below the 11,000,000-ton mark.

Erratum

The first sentence of the article upon "Coal- and Ash-Handling Equipment," appearing on page 76 of our issue of July 19, reads: "A coal-handling equipment supplied with a pivoted-bucket carrier system is, of course, designed only for a small plant." This should have read: "A coal-handling equipment consisting of a centrifugal discharge elevator handling both coal and ashes and a flight conveyor for the coal is, of course, designed only for small plants." As is well known, the pivoted-bucket carrier may be used in plants of almost any size.

COMING SOCIETY MEETINGS

International Geological Congress—The 12th session of this organization will meet, Aug. 7, at Toronto, Can. Address of Secretary, Victoria Memorial Museum, Ottawa, Can.

Woodward and Pettebone First-Aid Excursion—The united first-aid teams of the Woodward and Pettebone mines of the D. L. and W. R.R. Co. at Kingston, Penn., will run an excursion to Harveys Lake on Aug. 15.

American Institute of Mining Engineers—This institute holds its next annual meeting at Butte, Mont., on Aug. 18 to 21, inclusive. Bradley Stoughton, 29 W. 39th St., New York City, is secretary.

Kentucky Mining Institute First-Aid Meet—This meet will be held at Central City, Ky., on Labor Day, Sept. 1.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremen's Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

American Mine Safety Association—The second meeting of this society will be held at the Bureau of Mines, Pittsburgh, Sept. 22-24. H. M. Wilson is chairman.

American Mining Congress—This society meets for its 16th annual session at Philadelphia, Oct. 20-24; the secretary is J. F. Callbreath, who has opened quarters in the Land Title Building.

Coal Mining Institute of America—Winter Session meets Dec. 4 and 5 at the Fort Pitt Hotel, Pittsburgh, Penn. C. L. Fay, secretary, Wilkes-Barre, Penn.

EDITORIALS

The New Anthracite Tax

When the Pennsylvania State legislature enacted the measure which places a tax on anthracite coal, the proceeds of which are to be used by the state and county governments, a new precedent was established. Only on one other occasion has a similar tax been exacted and this was for the purpose of raising funds during the Civil War.

It is said in justification of the act that the mining industry of Pennsylvania has greatly increased the governmental expenditures, and, further, that some provision is necessary to compensate for the loss which the state will sustain when the coal supplies are finally exhausted.

These points seem reasonable enough, but as a matter of fact they will not bear a close scrutiny. State expenditures have, no doubt, been heavily increased by the mining operations, but it is equally true that the companies are already heavily assessed, and it is safe to say that they are carrying their full share; in addition to this there are entire communities that are solely dependent upon the coal operators.

In the matter of providing for the ultimate exhaustion of the coal supplies it is difficult to see wherein this is being done. The accrued funds are to be allotted in equal proportions to the state and county authorities and will in some instances effect a reduction, if not a complete elimination of existing taxes. Were the funds devoted to the interests of the coal industry in the state, the act would be more commendable. If the mining operations have been a burden, these new funds should be applied directly to the relief of these particular burdens, as might be done by establishing a workman's compensation fund or allotting a portion to the mine inspectorate.

As to the constitutionality of the law, this remains to be tested. The National Government specifically requires that states refrain from placing any tax on products used in interstate commerce, and a large part of the hard coal mined in Pennsylvania is consumed in New York and neighboring states. Exemption from this provision, however, can be obtained by special permission and the fact that the coal is sold locally, as well as outside the state, may have some bearing on the subject. However, from any viewpoint, it appears that Pennsylvania is asking the consumers of anthracite in New York and elsewhere to pay a part of her current expenses, for any additional charge on the production of hard coal must come out of the consumer's pocket.

Generally speaking, a tax of any kind on coal is to be regarded with disfavor for the reason that it is an economically wrong principle. Fuel is a basic product upon which all industries are compelled to rely to a greater or less extent and any increase in its cost must eventually narrow its limits of application, and effect a restriction in development. The present tax is an oppressive and mercenary one at the best. In fact, it savors somewhat of the Jewish extortioner and exhibits a sordid parsimoniousness that is a discredit to the people of Pennsylvania.

The Van Swearingen Decision

It has long been thought that in accord with an extended series of decisions, it would some day be ruled that a coal or other like deed could not contain a clause giving the grantee the right to buy a part of the surface whenever he desired at a fixed price unless the deed contained a clause limiting the period during which the option might be exercised to 21 years after the death of the optioner or for some shorter period.

J. Q. Van Swearingen, judge of the Fayette County Court, has just made such a decision in the case of William Barton, Priscilla King and Harriet Coffman versus the Thaw Trust. The purchasers of the coal land in dispute were J. M. Thompson and J. K. Ewing. They resold it and with it also the right to purchase the surface, which formed part of the original deed to William Thaw, who, in turn, devised it to trustees for the use of his children, grandchildren and great-grandchildren and their survivors.

The judge has declared that this option to purchase is and has been from the beginning null and void and has ordered that this decision be entered on the docket against this clause in both the deeds mentioned.

We have no doubt that the decision will stand the test of appeal. Perpetual rights of the kind which the deed seeks to establish are against the public interest. It often becomes impossible to sell lands under such a restriction, and it certainly makes inadvisable the improvement of properties menaced by such a clause. The public interest is larger even than the need of the coal operator, and the latter will, we are sure, look at the matter from a broad national viewpoint.

The law seeks that there shall be no masterless land; as our country grows the best sites must not be made worthless by a divided, unsettled ownership. The right to buy must not perpetually exist to cloud title; it must not be legalized without limitations lest it serve as an opportunity to levy blackmail under legal sanction.

Judge Van Swearingen quoted the case of Dewey versus the Great Lakes Coal Co.; we do not like that decision and hope eventually it may be proved to be bad law. It happened that substantial justice was done when the court decided that Dewey could not prevent the coal company from using land without payment for the development of its coal mines in accordance with the wording of the deed which conveyed the coal with general mining rights and the right to use the surface for mining purposes.

To the layman the Great Lakes Coal Co. was wholly within its moral rights, as it certainly took up the land within reasonable time and before any marked increment of value had taken place, but the interpretation of the law even if correct was, we think, much to be regretted. The judge said that as there was no consideration to be paid when the land was used by the corporation, the right to the land was not contingent but was immediately vested in the coal company. The taking of the land was not a remote possibility, it was practically an accomplished fact from a legal standpoint from the moment the purchase deed was signed.

We consider that this matter was open to debate and we believe that the decision, even if perfect from the standpoint of established equity, is not in accord with public advantage. An option to use land without payment for a long period of years is no more sacred from the point of view of public advantage than the option to buy it at a price, regarded as fair at the time of contract. We cannot feel that there is not the remoteness or contingency in such a case as will make it come under the perpetuity doctrine. It is equally uncertain in both cases what part of the land will be taken for mining and when that portion will be taken. As for the consideration that the use to which reference has been made is for a period of years only and the purchase is not so limited, that is rendered of no importance by the fact that the rule is directed to remove the remoteness, not of the "cesser" or termination of the alienation of the land, but its commencement.

It seems to us that some time or other the Dewey precedent will be reversed or will be corrected by statute law. In fact, we believe that not only the right to buy, but the right to use and even the right to spoil might be placed under the rule in equity relating to perpetuities with decisions reaching back to 1616. Surely the threat to injure property should not perdure from century to century, making the land threatened worthless meanwhile. The vendor in most cases gets enough at the time of sale to cover every form of surface disturbance often many times over, and we have little interest in him and his querulous complaints, but the public should not be cumbered by the uncertain ownership of land.

The laws which entailed the estates of the wealthy in England have been unfortunate. They have prevented the selling of land and have hampered its use. How much more unfortunate will our laws be if they prevent the use of a large part of the lands of the community for building purposes. Many a nation has suffered from laws which were not indeed inequitable between *the contracting* parties but which were highly unjust to the nation as a whole, a hidden canker in the economy of the people.

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The Second-Class, Mine Foreman's Certificate

In another column of this issue we print an interesting discussion of the handicap that attaches to the term "second-class," as applied to mine foreman's certificates. Our correspondent draws attention to the custom practiced in several mining states, of classifying the mines in the state as gaseous or nongaseous. The examination of candidates for mine foreman's certificate, in each of these classes, is made to conform to the particular conditions in those mines. The certificates granted to successful candidates, in respect to gaseous mines, are styled "first-class mine foreman's certificates"; while those relating to nongaseous mines are styled "second-class mine foreman's certificates."

While the terms *first-class and second-class* are intended to refer only to the classification of the mine, it is true, as is pointed out by our correspondent, that the term is too often taken as applying to the holder of the certificate; and he is, as a consequence, regarded as a "second-class" man. We heartily agree with our correspondent in the suggestion that this practice should be altered; and if there is to be any division styled "first-class" and "second-class, these terms should be used in reference to the capability of the candidate as determined by examination. The classification of the certificate as referring to gaseous and nongaseous mines should be designated by these terms only.

We hope that this matter will receive the attention that it deserves at the hands of state examining boards and state departments. It is not the first time that attention has been called to the same question by those who suffer from the error.

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A Contract Violation

An all but universal trait of human character is the desire to see the under dog win. There exists, however, an equally potent sentiment which demands a fair fight. Throughout the long and bitter industrial struggle which has been waged in the Kanawha coal fields in West Virginia, the mine worker has been almost universally regarded as the under dog, and few indeed have been the tongues or pens bold enough to resist public sentiment and champion the operators or their cause.

When the officers of the United Mine Workers recently signed a contract with two companies, operating upon Paint Creek, "for and in consideration of" the "check-off," whereby the union is assured of a certain revenue each payday, to all appearances they knowingly and deliberately violated an already existing agreement with other operators in the same region. Furthermore, this existing contract had been concluded with those, who, if not in actual sympathy with the organization and its motives, were at least willing to take equal chances for returns upon their investment with others in the same field when assured in all candor and upon the written agreement of the union that it would "enter into no contract with any other operator in the Kanawha district carrying different terms or conditions to those provided for herein."

However lightly the leaders of the United Mine Workers may regard the integrity of the organization they represent, they will sooner or later be made to realize that the union is primarily a commercial enterprise. From the business standpoint, the first duty of every seller of any commodity, be that commodity steel, oil, coal, labor or whatnot, is to fulfil all business obligations to the satisfaction of the customer, to give him the full value of 100c. for every dollar which he expends—otherwise no customer will long continue to make contracts or spend dollars.

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Much interest now attaches to the question of concrete overcasts. In this connection it is well to remember that the cost of such overcasts can be greatly reduced by the use of reinforcement. Well screened tough coal can be economically used in place of crushed stone in places where the roof pressure or the danger from fire is not great. If, however, the coal is not well screened, too much fuel dust is apt to be present, thus necessitating the use of a large amount of cement, without any corresponding improvement in the strength of the concrete.

Relation between Railroad and Shipper

By A. L. H. Street

SYNOPSIS—A railroad need not meet the peakload requirements in transportation. Before making a demand for shipment, the shipper would do well to make tender of freight charges. A carrier cannot be compelled to accept freight from a private siding unless it has so contracted. Damages may be punitive if malice can be proved.

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As a general rule, a railroad company is bound to furnish reasonable and ordinary facilities for transportation, but need not provide in advance for extraordinary occasions or an unusual influx of freight (18 Illinois Supreme Court Reports 488). Or, as decided by the Nebraska Supreme Court, the company must furnish cars necessary to transport freight offered it, but when it has provided itself with the equipment necessary for that purpose in the usual course of business, despite the fact that at certain seasons more cars are needed than at others, it has fulfilled its duty, and will not be required to meet unusual demands for cars (99 Northwestern Reporter 309).

In an Arkansas case, growing out of a carrier's refusal to furnish cars for coal shipments, it was held by the Supreme Court of that state that while a railway company must provide cars for normal conditions of its traffic, unless it has reason to foresee other conditions, it is not required, during a temporary abnormal situation, to furnish a car for every one that is sent off its line in fulfillment of previously made contracts, though cars wholly beyond its control are the same as if not owned by it (120 Southwestern Reporter 380).

The Kentucky Court of Appeals has excused a railroad company's refusal to furnish cars to move coal for a shipper in a case where a strike at the mines compelled it to use its coal-hauling equipment to obtain a fuel supply for its locomotives, etc., from more distant fields (35 Southwestern Reporter 626). But it has been decided that a railway company's action in reducing the wages of its employees, causing a strike which suspended operation of trains, did not make it liable for damages resulting from its refusal to receive a shipment. (65 Indiana Supreme Court Reports 188).

Prepayment and Shipping Rights

The fact that a shipper owes a carrier charges for previous shipments does not justify the latter in refusing to receive further consignments (4 Kentucky Law Reporter 730). But the carrier is entitled to demand prepayment of charges, though failure to tender such prepayment does not excuse refusal to receive freight for transportation unless prepayment is demanded (54 Illinois Supreme Court Reports 88). The Vermont Supreme Court has held, however, that refusal of a carrier to transport coal did not, in the absence of actual tender of freight charges, amount to a waiver of such tender, so as to subject the carrier to liability for loss of business on account of such refusal (30 Atlantic Reporter 41). It thus appears that, in order to preserve a right of action for a carrier's refusal to afford shipping facilities, it is safer to tender prepayment of the freight charges.

There is a federal-court decision to the effect that a railroad company was not entitled to enforce, as a condition precedent to the receipt of a coal shipment from canal boats at the company's dock, a requirement that the master of the boats employ shovelers designated by the company, at a price fixed by it (Federal Case No. 14,010).

Law Relating to Sidetracks

A carrier cannot be compelled to receive freight on a private switch track, unless it has contracted to do so (134 Federal Reporter 64). When it has designated a siding as the place at which it will receive coal for transportation, not in an unreasonable place, a railway company cannot be compelled by the shipper to receive shipments at another siding where merchandise other than coal is received, though the latter place may be more easily accessible to the shipper (129 Federal Reporter 753). But under the statute in force in West Virginia requiring carriers to make reasonable provisions to carry coal and coke, a railway company may be required to construct a sidetrack and switch wherever the same may be necessary (64 Southeastern Reporter 630). A railroad company having a newly constructed line through a locality underlaid with coal, by permitting owners of mines to load cars from wagons on its sidetracks at two small stations for several months, did not give them a vested right to continue that practice, nor forfeit the right to change the regulation when a change became reasonably necessary to faciliate the operation of trains and the handling of other freight (125 Federal Reporter 445).

Damages, Punitive and Actual

As a general rule, the damages recoverable against a railway company for refusing to receive a shipment are measured by the difference between the value of the property offered for shipment at the place where tendered for transportation and at the proposed destination, less freight charges (22 Hun 533 [New York]). Punitive, as well as actual, damages may be assessed if it is established by the complaining shipper that the refusal was induced by ill-will or willful disregard of his rights (7 Southeastern Reporter 493). In Kentucky, the Court of Appeals has held that where a railroad company failed to furnish the owners of a mine with cars, they could recover the difference between the value of the coal offered for carriage at the mines and at the proposed destination (13 Kentucky Law Reporter 832).

But a dealer cannot recover damages for a carrier's refusal to transport coal, arising from his contract to buy the coal, if the quantity which he could require the seller to deliver was optional with the latter, and it does not appear that the dealer made any contracts for resale that caused him loss; but as to another agreement binding the seller to deliver a specified quantity, the dealer can recover the enhanced cost of delivering the coal under contracts for resale made on the strength of that agreement (135 Southwestern Reporter 768). An Illinois statute making a railway company liable in treble damages for refusal to furnish cars to carry freight has been held not to bind a company to furnish cars for coal not yet mined (19 Illinois Appellate Court Reports 141).

SOCIOLOGICAL DEPARTMENT

"The First-Aid Muddle" Answered

By W. S. Rountree, M. D.*

In the May 17 issue, I note in the Sociological Department an article headed "The First-Aid Muddle," signed "By a Physician," which is an unjust and unwarranted attack upon the American Mine Safety Association, written by a person ignorant of the facts or else intentionally misrepresenting them. Ordinarily an anonymous article deserves no recognition, but since Coal Age has seen fit to publish the above mentioned article, as a member of the Executive Committee of the American Mine Safety Association, I am writing a brief statement of what is being done by that body to work out a uniform course in first aid to the injured.

All workers in the first-aid movement fully realize the importance and necessity of uniform standards and of forming a central organization, and it was with this end in view that the National Mine Rescue and First-Aid Meeting was held in Pitsburgh, 1911, and a conference on first-aid called by the U. S. Bureau of Mines at Pittsburgh on Sept. 25, 1912.

All great movements must have a beginning and the outcome of these meetings was the organizing of the American Mine Safety Association, the primary objects of which are not only to standardize first aid, but mine-safety and rescue methods also, and to create a central organization for carrying on the work.

The standardization of first-aid rules was referred by the conference to a committee of about two dozen surgeons, of which Dr. A. F. Knoefel is chairman. It is expected that this body will report back at the next annual meeting to the full committee of surgeons composing the association.

Both Lay and Medical Men in the Executive Council

The Executive Committee of the American Mine Safety Association which is charged with the duty of perfecting the rules for standardization as well as with the forming of a central organization is composed of the following members:

H. M. Wilson, chairman; U. S. Bureau of Mines, Pittsburgh, Penn.; John P. Reese, vice-chairman, Superior Coal Co., Gillespie, Ill.; Dr. W. S. Rountree, Tennessee Coal, Iron & Ry. Co., Birmingham, Ala.; Dr. A. F. Knoefel, Vandalia Coal Co., Terre Haute, Ind.; Dr. G. H. Halberstadt, Philadelphia & Reading Coal & Iron Co., Pottsville, Penn.; Austin King, Frick Coal & Coke Co., Scottdale, Penn.; G. H. Hawes, Oliver Iron Mining Co., Duluth, Minn.; E. H. Weitzel, Colorado Fuel & Iron Co., Pueblo, Colo.; R. A. Phillips, Delaware, Lackawanna & Western R.R. Co., Coal Department, Scranton, Penn.; C. S. Stevenson, secretary, Bureau of Mines, Pittsburgh, Penn.

Looking over the above list, it will be seen that practical mining men, as well as surgeons, were placed on this committee. The purpose of this was to obtain the best results on all the problems to be submitted and it will be readily conceded after reading the considerations here following that in appointing such a widely representative body of men, a wise decision was made insofar as first aid is concerned. As a rule, the work of the surgeon is done on the outside of the mines, while first-aid men do their work underground. Therefore, engineers and miners are those best prepared to give practical information regarding accidents and they greatly assist the surgeon in making suggestions as to the manner in which to conduct first-aid work within the mines. It is expected that when the executive and special committees meet next September that they will go over the report jointly and make suggestions, so that the first-aid work can be standardized from all viewpoints.

The noted surgeons of this country always specialize in some lines of work; so far few of them, outside the army and navy, have made a special study of first aid; in fact, this movement is still in its infancy and has developed no special leader of great fame. A man must work his way slowly to the heights.

Sylvester Versus Schaefer

The schedule of discounts is framed only temporarily, and experience will develop what changes are needed. Both the Sylvester and Schaefer methods of artificial respiration have been adopted for the reason that when one is impracticable, the other can replace it. For instance, when injuries to the arms or back are involved the Schaefer method is used—otherwise the Sylvester method may be employed; hence both methods must be taught.

In all surgery, aseptic treatment is the first and foremost necessity, standing preëminently ahead of all other needs, for without it there is no certainty of success in any treatment, especially when infection already exists. In such cases it is more vital than ever, for to add infection to infection would be a double crime.

It is beyond question that first aid should be standardized but, that it should be done wholly by a body of scientific medical men is not feasible for the reason that first aid is a necessity more practical than scientific, the scientific requirements having to be conformed to the practical surroundings; therefore, surgeons, even the most noted, must base all first-aid methods in mines, upon surrounding underground conditions, which are to be learned through the suggestions and information furnished by engineers and practical miners. Thus it is wise to include such men in the Executive Committee.

No jealousy and personal animosity should exist in the work of establishing a central organization and in adopting standard rules to be used in the mines, furnaces, factories and in fact all walks of life. First aid is a work of humanity, and not of personal grievances and should not be hampered by professional ethics and scientific methods. It is too big an undertaking to be held in check by individual narrowness. It is a work where surgeons, mine owners, engineers and miners should get together for the sake of safety and protection of life.

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*Member of the Executive Committee, American Mine Safety Association. Physician, Tennessee Coal, Iron & Ry. Co., Wylam Hospital, Birmingham, Ala.

New Frick Developments

The Union Supply Co., having stores at all the H. C. Frick Coke Co.'s plants, has recently contracted with the Nicola Building Co., of Pittsburgh, Penn., for the erection of two new store buildings, to be erected at Leith and at Phillips, to take the place of the one recently destroyed by fire.

Under directions from Superintendent John Lynch, of Uniontown, Penn., experiments have been conducted for some time past with soda-water fountains and ice-cream parlors. Superintendent Lynch states that they have been a decided success, a great accommodation to the people at the plants, giving them the same advantages possessed by the residents in the larger towns surrounding. The new stores will both be fitted up with these departments. A feature of the equipment in these stores will be the installation of what is designed as an absolutely flyproof meat department, with refrigerating counters, several of which are now in use at various stores.

A new swimming pool, illuminated at night, has been installed at Footedale, another operation of the same company. Another is under construction or already completed at the Redstone plant.

How the U. S. Coal & Coke Co. Kept the Fourth

Prize-Winning Float, No. 2 Works

Employees at Store at No. 4

Float from Mine No. 10

A Wagon Load of School Children

The Gary Ball Teams in Procession

Parade of Employees of Mine No. 12

DISCUSSION BY READERS

The Second-Class, Mine-Foreman's Certificate

All states that grant certificates of competency to candidates for the position of mine foreman invariably require a certain number of years' experience in a gaseous mine, as a prerequisite to the granting of a first-class certificate. Lacking this experience, though frequently excelling in other particulars, the applicant can only obtain a second-class certificate.

My purpose in writing is to draw attention to what may be called the psychological effect of the word "second class," as applied to a mine-foreman's certificate. While it is quite generally understood that the holder of a second-class certificate is eligible to the position of mine foreman in any mine not generating explosive gas, the general effect of the term on most mine managers is distinctly observable.

In many of the more important coal fields of the United States, little or no explosive gas is generated, yet these fields produce good men, who are well versed in both the theory and practice of mining and who are competent to fill the more lucrative and responsible position of mine foreman. I believe I am safe in the assertion that, as a rule, the man holding the second-class certificate is better equipped for the position of mine foreman in a nongaseous mine than is the man holding a first-class certificate; and yet the holder of a first-class certificate is often given the preference in respect to a position in a nongaseous mine.

The fact is not generally taken into consideration by the manager, that the holder of the second-class certificate is better acquainted with the conditions in a nongaseous mine than is the holder of a first-class certificate; because the former has obtained all of his experience in mines of that particular type. He knows or should know the methods and practices best adapted to the safe and economical extraction of the coal, in such mines, better than the holder of a first-class certificate, who has obtained his experience, perhaps, in the anthracite mines of Pennsylvania or in the large gaseous mines of the bituminous region.

Since the present method of granting certificates grades all applicants receiving the required percentage mark in the examination, on an equal footing, I want to suggest that it would, no doubt, prove beneficial to grant "first-class gaseous" and "first-class nongaseous" certificates to applicants receiving over 90 per cent. in both classes, in examination. Applicants receiving less than 90 and above, say 75 per cent., could then be granted "second-class gaseous" and "second-class nongaseous" certificates. This would relieve many good men of the handicap of being known as second-class men, or as holding second-class certificates when their capabilities are fully equal to those who hold first-class certificates.

X.

Crumpler, W. Va.

Safety Lamps and the Eyesight

I have been interested in the recent discussion of this question and particularly in the remarks of Mine Inspector W. L. Morgan, Coal Age, July 12, p. 63. Mr. Morgan refers to the examination of the eyes of firebosses at the Globe Colliery, Wales, England. As I worked in some of the worst gaseous mines in South Wales and Bristol, I am well acquainted with the conditions that existed in the Globe Colliery and am convinced that the eyesight of the miners in that colliery was injured more by the mine gases and firedamp to which they were exposed than by the safety lamps they used.

I want to suggest that a fairer test to determine if the constant use of the safety lamp has any tendency to injure the eyesight would be to select, say 100 miners of 50 years of age, from a gaseous mine; and compare their average eyesight with that of the same number of miners taken from mines entirely free from gas. I think that such a test would prove that the safety lamp produced no bad effect on the eyes when the lamp is properly used.

Much depends on the way a fireboss carries his lamp. This is the first thing to be learned; and, until then, no man has a right to be a fireboss. He should not hold his lamp in such a way as to expose his eyes to the heat and gases from the lamp. In my opinion, the experience of men who have used the safety lamp continuously for a number of years, without receiving any appreciable injury to the eyesight, proves more than the limited knowledge to be gained by an examination, in a single district, by oculists and physicians.

Fireboss.

Brazil, Ind.

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Advantage of Compressive Ventilation

I was glad to notice the reference made by Robert McCune, to the advantage of compressive ventilation in mines, in his article, "The Air Current and Mine Explosions," Coal Age, July 5, p. 25. In reciting his experience and observations in regard to the effect of the exhaust and compressive systems of mine ventilation, to increase or decrease the explosive conditions in a mine, Mr. McCune has drawn attention to an important factor, both in respect to preventing mine explosions and keeping mines in a sanitary condition.

In the compressive system of ventilation, the mine is ventilated under a pressure greater than that of the atmosphere; while, in the exhaustive system of ventilation, the mine is ventilated under a pressure less than that of the atmosphere. To make this matter more clear, assume the atmospheric pressure (sea level) is 14.7 lb. per sq.in. or 2116.8 lb. per sq.ft. If the mine water-gage taken in the fan drift is 2 in., the ventilating pressure is $2 \times 5.2 = 10.4$ lb. per sq.ft., at this point. Then, assuming the efficiency of the fan is 60 per cent., the total pressure producing ventilation or circulating the air through the fan and the mine is 10.4 ÷ 0.60 = 17.3 lb. per sq. ft.

When the fan is blowing the air through the mine (compressive system) the total pressure on the intake air is 2116.8 + 17.3 = 2134.1 lb. per sq.ft. On the other hand, when the fan is exhausting the air from the mine, the pressure on the intake is the atmospheric pressure (2116.8 lb. per sq. ft.) and the pressure on the air in the fan drift (return airway) is 2116.8 — 17.3 = 2099.5 lb. per sq.ft. This shows a difference in the mine pressure, in the two cases, of 34.6 lb. per sq.ft., in favor of the compressive system. In my judgment, this difference in pressure is exerted to keep back much of the poisonous and inflammable gases that would otherwise enter the mine, and is one point in favor of the compressive system of ventilation.

REES H. BEDDOW,
State Mine Inspector.

Gallup, N. Mex.

⁂

Shooting Mine Timber

I was interested in the article by Miner, COAL AGE, June 28, p. 1007, relating to the shooting of mine timber. I want to say that a better method is always to *draw* the timber, using for this purpose the Sylvester or other similar machine. I have had this machine for some time and consider it useful in many ways. No mine where posts are to be drawn is complete without it as a part of the equipment. The pulling strength of the machine is five tons; and unless proper precautions are taken, it will often break the chain.

Where there is a great weight on the post, or the latter is roof-bound, it is often necessary to weaken the post before attempting to draw the same. This must be done with caution, but can generally be accomplished by carefully splitting some from the cap-piece with a pick. Where the roof is loose or treacherous, however, this should not be attempted.

A good scheme in drawing a post is to so arrange the hook that the pull of the chain will be exerted on the side of the post, in such a manner as to turn it around when drawing. This will help very much to loosen the post from its hold in the roof. With the hook in front of the post, the chain exerts only a dead pull, and if the roof is heavy on the timber, it will often be difficult to start the post in this way.

It often happens that a post is nearly buried in the waste. In that case, it will be necessary, after loosening the head of the post, to slip the chain down and take another hold, in order to draw it out from the gob. If fastened at the middle the chain may break the post.

CHARLES WAINE.

Marianna, Penn.

⁂

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MULTIPLICATION

Multiplication is only a particular form of addition in which the numbers added together are all equal. Thus, instead of adding together five sevens, as follows:

$$7 + 7 + 7 + 7 + 7 = 35$$

since these figures are all the same, the operation is expressed more simply by the methods of multiplication. For example, in the above operation, seven is taken five times, which can be expressed thus,

$$5 \times 7 = 35$$

and is read

5 times 7 equals 35.

The same result is obtained by taking five, seven times. For example, by addition,

$$5 + 5 + 5 + 5 + 5 + 5 + 5 = 35$$

or, by multiplication,

$$7 \times 5 = 35.$$

It is important to observe that in adding or multiplying numbers, the order of the numbers is not important. The sign of multiplication is an oblique cross (×) and is read "times." It is written between numbers that are to be multiplied together. It is customary to memorize the multiplication of numbers up to 10; and these are known as the "multiplication tables." Instead of these tables we give below a simple chart, which shows at a glance the result of multiplying together any figure in the top row by any figure in the vertical column on the left. The product is found at the intersection of the corresponding column and row.

MULTIPLICATION CHART

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

For example, to multiply 7 by 5, find the figure 7, in the top row, above the line, and follow down that column to the row corresponding to the figure 5, in the column on the extreme left. The number found (35) is the desired result.

The Coal Age Pocket Book

Multiplication of Larger Numbers—When numbers of two or more figures are to be multiplied, the one by the other, the second, called the "multiplier," is written under the first, called the "multiplicand," so that units stand under units, tens under tens, etc. Then proceed according to the following:

Rule—Beginning on the right, multiply each figure of the multiplicand by the units figure of the multiplier, in turn, and write the units figure of the resulting number under the figure multiplied. In each case, the tens figure, if any, must be added in as units, in the next following multiplication, till the last figure has been multiplied, when it is set down in its place as the final figure of that multiplication, which is called a "partial product."

In the same manner, now, multiply each figure of the multiplicand, again, by the second figure of the multiplier, in turn. But, in this case, the units figure of each resulting number must be written one place to the left of the figure multiplied, instead of under that figure. The tens figure, as before, is added in as units, in the next following multiplication, except the last when it is written as the final figure of that multiplication.

In the same manner, multiply, in turn, each figure of the multiplicand by each figure of the multiplier; but each time a new multiplier is taken the units figure must be written another place further to the left, the tens figure, if any, being added in as units, in the next following multiplication till the last.

When all the figures of the multiplier have been used the several results must be added together, as they stand, beginning on the right and following the rule for addition.

One or two examples will make the process clear.

```
 38,509 Multiplicand         1,603,950 Multiplicand
    175 Multiplier               7 098 Multiplier
 -------                   --------------
 192 545                      12 831 600
2 695 63                     144 355 50
3 850 9                    11 227 650
 -------                   --------------
6,739,075 Product          11,384,837,100 Product
```

As indicated here, the multiplicand is written above the multiplier, and the final result is called the "product." When a cipher occurs in the multiplicand there would be a corresponding cipher in each of the partial products, except for the tens figure that is carried forward from the multiplication of the preceding figure.

As appears in the example on the right above, when a cipher occurs in the multiplier there is no corresponding partial product and the next partial product is set forward two places to the left instead of one. Always the first figure of each partial product stands under the corresponding figure of the multiplier. The proof of multiplication is division. The product divided by either the multiplier or multiplicand gives the other.

INQUIRIES OF GENERAL INTEREST

The Mine Foreman's Certificate

Kindly inform me if a Red-Cross certificate will be of any assistance to a candidate, in the examination for certificate of competency to act as mine foreman.

FIREBOSS.

Gallitzin, Penn.

The examination for a Red-Cross certificate is held under the auspices of the First-Aid Department of the National Red Cross Society. This certificate would not be accepted by an examining board appointed by the state for the examination of candidates for certificates of competency to act as mine foreman. Every mine foreman's examining board is held responsible for its own work and is not authorized to accept certificates issued by another board.

⁂

Weight of Broken Coal

Kindly give the weight per cubic foot of broken coal in the New River district of West Virginia.

INQUIRER.

Beckley, W. Va.

The average specific gravity of the New River coal may be taken as, say 1.3, which would make the coal weigh in the solid 1.3 × 62.5 = 81.25 lb. per cu.ft. When broken into the common market sizes for domestic use (stove or chestnut) the broken material increases, in bulk, from 75 to 90 per cent.; or, say, 1 cu.ft. of solid coal will occupy when broken to market size about 1.8 cu.ft. of space; and the weight of the broken coal would then be, for New River coal 81.25 ÷ 1.8 = 45.14 lb. per cu.ft. This would make a ton occupy 2000 ÷ 45.14 = 44.3 cu.ft.

⁂

The Mine-Cave Problem

In the solution of the mine-cave problem, there must often be considered a combination of facts, circumstances and conditions bearing on the case and affecting the results. These pertain mostly to the detailed manner of working the underlying seam or seams. An inquiry that often interjects itself in the solution of such a problem is: To what extent is the explosive force of the powder used in blasting, in the mine, effective at the surface?

In the mining of anthracite coal, under ordinary conditions, what energy is exerted or what is the sum total of the blow struck by the explosion of, say 25 lb. of black powder, the force of the blow to be expressed in tons; assuming that the force of the blast, in the mine, was sufficient to dislodge, say 1.14 tons of coal per pound of powder. The coal dislodged was, of course, in the line of least resistance; but, assuming the coal still in position at the initial moment of the explosion of the powder, is the force exerted equally in all directions, against the top, sides and bottom of the seam and what is the energy of the blast?

What is the effect of this explosive force to produce vibration or jar in the strata overlying the seam of coal, and how can this effect be reasonably or practically measured? What is the thickness of the overlying strata necessary to nullify or reduce to a negligible quantity the jar or vibration produced by a blast? Or, again, suppose 25 lb. of powder are exploded in 25 separate blasts, at the same time; will the combined blow be equal to or greater than what would result from the discharge of the same weight of powder, in a single blast?

ENGINEER.

Scranton, Penn.

The energy exerted in the explosion of black blasting powder is commonly estimated as 360 ft.-tons; and the total energy developed in the explosion of 25 lb. of black blasting powder would be 25 × 360 = 9000 ft.-tons. This means that if the whole energy of the blast were to be exerted in one direction, it would be capable of lifting a weight of 9000 tons through a distance of 1 ft.

This, however, does not have much practical bearing on the question of ascertaining the effect of the explosion of this weight of powder to produce vibration at the surface. Neither does the fact that the explosive force is such as to dislodge 1.14 tons of coal per pound of powder, in any way, assist in answering the question.

The charge of powder exploded is the center of a radiating explosive force, which is therefore exerted in all directions from that center. The vibratory effect produced at the surface will depend on the nature of the strata overlying the charge and the depth of the charge below the surface. Some strata are elastic and readily transmit a vibratory motion, while other strata are dead and do not respond to vibration. Moreover, the physical character of the strata, as determined by such features as the joints, cleats, fault lines and uniform structure of the rock, influence largely the transmission of the vibratory shock caused by the blast.

The jar or shock due to a mine blast is often felt a great distance in one direction, while it is scarcely perceptible in other directions, owing to peculiar geological formations, in the strata, that facilitate the transmission of the shock. On this account, the problem of calculating the effect of a mine blast at the surface is not a possible one. The effect of such a blast can only be determined, practically, by observations made with a delicate instrument, called a tromometer, for determining earth tremors. For the same reason, it would be impossible to make any calculation for determining the thickness of the strata necessary to nullify the jar or vibration at the surface.

In regard to the last question, the combined blow of 25 simultaneous blasts, if the charges are not too far separated from each other, would probably exceed, in effect, the blow caused by the same weight of powder exploded in a single blast. The reason for this opinion is that the 25 blasts properly placed would have a greater effect to break the rock, and the explosive force would be distributed over a larger area.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What horsepower will be required to hoist 1500 tons of coal, in nine hours, from a shaft 575 ft. deep; making an allowance of 10 per cent. of the power for overcoming friction and $\frac{1}{3}$ of the time for delays?

Ans.—Allowing $\frac{1}{3}$ of the time for delays, leaves $\frac{2}{3} \times 9 = 6$ hr. for actual hoisting. Adding 10 per cent. for friction or multiplying by 1.10, the work performed is

$$\frac{1.10\,(1500 \times 2000)\,575}{6 \times 60} = 5{,}270{,}833 \textit{ ft.-lb. per min.}$$

Since 1 hp. is equivalent to 33,000 ft.-lb. per min., the horsepower required, in this case, is

$$\frac{5{,}270{,}833}{33{,}000} = \textit{say } 160 \textit{ hp.}$$

Ques.—A certain mine has an output of 1200 tons in nine hours, from a slope. The slope rises on a grade of 1 in 8, for 2400 ft. pitch distance. The velocity of the loaded cars is 8 miles per hr., and that of the empty cars 14 miles per hr. The time lost in dumping the cars and starting and stopping the trips is 2 min., for each round trip. The capacity of the mine cars is 6720 lb., and the weight 1000 lb., for each car; and the weight of the rope is 3.375 lb. per running foot. What horsepower will be required to do this work?

Ans.—The total working time is $9 \times 60 = 540$ min. If the grade has a rise of 1 ft. vertical height, in each 8 ft. of pitch distance, the total rise is $2400 \div 8 = 300$ ft. The velocity of the loaded cars is $(8 \times 5280) \div 60 = 704$ ft. per min. The velocity of the empty cars is $(14 \times 5280) \div 60 = 1232$ ft. per min. The time of hoisting a single trip of loaded cars is $2400 \div 704 = 3.41$ min. The time of lowering a trip of empty cars is $2400 \div 1232 = 1.95$ min. Allowing 2 min. for dumping cars and starting and stopping trips, the total time consumed in making one round trip is $3.41 + 1.95 + 2 = 7.36$, say $7\frac{1}{3}$ min. On this basis, 72 trips would consume $72 \times 7\frac{1}{3} = 528$ min. This would allow $540 - 528 = 12$ min., for unavoidable delays, during the day.

In order to hoist 1200 tons in 72 trips, the total load per trip is

$$\frac{1200 \times 2000}{72} = 33{,}333 \textit{ lb.}$$

Since each car carries 6720 lb. of coal, the number of cars per trip is $33{,}333 \div 6720 =$ say 5 cars. The weight hoisted each trip, including the weight of the coal, weight of cars and rope, is then $5(6720 + 1000) + 2400 \times 3.375 = 46{,}700$ lb.

Approximately, the gravity pull on the rope, due to the loaded trip, for a grade of 1 in 8, is one-eighth of the total weight of the load hoisted. Assuming a fair condition of the track and rolling stock, the friction pull may be taken as one-fortieth of the weight hoisted. On this basis, the gravity pull is $46{,}700 \div 8 = 5837.5$ lb., and the friction pull is $46{,}700 \div 40 = 1167.5$. This makes the total load on the rope $5837.5 + 1167.5 =$ say 7000 lb.

Now, assuming an unbalanced hoist, the power of the engine must be sufficient to produce a pull of 7000 lb., at a velocity of 704 ft. per min., which gives

$$\frac{7000 \times 704}{33{,}000} = \textit{say } 150 \textit{ hp.}$$

Ques.—How would **you treat** persons suffering from broken limbs, bruises and **cuts**? Explain fully.

Ans.—Treatment depends on the character of the injury. If a limb is broken, shock often results and must be treated. Place the patient in a safe position on his back with the head low. If vomiting occurs, turn the head to one side. If the victim is conscious, water may be given. If the clothing is to be removed, cut it off. Hold ammonia or smelling salts to the nose, if procurable. Examine for bleeding and if that is severe apply a tourniquet or compress. Keep the patient warm by the application of blankets, coats, hot-water bottles, hot bricks, hot cloths, etc. Rub the legs and arms toward the body, under covers, to quicken the circulation.

If it is a simple fracture, adjust the limb gently and apply suitable splints, taking care that the points of the broken bones do not pierce the flesh. If the fracture is compound, cut away the clothing. Use every precaution to prevent any movement of the sharp ends of bones. Do not touch the wound with the fingers. If a bone protrudes, do not attempt to restore it to its place. Cover the wound with a surgically clean compress and hold the bones in place with padded splints.

Bruises if slight need no treatment; but if severe very hot or very cold water, ice, arnica, or witch-hazel should be applied. If arnica or witch-hazel is used, saturate a cloth with the liquid and apply to the bruise. If possible, keep the injured part elevated, thus diminishing the flow of blood in that part. Cuts, if bleeding is not profuse, may be left for the doctor to treat.

Ques.—What is the highest percentage of explosive gas in which you deem it safe to carry on blasting operations in the mine?

Ans.—This will depend on the nature of the coal with respct to its inflammability and the fineness of the dust; the thickness of the seam and character of the roof and floor, as determining the size of the openings or volume of the workings; the method of mining the coal and working the mine; the velocity of the air current and its gaseous condition, or the kind and proportion of gases present in the air; and the kind of explosives used in blasting.

Under ordinary mining conditions, the blasting of anthracite coal is considered safe in the presence of 2 or even 2.5 per cent. of marsh gas; while, in many bituminous mines, especially if the coal is friable and inflammable, less than 1 per cent. of gas may make blasting dangerous. In either case, the danger is more imminent in contracted workings and thin seams.

COAL AND COKE NEWS

Washington, D. C.

It is now practically a certainty that within a comparatively short time, the Interstate Commerce Commission will hand down a decision in the anthracite coal cases which have been pending before it for some time past. The belief of coal men who have been following the situation closely and carefully is that the decision in these cases will order a material reduction in the charge for transporting anthracite coal from the mines to the seaboard.

It is being noted that in all recent cases in which the commission has passed upon rates affecting commodities which move in bulk or in which the traffic may be expected to grow as the density in population increases such as lumber, coal and the like it has been directed that rates shall be cut materially below their present level. The commission has undoubtedly accepted a general policy of reducing rates upon these bulky commodities, and of placing the burden of such advances as it may deem wise upon the more highly valued articles which move in smaller quantities and at much higher charges.

Another feature of the situation which has strengthened the belief that the cuts just indicated will be made is the fact that the Commission has refused to increase the bituminous coal rates whenever they have been presented to it for adjudication. The bituminous rates, taking them upon a basis of mileage equality, are far below the level of the anthracite rates, and it seems reasonable to suppose that the commission will endeavor to produce greater equality between them by lowering the charges on anthracite, inasmuch as it has refused to raise those on bituminous.

Dissatisfaction is Manifested

Further statements issued by the West Virginia Mining Association with reference to the situation in the West Virginia district indicate that strong dissatisfaction exists with the tactics that have been followed by the United Mine Workers especially in view of the violation of the agreement between the operators of the Kanawha district and the mine workers. It appears that that contract included the following language:

> It is understood that during the life of this agreement the United Mine Workers of America shall enter into no contract with any other operator in the Kanawha District carrying different terms or conditions to hose provided for herein.

Although this agreement does not expire till Mar. 31, 1914, the contract signed with the two Paint Creek companies July 15 provides for a material reduction in prices, as follows:

> For splint machine-mined coal in rooms, the price is reduced from 32½ cents, which other operators in the district are required to pay for work on Kanawha Thick Vein No. 1 and 2 seams, to 29 cents; for splint machine-mined coal in entries the reduction is from 37 to 29 cents. Other reductions are as follows: Splint pick-mined coal from 26 to 25 cents; gas machine-mined coal in entries from 31 to 25 cents; gas pick-mined coal from 49 to 45 cents; airways and entries, splint coal, from 37 to 29 cents; airways and entries gas coal from 31 to 25 cents.

It is to be noted that the contract given the two Paint Creek companies provide even lower rates than the companies offered to pay when the long-drawn-out strike was threatened. The companies offered to pay the old scale, based on a rate of 47½ cents for pick-mining gas coal. The union insisted on an advance of 3 cents, run-of-mine, but compromised on an advance of 1½ cents, making the rate 49 cents, which the Kanawha Valley operators agreed to pay, and have paid up to the present, while the Paint Creek operators refused to accede the advance. Now, after a strike lasting 16 months, these two companies actually get a contract at a lower rate than they were willing to pay in the first place, while the operators who sacrificed their profits to purchase peace have, as they believe, been betrayed.

Reparation Awarded

The Interstate Commerce Commission has awarded reparation to the Marian Coal Co. against the Delaware, Lackawanna & Western R.R. Co. on account of unreasonable rates charged for the transportation of anthracite coal from Taylor, Penn., to Hoboken, N. J. An interesting point is raised in this decision in connection with the question "was the receipt of the original complaint against the rates an official filing of the claim with the Commission " The Commission says on this subject:

> "We are of the opinion that it was. There is no question, as we understand it, that the complaint first received did contain a prayer for reparation to be paid to complainant based upon reasonable rates to be fixed by the Commission. There has been no intervention nor complaint filed by any other party. Neither the statute nor the rules of the Commission prescribe what act or acts shall constitute the filing of a claim for reparation with the Commission. The letter which accompanied the complaint is marked as received by the Commission, Aug. 15, 1910. We hold that on that date the claim was filed, and that shipments on which reparation is asked made within two years prior thereto are not barred.'

Senator Smoot on Free Coal

Senator Smoot in his attack upon the Democratic tariff bill during the past week devoted some special attention to the fact that coal was to be free under the tariff, and asserted that this would mean great injustice to the mines located in the Northwestern states.

HARRISBURG, PENN.

The Attorney General of Pennsylvania has ruled that the Auditor General was without legal justification in his attempted holdup of $17,000,000 of appropriations to important state departments, which included the department of mines.

On July 22, Auditor General Powell served notice on eighteen departments and commissions of the state that he would refuse to approve any warrants of departments of the state government created since the adoption of the constitution of 1874, until he was satisfied on two legal questions.

> "First, whether they are legally a part of the executive branch of the state government, not having been mentioned in the constitution, which involves the question whether the legislature can create departments by statute.
>
> "Second, what are the ordinary expenses of the executive branch of the government, which involves, the question of roads, maintenance of state police, etc."

No more drastic action has ever been taken since the office was created, and if the Auditor General does not accept the opinion of the Attorney General, the effects of his action may be far reaching, as the Supreme Court cannot be reached, except after an action is begun in the Dauphin County Court. The Supreme Court will not meet until the late fall. Should this be the case, it would paralyze many of the most important departments of the state, such as the Mines, Health, Highways, Constabulary, etc.

It is the general opinion that Mr. Powell will take up one or two departments and make a test case, so as not to hold up the state government, as he is being severely criticized throughout the state for his narrow actions.

The Public Service Bill

On July 26 the governor approved the public-service bill as it came from conference in the legislature. It is expected that the governor will name the seven public-service commissioners promptly as the commission law is now in effect. The old railway commission is legislated out of existence.

The powers of the commission will be far reaching, as this body will have authority to regulate the public service of all railroads, trolleys, etc., and will also have authority over rates, extensions and the like.

Provision is made for court appeal from decisions of the commission, and it may hold its hearings any place in the state. The commissioners will receive $10,000 a year and members serve for ten years.

Appropriations Are Slashed

The governor of Pennsylvania has announced that he has vetoed the appropriation of $150,000 for the mine fire under the city of Carbondale, Lackawanna County, and likewise the appropriation of $25,000 for the commission to investigate mine accidents in the anthracite region. Also the appropriation of $50,000 for the coöperation of the state in the establishment of a mining-experiment station for investigations with a view of better safeguarding the lives of miners, and for the greater efficiency of mining has been reduced to $25,000.

PENNSYLVANIA

Anthracite

Pottsville—Several hundred miners of the Glendower Colliery of the Philadelphia and Reading Coal and Iron Co. will have to be vaccinated at once, and the doctors are endeavoring to round up all the miners who attended a picnic two weeks ago, and all the persons who bought milk from the dairy, where the man who did the milking had smallpox. Three cases of the deadly disease have broken out among the men of this colliery.

Scranton—On July 23, fifteen hundred miners of the Sloan colliery operated by the Delaware, Lackawanna and Western R.R. Co., were thrown idle when the workings were discovered to be flooded. A sub-surface settling broke water mains, causing so much damage that the mine will probably be idle for a month.

Pittston—Several properties along the Erie tracks have been considerably damaged by mine caves. Some days ago the officials of the company notified the people to be on the lookout for caves. It is thought the heavy rains caused the subsidence of the earth, but the damage done is due to the workings of the old Butler mine and the robbing of pillars.

Wilkes-Barre—By an opinion handed down by the Courts of Luzerne County, the Delaware and Hudson Co. will be compelled to pay $33,634 with interest from Oct. 1, 1912, and must also render an accounting for all coal mined since July 16, 1878 that would have passed through a ¾-in. square mesh and over a ⅝-in. square mesh screen.

The suit is one brought by the Girard Trust Co. and others, trustee, heirs, and executors of the estate of the late L. D. Shoemaker, and concerned the provisions of a lease for coal land worked by the D. & H. Co., and especially over payments for certain smaller sizes of coal. The plaintiffs charged that the company mined a considerable quantity of small sized coal on which it paid no royalty, and asked for an accounting of this coal and payment therefor.

Bituminous

Pittsburgh—Damages of $50,000 are demanded in a suit filed by Marion Hale and her six children against the United Coal Co. The damages are claimed because of the death of Alfred Hale, husband of the plaintiff, who was killed at a coal mine of the defendant at Milesville on Apr. 2. 1913.

Fairbanks—J. W. Paul and Charles Enzian, connected with the National Bureau of Mines made an investigation on July 22 of the fire which is burning in the Solon mine of the Prospect Coal and Coke Co. Samples of the gas have been taken, and after analyzing these, methods will be suggested as to fighting the fire.

Although the fire has been raging for several weeks, it does not endanger the working portion of the mine. It is the opinion of experts that this gob fire will continue for some time to come and it is possible that it will burn itself out.

Waynesburg—A suit in ejectment was filed in the local court July 24, against W. Harry Brown, the coal operator of Pittsburgh, by Charles W. Weltner and others. The suit involves coal property, title to which is held by Brown.

The plaintiffs claim that last January, Brown purchased from J. V. Thompson of Uniontown a tract of coal land, about 1700 acres in all, at $1000 per acre. It was alleged in the petition that 99 acres of this property Thompson did not own and therefore Brown does not possess legal title thereto.

Uniontown—Suit for $20,000 was entered, July 25, against the Sunshine Coal and Coke Co. by Albert Cruse a miner, who alleges that he was permanently injured by an accident in the mine at Lynn Station on Feb. 27 of this year.

All of the coal and mining rights of the W. A. Stone Coal and Coke Co., of Uniontown have been transferred to the W. A. Stone Fuel Co. of the same place. The consideration named was $147,950.

WEST VIRGINIA

Charleston—On July 24 four men were killed in a battle between striking miners and watchmen employed by the Wake Forest Coal Co. on Cabin Creek. Since the shooting in this region a few weeks ago the coal operators have had watchmen scout the hillside before the non-union miners enter or leave the mine. While performing this duty two of the watchmen at the above named mine were fired upon.

Huntington — Twenty-seven thousand acres of Island Creek coal land in Logan County have been leased for immediate development by John Laing from Cole & Crane, Cincinnati capitalists and timbermen. This tract is located in one of the finest coal fields of West Virginia and the operation which is soon to begn will involve millions of dollars and it is expected result in an output of approximately 5,000,000 tons annually.

MARYLAND

Cumberland—Two hundred miners of the Small Vein mine No. 15, George's Creek Coal Co. at Lonaconing walked out on July 25 because of alleged short weight.

KENTUCKY

Louisville—The Nebo Coal Co., recently organized in Louisville to operate the famous Nebo vein in Western Kentucky, is busy getting things in shape at the mines for the coming season's business. Considerable new machinery is being purchased and installed, and much work was found necessary within the mine itself, where falls and other obstructions must be removed before work can be begun in getting out coal. For the present the company will open no new operations, contenting itself with placing those now open in good shape.

Whitesburg—J. B. Hoge and associates, of Whitesburg, have purchased of Archie Crane, of Sergeant, Ky., a tract of coal and timber land, and plan its immediate development.

Lexington—The Eastern Kentucky Land Corporation, recently incorporated at Lexington, Ky., with a capital stock of $100,000, has acquired 5000 acres of coal lands in Owsley and Perry counties., on Buffalo and Squabble Creek. The property will be held by the company, and leased to operating concerns, as the company does not intend itself to be engaged in either coal or timber operations.

OHIO

Columbus—The Ohio Mine Commission appointed by Governor Cox to investigate the method of payment for coal mined in Ohio started out on its investigation last week. The first place visited was that of Jackson and the commission then moved to Ironton to investigate the Pine Grove mines at that place. The commission has made up an itinerary consisting of all the principal fields of the state.

East Liverpool—The West Point Coal Co. which has a large coal area and several producing mines near this place has leased its holdings to the Kirk-Dunn Coal Co., of Cleveland of which W. H. Dunn, of Salem, Ohio is manager. The new company will improve the equipment of the mine and will increase its capacity to 600 tons daily.

McLuney—The Zanesville Coal Co. owner of the Keystone mine No. 2 at McLuney, Perry County, Ohio has abandoned the mine and moved all of the equipment to mine No. 1 nearby. All of the coal land owned by the company that can be reached through this entrance has been mined.

INDIANA

Augusta—The Hartwell coal mining property situated near Augusta has been sold to a syndicate of St. Louis capitalists, the reported price being $90,000. These mines have been idle for the past three years, the property being in litigation. When in operation it employed over 400 miners and was among the best equipped mines in the country. The purchasers expect to open the mines at once, and operate them to their fullest capacity.

ILLINOIS

Nashville—The Nicholson coal mine which has been in the hands of a receiver for several months was sold on July 21 to Clarence Dallam, of Louisville, for $2000. Mr. Dallam will continue to run the mine until the court approves of the sale. The total indebtedness of the property amounts to $55,000.

Lincoln—Charged with defrauding the Lincoln Coal Mining Co. and its employees by falsifying weight, William Dugan, John and Richard Roe will face the charge of conspiracy against the company and the United Mine Workers. It is alleged that Dugan, the check weighman of the mine conspired with others in manipulating the weights and divided the profits. The amount said to be involved is $18,000.

NORTH DAKOTA

Kenmare—B. A. Bertelson reports that he has struck a 6-ft. bed of coal of unusual hardness at a depth of 174 ft. in his Spiral mine. In going down to this depth he passed through other seams and is certain that he has struck the deepest-lying lignite deposit and one which is not now being worked.

ARKANSAS

Hartford—State mine inspector, Thomas H. Shaw on July 21 closed mine No. 4 of the Central Coal & Coke Co. at Hartford until refuge holes could be cut in the mine tunnels as required by the state mining laws. Refuge holes are being rapidly cut, and the mine will be permitted to resume operations as soon as this work is completed.

FOREIGN NEWS

Geilenkirchen, Germany—On July 23 the bodies of 14 coal miners were found dead in a pit where they were entombed the day before by a fall of coal. It appears that a large area above the mine caved in as the result of extremely heavy rainfall.

Montevidéo, Uruguay—Money is not being stinted in Uruguay in the effort that the government is making in prospecting for coal. Coal seams outcrop in many places in the republic but surface indications in most of them are not promising. Extensive development, however is being carried on at several points, notably at Canadá de los Burros, in the Department of Cerro Largo. The work is being done under the direction of the National Institute of Geology, which is directed by Americans. The high price of coal in Uruguay handicaps industries of many kinds, and the government has shown great energy in attempting to secure cheaper fuel.

Panama—Improvements at the yards of the Caledonian Collieries Ltd., the largest shippers of Australian coal to South America, in Valparaiso, Santiago, Antofagasta and Callao, leads to the belief that this company is preparing to fight for this market. It is generally predicted that American coal will supplant Australian on the west coast as soon as the Panama canal is opened.

PERSONALS

F. R. Wadleigh, consulting fuel engineer, sailed on the "Celtic," July 23, for a two months' trip on professional business at different points in Europe.

State Senator William Green, of Ohio has been appointed International Secretary-Treasurer of the United Mine Workers of America to fill a vacancy created by the resignation of Edwin Perry, of Oskaloosa, Iowa.

Following a service of several years as superintendent of the landings of the Monongahela River Consolidated Coal & Coke Co. east of Louisville, Ky. George Dustin has resigned and will accept a position with a sand company in New Orleans.

J. W. Powell, superintendent and mine manager of the Columbia Coal & Coke Co., has severed his connection with that company owing to the indefinite suspension of operations at their mines. He is now visiting in the East among the anthracite mines.

F. C. Cornet, mining engineer, has given up his office at Charleston, W. Va., to accept the position of general manager of the Elkhorn Gas, Coal & Mining Co., at Melvin, Ky. This company has just been incorporated, in West Virginia, by Messrs. Schlesinger & Weeks, of Milwaukee, Wis. The new company replaces the old Beaver Creek Fuel Co.

William Grelley, well known in eastern Ohio and West Virginia coal regions has resigned his position with the West Virginia Pittsburgh Coal Co. at Wellsburg to take charge of the Buckeye mine near Flushing, Ohio, as superintendent. John T. McMahon, formerly with the United States Coal Co. at Bradley, Ohio has succeeded him with the West Virginia Pittsburgh Co.

A number of changes have recently been made in the personnel of the Davis Coal & Coke Co. Lee Ott, general superintendent, has resigned to become a member of the Board of Control of the state of Pennsylvania. His successor has not yet been named. W. W. Brewer, of the Weaver plant has been made superintendent of the Pierce plant to succeed Charles Connor resigned. H. B. Harrison, of the Elks Garden plant is made superintendent of the Weaver operations, while J. E. Ott succeeds Mr. Harrison as superintendent at Elks Garden. Harry Sharp formerly with the Youghiogheny Coal Co. has been appointed assistant to the general superintendent.

OBITUARY

H. A. Nelson, for thirty years connected with the Pleasant Valley Coal Co., Utah Fuel Co. and Wasatch Store Co., died at his home 969 East South Temple St., Salt Lake City Utah early July 18 at the age of 53 years. Mr. Nelson was widely known and universally liked.

CONSTRUCTION NEWS

East Liverpool, Ohio—John Blackford of Pennsylvania Ave. is having a shaft sunk for a new coal mine in Klondyke.

Sykesville, Penn.—The Erie Co. has advertised for bids on the sinking of two immense shafts at Cramer, two miles south of this place.

Johntown, Penn.—The Link-Belt Co., of Philadelphia has secured the contract for screening and picking equipment for the Valley Smokeless Coal Co., Mine No. 2.

Russelton, Penn.—The Bessemer Coal & Coke Co. has recently asked Pittsburgh contractors for estimates on a brick power house and engine plant at Russelton.

Martins Ferry, Ohio—A new tipple is being erected by the Belmont Coal Co. at the Glencoe mine. This structure will be 150 ft. long, built of wood and will not be completed for some time.

Marquette, Mich.—Work has been started on the construction of a 300-ft. extension to the C. Reiss Coal Co's dock at Escanaba. In addition to the dock extension, two new steel bridges for the distribution of coal upon the dock will be erected.

Holden, Va.—The United States Coal & Oil Co. has awarded the contract for an extension of their No. 7 tipple to the Link-Belt Co., Philadelphia. This new addition consists of a picking table and electrically operated loading boom, all housed in steel.

Elmira, N. Y.—The Delaware, Lackawanna & Western R.R. Co. has a force of men employed in constructing the super-structure for a new coal elevator for the Chemung Coal Co. which will replace the trestle that has been in use by that firm on East Washington Ave.

Joliet, Ill.—Louis Wilbutte, the contractor, has begun putting in concrete for the foundation of the 18 additional coke ovens for the Joliet Coal Products Co. These ovens are expected to be complete by Oct. 1, and the cost of their installation will be approximately $375,000.

Whitesburg, Ky.—Engineers are locating the Rockhouse branch of the Lexington & Eastern R.R. up Rockhouse Creek an important coal and timber section of this county. This work will be completed in about 15 days and immediately thereafter contracts are to be let for the construction of the road.

Morgantown, W. Va.—In anticipation of further enlargement of its plants at both Masontown and Burt, the Elkins Coal & Coke Co. has let the contract for the consruction of 26 five-room, two-story dwellings for the use of miners' families. Fourteen of these will be erected at Burt, and 12 are to be built at Masontown.

Chicago, Ill.—The Malcolmson Briquetting Co. have closed a deal with the Pacific Coast Coal Co. at Seattle for a complete coal briquetting plant having a capacity of 30 tons per hour of 10 oz. briquettes. The Rutledge press will be used, the entire plant being similar in design to that of the Berwind Fuel Co. The estimated cost of the plant is $250,000.

Windber, Penn.—The Berwind-White Coal Mining Co. has recently contracted with the Dodge Manufacturing Co., of Pittsburgh, for a 350 h.p. Dodge American system rope drive to connect a motor with a mine fan. The sheaves will be 40 in. and 96 in. in diameter carrying 20 rope grooves and are to be set 24 ft. on centers; 1400 ft. of 1-in. Firmus manila transmission rope together with the necessary tension equipment will also be furnished.

Connellsville, Penn.—The H. C. Frick Coke Co. has awarded the contract for 60 new houses to be built in various parts of the Connellsville region, to D. M. Fair & Sons, the approximate cost being $140,000. Thirty of the houses will be built at Colonial, seven at Lemont, five at York Run, ten at Sloan, and four at Colonial Nos. 1 and 3. Superintendents' houses will also be built at Edenborn, Wynn and Lemont.

Kempton, W. Va.—The Davis Coal & Coke Co. has completed plans for opening another mine near Kempton. The contract for sinking the shaft for the additional mining operations has been awarded to the Dravo Contracting Co., of Pittsburgh while the necessary railroad facilities will be provided by the construction of a branch line of the Western Maryland Ry. from a point near Henry, a distance of about three miles. The contract for this railway construction has already been awarded to G. L. Anderson & Bros., of Altoona, Penn.

Elmore, W. Va.—The Roberts & Schaefer Co. have closed a contract with the Virginian R.R. for a 400-ton capacity reinforced counterbalanced bucket locomotive coaling station to be built at Elmore, W. Va., at the approximate contract price of $30,000. This will be one of the largest and most complicated coaling plants ever built in this country being equipped with machinery for screening and crushing run of mine coal to stoker size which is used in the heavy Mallet compound locomotives which the Virginian employs in its coal traffic.

Melvin, Ky.—The Baltimore & Ohio is building a line 32 miles long into the Schlesinger lands. This line will, for the present, connect with the Chesapeake & Ohio R.R., at Beaver Creek station. The Baltimore & Ohio Co. has just completed a survey down the Big Sandy River to the Ohio River, crossing that stream at Huntington, W. Va. This new line will parallel the Chesapeake & Ohio line for over 110 miles, along the Big Sandy River, and will serve to transport the coal not only from the Schlesinger lands, by the 32-mile branch mentioned, but also from the new operations of the Consolidation Coal Co., in Letcher county, now connected with the B. & O. by the Sandy Valley & Elkhorn Ry., a part of the B. & O. system running from Jenkins, Letcher County, to Shelby, a distance of 28 miles.

NEW INCORPORATIONS

Ashland, Ky.—The Middle West Coal Co. has increased its capital from $50,000 to $100,000.

Harlan, Ky.—The Lynn Hollow Coal Co., of Harlan is increasing its capital stock from $10,000 to $25,000.

North Lima, Ohio—The North Lima Coal Co., has been incorporated by James Aspenwell and others with a capital stock of $10,000.

Denver, Colo.—The Crested Butte Anthracite Mining Co. has been incorporated with a capital stock of $500,000 by Frank Buckley, R. F. Buckley, and Joseph Deedlartz, all of Denver.

St. Louis, Mo.—The Southern Illinois Coal & Coke Co. has been licensed to do business in the State of Missouri. The capital stock is $1,000,000 and the headquarters are located in St. Louis.

Fort Smith, Ark.—Articles of incorporation have been granted to the Royal Coal Co. with a capital stock of $100,000. The incorporators are Wash Pigg, W. H. Collier, and E. L. Collier.

Denver, Colo.—The Turner Coal Co. has been incorporated with a capital stock of $100,000. The incorporators are James Turner, James C. Dick, of Huerfano County, and George Peart, of Denver.

INDUSTRIAL NEWS

Centralia, Ore.—Following the discovery a short time ago of a 12-ft. vein of coal four miles south of Wynlock steps are already being taken for its development.

Virgie, Ky.—On July 23 the Elkhorn Gas Coal Mining Co. took over the business and works of the Beaver Creek Fuel Co. The address of the new firm is Melvin, Ky.

Huntington, W. Va.—A seven-foot vein of coal of the finest quality has been uncovered on the Holderby farm near the city's edge. This discovery was made at a depth of 199 feet.

Philadelphia, Penn.—For the first half of this year the coal and coke shipments on the Pennsylvania R.R. east of Pittsburgh amounted to 37,087,558 tons, or an increase of 3,621,215 tons.

Cincinnati, Ohio—Edwin Marmet and Charles W. Poysell have been appointed receivers for the Marmet Coal Co. It is believed that this receivership will be only temporary as the assets of the firm greatly exceed its liabilities.

Farmington, Ill.—It is reported that a new coal mine will be located about one mile west of this town. It is believed this will be operated by the Alden Coal Co., of Davenport, Iowa. Surveys and grading will be begun at once.

Rockland, Me.—The Schooner, Charles H. Sprague, of New York, bound from Philadelphia to St. John, New Brunswick with a load of coal sprung a leak and sank off Menhegan on the night of July 23. Captain Elmer Greenlaw and all members of the crew were rescued.

Philadelphia, Penn.—Alleging that the Pennsylvania R.R. is violating the commodity clause of the Commerce Law by granting to certain coal shippers rebates and privileges, the Mitchell Coal & Coke Co., of Philadelphia recently filed complaint with the Interstate Commerce Commission.

Birmingham, Ala.—The Tennessee Coal Iron & R.R. Co. has renewed the contract with the Alabama Co. for the coal mined at the Searles mines in Tuscaloosa County. Not only will steam coal be taken on this contract but practically all of that mined at Searles during the balance of the year.

Bluefield, W. Va.—The property known as the Southern Pocahontas Coal Co. has been recently sold to a mining syndicate headed by Thomas T. Boswell, and Edward T. Boswell. This property which is located near Richland, Va., is already equipped ready for resumption of work.

New York, N. Y.—The New York court has recently declared the law prohibiting the use of bituminous coal in that city as unconstitutional. Health Commissioner Lederle says that one can now burn soft coal in New York legally, but he deprecates the result to the health and comfort of the community.

Cambridge, Ohio—The O'Gara Coal Co. has announced that it will abandon the Derwent Coal Mine. All of the 300 employees have been discharged. The generators will be taken to the Imperial mine at Belle Valley and the other machinery will be shipped to the Illinois field where the company has 21 operating mines.

Birmingham, Ala.—One thousand five hundred new coal cars are to be bought by the Southern Ry. during the next few weeks. Of this number, 1000 will be hopper cars, and the balance of the gondola type. The Virginia Northwestern Ry. which is owned by the Southern was also authorized to purchase 500 coal cars.

Vancouver, B. C.—The Canadian Pacific Ry. will use oil as fuel instead of coal, for its locomotives on the Cascade division of the main line between Vancouver and North Bend. Tanks for the fuel have been located in Fort Moody and it is now proposed to have the oil piped to Cokuitlam where the company shops are located.

New York, N. Y.—Manning, Maxwell & Moore, Inc., together with their subsidiary companies will on or about Oct. 1 next move their office from 85-89 Liberty St. to the new Lewisohn Building, 113-119 W. 40th St. This change is being made in order to secure both a more central location and more commodious offices and store rooms.

Denver, Colo.—The Interstate Commerce Commission has held that the Denver & Rio Grande Ry.'s ownership of the Utah Fuel Co. and its competition commercially in interstate markets is in violation of the commodity clause of the Interstate Commerce Law. This decision implies that the railroad must dispose of its $10,000,000 worth of coal property.

San Francisco, Calif.—Within the past few months, 20 coal carrying vessels laden with a total of over 120,000 tons of coal have sailed from Norfolk, Baltimore, and Newport News, and are now stationed at various ports of the Pacific where their cargoes can be available at a moment's notice for cruisers or battle ships. Other supplies have also been sent to Pearl Harbor, Honolulu, where additional bunkers have been completed.

Monongahela, Penn.—Nine hundred acres of Pittsburgh vein coal recently passed into new hands with the immediate prospect of development upon a large scale. The amount involved is said to be $800 an acre which with contemplated improvements will bring the amount expended to about $1,000,000. The openings for the mines will be almost opposite the Hazel Kirk mine of the Pittsburgh Westmoreland Co. with shipping facilities on the Pennsylvania R.R.

Milwaukee, Wis.—George Manierre announces that he has acquired the patent, patterns, drawings and other assets of the late Ticknor-Manierre Co. which has gone out of business and that he will continue the manufacture of box car loading machinery under the style of the Northern Conveying Machinery Co., at 418 Engineering Building, Milwaukee, Wis. The efficiency and practicability of the loaders manufactured under the Ticknor-Manierre patent have been thoroughly demonstrated in the past.

Pittsburgh, Penn.—The National Tube Co. announces that commencing Aug. 1, 1913, it will enter the elecrical conduit field. It has contracted with the National Metal Molding Co. and the Safety-Armorite Conduit Co., both of Pittsburgh, Penn., to manufacture and sell this product for it as its agents, under their various brands. It has also decided to sell this product on the "Pittsburgh basing discount" plan in the same manner as all wrought pipe for other purposes has been sold for the past thirteen years.

COAL TRADE REVIEWS

GENERAL REVIEW

Difficulty in obtaining adequate shipments of soft coal is causing some uneasiness. Little coal in the hands of the consumers and the demand is heavy in all sections. Better grades are entirely out of the market. Hard coal quiet and featureless.

The midsummer dullness on hard coal is now acutely evident, and the demand has fallen off to practically nothing. The individuals are raiding the market with low-priced coal, and this is about the only business that is being done. The steam grades are particularly heavy and can be moved only when the consumer is forced to take a certain proportion of the small sizes in order to obtain any shipments of the domestics. There is considerable interest in the new hard-coal tax.

The difficulty in obtaining adequate shipments of bituminous in the Eastern Coastwise trade is causing apprehension over what the situation will be when the fall and winter activity sets in. Although the congestion at Hampton Roads is clearing up rapidly, the movement into New England continues slow and there is much uncertainty over what tonnages can be expected. While spotty on occasions the trade as a whole is strong and large consumers, who are attempting to accumulate surpluses against a possible stringency in the fall and winter, are finding it impossible to do so. Though the market may ease up slightly this month, this is doubtful, and will not in any event, be of any serious proportion.

The Pittsburgh district is experiencing one of its best years. Mines are operating up to the full limit of the car and labor supply, both of which are good, so that the production is heavy. The prompt demand is relatively light, the heavy movement being principally on contracts. There is little coal in the hands of the consumers and the renewed activity in iron may cause a further stiffening in the coal and coke markets. The seller is still in full control and there will be little surplus fuel for some time.

The Ohio trade continues to maintain an activity far above normal. The steam grades are particularly hard, due to the increased manufacturing demand and heavy consumption on the railroads and in the iron and steel business. The Pocahontas grades in the Lake market are practically unobtainable. Foreign shipments out of Hampton Roads have eased up, but the Coastwise business is heavier; prices are holding up, and production is much improved, although there is still a shortage at the piers.

In the Southern markets the producers are issuing warnings, urging the consumers to stock against the possibility of a serious car shortage, but as usual such notices are most commonly ignored; domestic prices continue firm, but the steam grades have eased up slightly. The improvement in the Middlewestern market continues. Although the steam grades are a trifle weaker, the domestic sizes are showing a satisfactory improvement, and indications are that they will hold steady throughout the balance of the season.

BOSTON, MASS.

Uncertainty over what tonnage can be relied upon from West Virginia is causing apprehension. Congestion at Hampton Roads is gradually clearing up but all agencies are well sold. Prices stiff and firm.

Bituminous—The market here shows little change from a week ago. There is, however, an undertone of apprehension over the outlook for supplies in the late fall and winter. Pocahontas, New River and Georges Creek, on which tidewater New England so largely depends, are coming forward slowly and there is not enough improvement in despatch at the loading piers to warrant a cheerful view. At Hampton Roads the congestion due to the suspension early in July is gradually clearing up, but as August comes along it is seen that by far the most of the agencies have all the orders they can possibly take care of. Then, too, there seems a good deal of uncertainty over what output can be counted on from West Virginia, the labor shortage there being still a considerable factor.

Buyers at this end are keeping close watch on their shippers and there is a disposition apparent to make settlements on demurrage as easily as possible, so long as coal is forthcoming. There is an anxiety, too, on the part of corporations generally to be forehanded on supplies and if extra shipments are secured through such a policy something will have been done to relieve what in September and October may be a tightening situation. Prices on Pocahontas and New River are firm, sales having been made lately up to $3.10, f.o.b. There are a few shippers, however, who did not take much contract business and from such sources there is a small tonnage offering at down to $2.90 and $2.85, but the volume is insignificant.

Georges Creek continues strong and there is no surplus for sale at current prices. There are already rumblings of the anticipated car shortage and that is hardly a good sign in August. In Pennsylvania the operators are going carefully over their commitments to see what will be available the balance of the year and this is reflected in the extreme caution which selling agents show in response to inquiries for coal a month or two ahead. Prices are now about on the level of late June when a West Virginia strike seemed imminent.

Anthracite—There has been a mild rush to get hard coal forward late in July, chiefly to secure July billing, but now that another monthly advance is in force there will be another lull until about the twentieth. The dealers are not moving their stocks as fast as the spring trade seemed to indicate, but the first of September will doubtless see a spurt, especially in the cities. Broken is still in short supply, now particularly on account of the curtailment in mining, and gas companies and other large consumers are pressing for shipments.

Quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.45	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.40@2.70	2.60@2.90	2.92@3.02	
New York*	2.70@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.10
Providence†				3.95@4.10
Boston†				4.05@4.15

*F.o.b. †On cars.

NEW YORK

Soft coal shows a tendency to ease up and may continue slightly softer the balance of the season. Still a sharp demand however and consumers taking full allotments on contracts. Hard coal easy with considerable going into storage.

Bituminous—The contract season on soft coal is now definitely closed. Any consumers who are still not under cover may possibly prevail upon concerns of which they are old customers to take care of them. It is only on such conditions, however, that contracting could be done and even in these instances operators would much prefer to carry any free tonnage they now have over into the fall trade. The prompt demand locally has eased up slightly during the week, which is no more than was to be expected in midsummer; it is very probable that it will continue more or less easy until preparations for the fall trade are actively under way. There were rumors of an acute car shortage on the B. & O. but the supply on the Pennsylvania and the New York Central have been wholly up to requirements, although trouble is anticipated before long. It is unofficially stated that the New Haven R.R. is in the market for 200,000 tons of coal. We continue New York prices on the following basis:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—Hard coal continues stagnant and entirely devoid of interest with the possible exception of a great deal of unfavorable comment which has arisen over the new Pennsylvania state tax on anthracite. The move seems to have been entirely unexpected and no generally accepted policy has yet been adopted, either as regards increasing the cost to cover the new tax, or toward making a move to have it repealed. As a rule most companies have increased the price to the dealer sufficiently to cover the new tax burden, but there are a few notable exceptions to this.

Locally the trade is quiet. The steam sizes are particularly heavy and are going into storage rapidly, while sales of the domestic grades are made only on condition that orders for a proportion of the small sizes be given at the same time. The labor supply is only fair and the mines are slackening up considerable. We quote New York prices as follows, the circular on domestic grades being 10c. above that for last week due to the regular monthly decrease in the discounts:

		Individual		
	Circular	Lehigh	Scranton	Schuylkill
Broken	$5.10	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.35	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.35	4.90	4.95	4.90 .....
Chestnut	5.60	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.75

PHILADELPHIA, PENN.

Anthracite flat and individuals are offering concessions on nearly all grades. Demand has fallen off to almost nothing. Heavy winter business expected. Bituminous continues abnormally strong and active.

The usual mid-summer dullness is still holding on, and as the season advances it is not likely to improve. There seems to be more talk of investigations than business, due to the fact that many of the retail dealers, effective Aug. 1, contemplate an advance of 10c. per ton over the prices generally ruling at that time, to offset the new Pennsylvania state tax. The city authorities have been called on to inquire into the matter, but no steps have as yet been taken.

The market itself shows a lamentable lack of activity, and the only business of any account is being done by the individuals, who are resorting to their practice of cutting prices to induce trade. Outside of stove coal, the demand has fallen off to almost nothing, and the call for this size is only equalled by the requisitions of the consumer so that with many homes closed, there is not much business. As usual they will probably do nothing now, and in the fall be rushed to death. It is expected by many that the coming season will see practically a duplication of last year's experience, when all sizes were in short supply and hard to get.

The bituminous trade shows up in marked contrast to the anthracite. Good prices and large orders are being received, while the current demand is far in excess of the supply. The shortage is probably due to the lack of labor at the mines. However, producers have no complaint to make as they are finding business better than ever before. This is the consensus of opinion in the trade and there is a ready market for good, as well as the cheaper grades of coal. Many buyers are now bemoaning the fact that they did not profit by the advice of the operators, and make their purchases during the period of inactivity some two months ago.

PITTSBURGH, PENN.

Pittsburgh district experiencing one of the best seasons in years. Demand on contracts heavy but light in the spot market with few premiums offered. Coke situation unchanged and indications are that the producers will win their fight for the $2.50 price on second-half contracts.

Bituminous—The great activity in the Pittsburgh district continues, mines being operated up to the limit of labor and car supply. There has been less labor shortage than expected, and the same can be said of the cars. While there is a constant tendency toward congestion in railroad yards there has been no serious difficulty thus far. Demand for coal on contract is excellent, and has shown an improvement since the first of July, when there was a slight letting up, chiefly through plants closing for repairs. Demand for prompt coal is relatively light, and premiums are exceptional. On the whole, the Pittsburgh coal trade is experiencing one of the best years in its history. Free slack is being readily absorbed, much more so than usual at this season, and only a moderate tonnage can be picked up and only on a few lines, at less than the standard price. The pressure for coal in the Northwest is unabated. We continue to quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

Connellsville Coke—The restriction of coke production, in accordance with the program of merchant operators, is fully sufficient to meet the situation and maintain the $2.50 price so long demanded. Although prompt demand is light, there is hardly enough free coke to meet it, and buyers find difficulty in securing prompt lots at $2.50, a premium occasionally being paid. The market is quiet at the moment, but a tense feeling results from the knowledge that the requirements of furnaces which covered sparingly for July will come up again for August. However, the furnacemen are less averse to paying the $2.50 price than they were, for the pig-iron market has shown signs of stiffening, and a break in coke now would doubtless weaken iron again. We quote: Prompt furnace, $2.50@2.60; contract furnace, $2.50; prompt foundry, $2.85@3; contract foundry, $2.85@3, per ton at ovens.

BALTIMORE, MD.

Trade spotty at times but exceptionally strong as a whole. Occasional surpluses of slack, due to the heavy shipments of three-quarter to the Lakes. Foreign business slacked up some, but the coastwise movement is increasing.

July has been rounded out by the coal trade here in stronger form than any similar period for years. While the market is somewhat spotty from time to time, there is apparently every prospect for a steady August trade.

As a matter of fact, the present summer has been an excellent one in the trade. While the early spring saw a rather slow contracting period, the failure of big consumers to find any quantity of cheap coal early in the season, caused a quick movement to cover. Since that time, in spite of predictions to the contrary, the changes in the spot market, and in contract renewals, have been at advances for the most part. During the past week, slack was the only grade that could be marked spotty, and this was due to the rush movement of three-quarter toward the Lakes.

Considerable activity was to be noted at the piers. While the foreign movement showed a falling off, there was a large shipment coastwise. Southern consignments particularly showed an increase. For the next two weeks this will be even heavier, as a number of coal shippers will try to avoid the hurricane season along the Southern Atlantic seaboard, which usually appears about the middle of August. A number of loadings for Vera Cruz, and other Mexican ports, will be noted in the next few days.

The board of directors of the Baltimore Coal Exchange has passed a resolution declaring that the tax of 2½%, recently imposed by the State of Pennsylvania on anthracite coal, is unjust and burdensome on the consumer. The tax has been passed from the mines to the wholesalers, and from the latter to retailers, who have now decided to add 10c. per ton on the cost of coal to consumers, in order to meet the situation without direct loss.

Notices sent out by the Baltimore & Ohio R.R. announce an important change in coke rates to this port. As a result of the recent agitation of a certain Connellsville interest for a reduction, a cut of 35c. per ton was made, which is probably a record. The rate is reduced from $2.15 per ton to $1.80. West Virginia is favored with a similar cut, the rate being reduced from $1.95 to $1.60. It is understood that Philadelphia is also to have some reduction as well as some points in Ohio. The new tariff becomes effective Aug. 1. Coal men here are rather at loss to understand such a substantial cut on coke freight rates, when the rate on bituminous coal remains unchanged.

BUFFALO, N. Y.

Renewed activity in iron, which will have a further stimulating effect on coal. Consumers have little surplus and producers are in full control of the market.

There is no slacking off in the bituminous trade and the only difficulty is to get enough coal to meet the demand. It is believed that iron is about to follow coal in activity and stiffness in price. In fact it is declared that the movement has already begun. There has been a large amount of iron sold right along, but the price has been low, so that the complaint was that no money could be made in the trade. With iron active and crops in good condition the outlook is excellent in spite of the tariff revision and other troubles.

Consumers are so eager for any coal that they are now paying within about 15c. of Pittsburgh prices for Allegheny Valley coal, which is sometimes as much as 30c. lower. Jobbers also say that there is little surplus coal in the hands of consumers and as it appears now there is not going to be any for a long time hence. Most of them are not trying to buy any more than they need for early consumption. There is all of the former complaint of shortage of men, with cars growing scarcer every week. What the ultimate result will be is difficult to say but it is clear there will not be a surplus of coal right away. The consumer has lost all control of the market and must accept what he can get at sellers' prices. At the same time it is noted that there is not so much talk as there was of $2 coal at the mines. The operators and jobbers have become aware that with much more booming of the market, they will soon be digging coal out of every farm in the state of Pennsylvania.

Quotations are strong as ever on the former basis of $2.90 for Pittsburgh lump, $2.75 for three-quarter, $2.65 for mine-run and $2.15 for slack, with Allegheny Valley not more than 20c. lower. Coke is not much changed and may therefore be quoted as quiet at $4.85 for best Connellsville foundry.

There is no stir yet in anthracite and none is looked for till cool weather sets in. Some increase in the demand was created in the spring by the reduction in price, but the consumer is indifferent now. Members of the trade locally, as well as the public generally are speaking in an uncomfortable way of the 2½% Pennsylvania tax on anthracite and there is a growing belief that it will be pronounced unconstitutional by the courts. For that reason some of the shippers have refused to add it to their regular prices for the present.

Shipments of anthracite by lake were 162,580 tons, which is a large amount, though not so large as the month will average.

COLUMBUS, OHIO

Trade still active, despite the hot weather, which has curtailed the domestic demand. Lake market is strong. Steam business holding up well and price list is firmly maintained.

The coal trade continues to maintain its strong position of the past few weeks. There is a good demand for all grades and prices at the circular figures announced July 1 are well maintained. There is little shading of quotations reported, and on the whole the tone of the market is satisfactory in every way. The future outlook is bright, with the possible exception of an expected car shortage.

One of the best features of the trade is the good demand for steam grades. Manufacturing establishments are taking a large tonnage and in some cases increases in their requisitions are reported. Iron and steel companies are good consumers of steam fuel, also the railroads, which are having a heavy freight movement. Expiring contracts are being renewed at advanced figures over those of last year.

Domestic trade is strong despite the hot weather. Operators and jobbers report a large number of inquiries, mostly for delivery in August and September. Dealers have stocked up pretty well and will not be in the market for some little time. Consumers are placing orders, but deliveries from retail yards are not large. Threshing due to the heavy wheat crop is creating a demand for domestic grades in the rural sections of the state. Municipal contracts are being awarded and the same is true of school and office building contracts.

The demand from the Northwest is still good, and consequently the lake trade continues active. The tonnage going to the Northwest via the lake is larger than in years, and the indications are bright for a continuation of the heavy movement right up to the close of navigation. The tonnage handled by the Toledo docks of the Hocking Valley up to July 25 was 1,393,000.

As a result of the good car supply which is reported from all of the mining districts of the state, the output has been large. In the Hocking Valley the production was normal and the same is true of Pomeroy Bend district; in eastern Ohio, where the car supply has not been the best in the past, there was a 100% supply reported during the week. In the domestic fields of Jackson and Massillon the output was also larger than usual.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump........	$1.60		$1.60	$1.60
¾ inch................	1.45	$1.25	1.45	1.40
Nut...................	1.25		1.35	
Mine-run..............	1.25	1.15	1.25	1.20
Nut, pea and slack....	0.65		0.65	0.60
Coarse slack..........	0.55	0.70	0.55	0.50

HAMPTON ROADS, VA.

Falling off in foreign shipments, but coastwise movement continues large. Heavier production at the mines and supplies at the piers are much improved but still inadequate. Prices being well maintained.

While the dumpings over the three Hampton Roads piers have been good there has at the same time been a falling off in the foreign shipments and it is doubtful if the past week will compare at all favorably with the first three weeks of July. There has been quite a good movement coastwise but a large portion of this business has been taken care of by practically one shipper, so that it will not offset the falling off in exports.

The working conditions at the mines having improved, coal is coming forward in much larger quantities than at any time during the month and the shortage at tidewater is greatly improved. A number of shippers are still short, however, and find it difficult to take care of contract business.

The demand for coal still continues good and prices range from $2.95 to $3.10 for New River-Pocahontas coals and Kanawha is bringing from $2.70 to $2.85. Foreign shipments have moved to Havana, Kingston and Georgetown, with one coastwise shipment to San Francisco.

TOLEDO, OHIO

Exceptionally heavy movement up the Lakes. Local demand for both steam and domestic grades above normal with prices firm. Pocahontas practically out of the market.

Conditions have not greatly changed here during the past week and there has been no variation in price. The coal movement on the Lakes has been exceptionally heavy for this season of the year and fully 200,000 tons of coal and coke were loaded at the C. H. & D. docks, the past week for uplake shipment. The proportion of coke was small, being estimated at about 25,000 tons, the remainder being steam coal for which the demand is remarkably strong. The "Ward Ames," bound for Duluth with 10,500 tons capacity, is now loading at these docks. The reports at the customs office show that the coal movement for July up to this week has been 1,516,230 tons as against 707,651 tons for the entire month of July, 1912. Of this tonnage, 461,925 was for export shipment going to Lake Superior and Georgian Bay points.

The demand for both domestic and steam coal is good locally, far above normal for this season of the year, and prices are holding firm. There is practically no Pocahontas to be had. Following are the prices quoted here:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump.........	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg...................	2.25	1.20	2.50	1.50	2.50	....	....
Nut...................	1.80	1.20	2.25	1.50	2.50	....	....
⅞ lump................	....	1.35	....	....	....	1.20	1.20
Mine-run..............	1.50	1.10	....	....	....	1.10	1.10
Slack.................	....	0.70	....	....	....	0.80	....

LOUISVILLE, KY.

Movement to the Northwest slackening up, due to the inadequate labor supply there. Prices remain steady, however, and mines are working full time. Much complaint about the new class of equipment on the L. & N.

There has been little change in the market during the past week, except possibly a slight easing up in the demand from the Northwest. Prices are steady at the same level that has been prevailing for the last few weeks. There are a few complaints of car shortage, but for the most part the mines are running full time.

The distribution of the "battleship" type of cars is becoming more general and is also resulting in more complaints from the shippers. A committee of operators and dealers recently consulted with the traffic officials of the Louisville & Nashville, regarding the situation, and were promised prompt relief. It is a rather significant fact that the road itself will not accept about half of their fuel requirements in this class of equipment. Even few of the larger dealers are prepared to handle the new type of cars to an advantage, so that the complaint is general.

It is obviously unfair to expect a dealer to install the trestles necessary to handle the new equipment irrespective of the size or importance of their business; this, however, seems to be the position of the railroad in the matter. Considerable friction has also occurred between producers and dealers. One result of the new situation may be the loss of considerable business to the Louisville & Nashville R.R. Dealers who cannot handle the battleship cars to an advantage will, of course, order from mines on other roads when same is possible. This may thus eventually prove a serious disadvantage to the operators on the Louisville & Nashville Railroad.

There has been little or no coal stored by the dealers so far this season; as is always the case, this is due to the reluctance on the part of the dealers to tie up any considerable amount of money. The heavy movement into the North and Northwest still continues to be one of the best features in the local trade; the indications are that this will continue as long as the mines have surplus tonnages to ship those markets.

BIRMINGHAM, ALA.

Producers anticipate a severe car shortage and are urging consumers to stock. Steam grades easier but domestics are firm and there is an increased activity in the iron market.

While the warnings given out by the producers that heavy stocks should be laid in during the summer, owing to the probability of a serious car shortage, are, no doubt, timely, the buyers are not frightened. Steam prices have suffered to some extent, especially with the mines producing both steam and domestic coal, as such operators must move their steam product in order to be able to produce domestic grades. Domestic prices on standard coals are well maintained; in fact, some of the largest mines report they are behind on shipments of this grade of coal.

The pig-iron market, around which most other markets in this district usually revolve, shows more activity, but the volume of buying has been increased largely at the expense of prices and the lowest figures of the year now prevail.

NEW ORLEANS

Heavy shipments being made from the Alabama field; consumers endeavoring to cover before the car shortage develops. Receipts by water interfered with. Large tonnage started out of Pittsburgh.

In order to take full advantage of the abundance of cars, shipments of Alabama coal are being made on an unusually large basis. As the crop movement will soon begin taking the cars, every effort is being made to move as much of the fuel as possible now. Shipments from Alabama were curtailed to some extent earlier in the year from the fact that river transportation was expected to open. The navigation of the Warrior and Tombigbee rivers has been delayed by unexpected difficulties which the engineers encountered. As a consequence, the receipts of coal by water will not begin in time to assure the accumulation of any stock before winter. A contract for 20,000 tons of Alabama coke was let by the New Orleans Gas Light Co.

Unexpected high water in the Monongahela released over 1,000,000 bushels of coal, consigned to local dealers. It is feared that the low stage in the rivers will not allow it to come through soon, however. Shipments of domestic lump are moving to western Louisianna and eastern Texas. Demand for coal in the harbor has been unusually heavy during the past week. Trade in the city is normal and featureless.

DETROIT, MICH.

Producers are no longer showing any anxiety to contract and are apparently willing to take their chances in the spot market from now on. Indications for the fall trade excellent. Dealers endeavoring to accumulate reserve stocks.

Bituminous—The season is approaching when there is little or no inducement for producers to contract so that there is a tendency on the part of the buyers to close without further delay. The operator who has contracted for only half of his production, is more or less indifferent about the remainder and probably feels that he can do better by taking a chance on the spot market.

Indications for the fall trade are excellent. The domestic fuels, particularly the larger sizes, are already in strong demand, due to the fact that dealers are endeavoring to accumulate substantial reserve stocks in anticipation of a heavy demand this winter. However, there have been previous occasions when the market displayed a similar strength, but failed to realize the full expectations of the trade, so there is still some uncertainty over the future.

We continue local quotations on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.65	....	$1.60	....	....	$2.50	$2.25
Egg	1.65	....	1.60	....	....	2.50	2.25
Steam lump	1.25	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	1.20	....	....	....	....
Mine-run	1.05	1.05	1.00	$1.00	$1.00	1.50	....
Slack	0.90	0.90	0.50	0.65	0.65	....	....

Anthracite—The local dealers are keeping well up with their orders and the hard-coal situation here is comparatively easy. Payment of the additional 10c. per ton to cover the new state tax on anthracite is being made under protest. There are hopes that dealers will be reimbursed for this, but apparently the new charge has come to stay. The smaller sizes are in long supply, and are becoming difficult to move.

ST. LOUIS, MO.

Local market on the edge of a sharp advance. However, steam grades continue heavy, and this is affecting the buoyancy in the other departments. Anthracite dull and inactive.

Judging from conditions the last week in July the long expected demand in the local coal market has almost arrived. Especially was this so on the screened sizes, such as lump and egg; on steam grades the market continues to get weaker, and the accumulation of steam sizes has prevented many mines from working, so that a shortage of lump and egg is almost in sight. It is likely that these conditions will continue to exist for the next month, as nut does not as a rule begin to move freely for the fall trade until about September.

Carterville screenings took another drop of 10c., and Standard screenings have been wavering for the past week with absolutely no demand. Standard lump coal is still being held at 80c. to 85c., and screenings at about 60c. to 65c. It costs more than 80c. to get this coal out in the form of mine-run, so it is still a losing proposition for the operators. Even with the prices of Carterville and Franklin County advancing on lump and egg, the falling off on steam coal prices enables these operators in some instances to break even, but a great many of them are still losing money.

The coke market is in a demoralized condition, various grades being offered in the past week at prices far below the circular. The same pertains to anthracite coal—one or two shippers having speculated on inferior grades, and now find that they are unable to dispose of them and will probably have to sell at a loss.

Very little smokeless is coming in and it is extremely hard to get, although Arkansas coal seems to be moving in far better than was anticipated.

The local market is quotable on the following basis:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.90
3-in. lump	....	....	$1.25	....
6-in. lump	$1.35 @ 1.50	....	1.35	1.10
Lump and egg	....	$2.10	1.30	....
No. 1 nut	1.00 @ 1.15	....	1.05	0.87½
Screenings	0.65	....	....	0.80
Mine-run	1.10	....	....	0.75
No. 1 washed nut	1.40 @ 1.50	....	....	....
No. 2 washed nut	1.25 @ 1.35	....	....	....
No. 3 washed nut	1.15 @ 1.20	....	....	....
No. 4 washed nut	1.10 @ 1.20	....	....	....
No. 5 washed nut	0.80 @ 0.90	....	....	....

PORTLAND, ORE.

Customary Aug. 1 advance on Utah and southern Wyoming coals gone into effect. Market quiet and dull.

Coal dealers here have been notified that on Aug. 1, the wholesale price of coals on the Utah and south Wyoming mines will advance as usual at this time of the year in anticipation of the winter demand from $1.75 to $2.25 per ton for nut and from $2.25 to $2.75 per ton for lump. To what extent the advance at the mines will affect prices here is not known yet, but it is supposed that the local advance to the consumers will be commensurate with that assessed against the retailers. The weather has been tropical here for the past week and under the circumstances people are not inclined to turn their thoughts to fuel.

PRODUCTION AND TRANSPORTATION STATISTICS

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during May and the first five months of this year in comparison to last year, in short tons:

Classes and Railroads	May		5 Months	
Anthracite:	1912	1913	1912	1913
B. & O. (a)	18,496	107,494	601,152	665,488
C. & O. (a)	364	2,638	14,806	6,981
Erie (c)	289,854	*752,609	2,592,520	3,463,729
Penna. (a-c)	109,341	967,896	3,688,943	4,641,994
Virginia (a-b)	20	130	20	486
Total 5 roads	418,075	1,830,769	6,897,441	8,778,678
Bituminous:				
B. & O. (a)	2,956,614	3,151,296	14,015,327	14,343,132
B. R. & P. (a-b)	619,430	811,280	3,320,840	3,766,426
B. & Susq. (a-b)	108,001	151,795	598,369	754,396
C. & O. (a)	1,450,893	1,450,371	7,366,533	6,375,705
Erie (c)	8,086	7,396	142,409	263,218
H. & BTM (a-b)	72,942	99,691	574,965	574,667
N. Y. C. & H. R. (a-b)	598,593	672,425	3,434,116	3,791,585
N. & W. (a-b)	1,955,495	2,151,745	9,077,058	9,369,541
Penna. (a-c)	3,495,016	4,178,271	18,956,936	20,092,450
P. & L. E. (a-b)	852,537	1,180,197	3,943,497	5,223,592
P. S. & N (a-b)	181,372	214,065	600,164	1,123,050
Virginia (a-b)	311,247	318,720	1,496,208	1,897,003
W. Md.	269,939	248,063	1,236,905	1,254,612
Total 13 roads	12,880,165	14,615,315	64,973,327	68,829,427
Coke:				
B. & O. (a)	439,631	434,898	1,910,286	1,721,410
B. R. & P. (a-b)	49,423	45,711	183,711	255,154
B. & Susq. (a-b)	15,111	26,060	97,197	130,271
C. & O. (a)	25,157	29,438	105,100	150,523
N. Y. C. & H. R. (a-b)	7,136	4,233	36,780	29,385
N. & W. (a-b)	106,549	138,248	641,615	716,701
Penna. (a-c)	1,150,080	1,238,083	5,340,912	6,225,387
P. & L. E. (a-b)	539,431	615,433	2,535,719	3,070,143
S. & N. (a-b)	....	....	5,155	9,383
W. Md.	5,210	8,608	30,197	35,511
Total 10 roads	2,337,728	2,540,512	10,886,362	12,343,868
Total Coal and Coke 13 roads:				
January			16,421,839	18,936,646
February			17,767,381	17,546,496
March			19,483,025	17,631,346
April			13,429,367	16,850,690
May			15,635,568	18,986,796

(a) Includes coal from connecting lines. (b) Includes Company's coal. (c) Does not include company coal hauled free. * Includes company coal for fueling.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended July 15, as follows:

	Surplus	Shortage	Net*
New England Lines	112	58	**54**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	1,445	217	**1,228**
Ohio; Indiana; Michigan; Western Pennsylvania	3,172	178	**2,994**
West Virginia, Virginia, North & South Carolina	851	1,050	199
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	535	110	**425**
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,717	37	**1,680**
Montana, Wyoming, Nebraska	268	0	**268**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,601	46	**2,555**
Texas, Louisiana, New Mexico	330	5	**325**
Oregon, Idaho, California, Arizona	2,172	125	**2,047**
Canadian Lines	0	0	0
Totals	13,203	1,826	**11,377**

	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 14	June 30
Surplus	12,151	12,243	17,867	21,845	12,267	11,098	11,055
Shortage	3,509	7,196	3,776	2,196	4,226	2,033	2,821
Net*	**8,642**	**5,047**	**14,091**	**19,649**	**8,041**	**9,065**	**8,234**

*Bold face type indicate a surplus.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for June and first six months of this year and last year in short tons:

	June		Six Months	
	1913	1912	1913	1912
Anthracite	776,237	883,326	5,418,231	4,572,269
Bituminous	4,189,969	3,562,845	24,282,419	22,519,781
Coke	1,161,521	1,033,381	7,386,908	6,374,293
	6,127,727	5,479,552	37,087,558	33,466,343

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending July 26:

Stocks	Week's Range High	Low	Last	Year's Range High	Low
American Coal Products	80	80	80	87	80
American Coal Products Pref.	105	105	105	109¼	105
Colorado Fuel & Iron	32½	29½	32	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com.	49	48	49	....	....
Island Creek Coal Pref.	79½	79	79	....	....
Pittsburgh Coal	18½	17	18½	24⅜	14½
Pittsburgh Coal Pref.	83½	82	82¼	95	73
Pond Creek	17¼	16½	17	23¾	16½
Reading	162⅜	159⅝	161 5/3	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	89¼	88½	89¼	95	84
Virginia Iron, Coal & Coke	....	....	37⅞	54	37¼

Bonds	Closing Bid	Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	97	95½	95½	93⅝	99⅛
Colo. F. & I. gen. 6s	102½	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	80¼	81	81	81	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	72	79	73	73	73	80
Tenn. Coal gen. 5s	99¼	99⅞	99⅞	July '13	99¾	103
Birm. Div. 1st consol. 6s	100½	101¾	101	April '13	101	103
Tenn. Div. 1st g 6s	100¼	101⅞	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92⅛	92¼	93	July '13	92	98

DIVIDENDS

St. Louis, Rocky Mountain & Pacific—Dividend No. 1 on the common of ½% payable July 16 to holders of record July 1.

Jefferson & Clearfield Coal & Iron Co.—Dividend of 2½% on the preferred, payable Aug. 15, to holders of record Aug. 8.

⁂

Alabama Consolidated Coal & Iron Co.—The net earnings of this concern, which is now in bankruptcy, are at the rate of $240,000 a year, which is more than sufficient to pay the fixed charges and the full dividend of 7% on the preferred stock. Since neither of these payments are being met, the earnings must apparently be applied to the improvement of the property.

American Coal—This concern operates mines at Barton and Lonaconing, Md.; also in the Pocahontas region, West Virginia. It was originally incorporated in Maryland and reincorporated in 1903, in New Jersey. During the period from 1894 to 1900, it paid dividends ranging from 6½ to 10 per cent., and from 1900 to 1909, at the rate of 10 per cent.; since that time the dividend distribution has been 6 per cent. per annum.

FOREIGN MARKETS

BELGIUM

Belgium imports and exports for May and the first five months of the year were as follows:

	Exports			Imports		
	May	5 Months		May	5 Months	
	1913	1912	1913	1913	1912	1913
Coal	418,661	2,051,833	1,952,476	677,339	3,232,351	3,821,198
Coke	90,441	385,716	423,092	92,927	370,540	535,789
Briquettes	54,349	287,675	216,618	34,972	166,215	201,107

BARCELONA

A consular report says: "The quantity of coal discharged in Barcelona in 1912 totalled 1,032,954 metric tons (of 2204.6 lb.), which was in excess of the arrivals of coal in any previous year. Of the quantity stated, 649,351 tons came from Great Britain, 83,346 tons from Rotterdam, 8275 tons from Belgium, and 1832 tons from Philadelphia, the rest being Austrian coal of Spanish production. In 1911 the arrivals of coal in Barcelona totaled 930,389 metric tons."

COAL FREIGHT DECISIONS

I. C. C. Nos. 4947—5078—5079, Sheridan (Wyo.) Chamber of Commerce vs. Chicago, Burlington & Quincy R.R.

Complaint was made of the rates on coal from Sheridan, Wyo., to points in Nebraska and South Dakota on the line of the Chicago & North Western and the Chicago, Milwaukee & St. Paul, and to points east and west of Billings, Mont., on the line of the Northern Pacific. Comparisons are made of distances and rates from Sheridan, Hudson, and from Illinois and Indiana coal fields to points of destination on the Chicago & North Western herein involved. Similar comparisons are made of distances and rates from Sheridan, Roundup, Mont., and from Illinois coal fields to points of destination on the Chicago, Milwaukee & St. Paul herein involved. Sheridan mines are at a disadvantage of from 85c. to $1 in competing at points on the Northern Pacific with the mines located on that railroad. **Held:**

1. The great discrepancy between the rates from Sheridan and from Hudson to the same points of destination on the Chicago & North Western and between rates from Sheridan and Roundup to the same points of destination on the Chicago, Milwaukee & St. Paul cannot be justified on the ground that the movement from Sheridan involves a two-line haul.
2. Where the physical connection between connecting carriers is as simple as in these small Western towns, involving no expensive terminal service, the additional cost due to the switching movement is very small, so small in fact that it may not properly be made the basis of an additional charge for a two-line haul of substantial length.
3. The facts in these cases demonstrate the necessity of promulgating rates which will allow this coal to find a market in the territory described. In order to accomplish this result there must be a free interchange of traffic at reasonable joint rates.
4. Joint rates should be established from the mines at Sheridan to the points on the Chicago & North Western which have been specified in the complaint in No. 4947, which should in no case exceed the rate from Hudson, Wyo., to the same points of destination, except that the rate to common points of the Chicago, Burlington & Quincy and the Chicago & North Western need not be changed.
5. A joint rate should be established from Sheridan to Chamberlain, S. Dak., not to exceed that from Roundup to Chamberlain and this rate should be carried back as far as Okaton, S. Dak.
6. A differential of 25c. is a reasonable allowance for the difference in the distance from Sheridan and from the Northern Pacific mines to points of destination involved in No. 5079 within 500 miles of Sheridan. As the distance to points of destination increases, the differential between the rates from Sheridan and from Red Lodge should be further contracted, so as not to exceed 15c. to points between 500 and 600 miles distant and not to exceed 5c. to points between 600 and 700 miles distant. To points over 700 miles distant the rate from Sheridan should be the same as the rate from Red Lodge. **Opinion No. 2290.**

CURRENT COAL LITERATURE

We will furnish copy of any article (if in print) in the original language for the price quoted. Where no price is quoted, the cost is unknown. Inasmuch as the papers must be ordered from the publishers, there will be some delay for foreign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

Preventing Roof Falls in Mines by Using Cement. Black Diamond, June 21, 1913; 1¼ pp., illus. 20c.

Accidents in Montana Mines in 1912; Carelessness Largely the Cause. Wm. Walsh. Min. and Eng. Wld., July 12, 1913; ¾ p. 20c.

BLASTING, EXPLOSIVES

The Analysis of Black Powder and Dynamite. W. O. Snelling and C. G. Storm. Bureau of Mines, Bull. 51; 71 pp., illus.

Suggestions Governing Safe Use of Explosives in Mines. Wm. Walsh, Min. & Eng. Wld., June 14, 1913; ¾ p. 20c.

Study of Magazines for Black Powder. Report of the Droitaumont tests under the Permanent Commission for Scientific Investigation of Gas, and Explosives. (Etude des Dépots de Poudre Noire.) Saladin and Dautriche. Annales des Mines, Vol. 3, No. 1, 1913, 40 pp., ill.

BRIQUETTES

Briquette Manufacture in Nova Scotia. Coal & Coke Op., June 14, 1913; ½ p. 20c.

Briquetting Coal. Coll. Engr., July, 1913; 2¼ pp., illus. 40c.

COAL DUST

The Combustion of Oxygen and Coal Dust in Mines. Discussion of Mr. Blackett's paper. Jas. Ashworth. Coll. Engr., July, 1913; 1¼ pp. 40c.

COKE

Ammonia Stills in Byproduct Coke Oven Plants. A. Thau. Iron Coal Tr. Rev., June 27, July 4 and 11, 1913; 8¼ pp., illus. $1.

A New Device for Waste Heat Recovery. A. T. Shurick. Coal Age, June 7, 1913; 1¾ pp., illus. 10c.

Beehive and Byproduct Coke in Alabama. H. S. Geismer and D. Hancock. Coal Age, June 7, 1913; 4 pp., illus. 10c.

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Development of the Coke Oven Gas Aspirator. (Die Entwicklung der Kokereigassauger.) A. Thau. Glückauf, June 7, 1913; 10 pp., illus. 40c.

Goodall's Coke-Quenching, Screening and Loading Machine. Gas World, June 7, 1913; 1¼ pp., illus. 40c.

Improving Coke from Beehive Ovens. N. G. Alford. Coal Age, June 7, 1913; 2¾ pp., illus. 10c.

Investigation of Coal in Byproduct Coke Oven Practice. Describes different forms of coal analysis and estimation. (Die Untersuchung der Steinkohle in der Praxis des Kokereibetriebes mit Gewinnung der Nebenprodukte.) A. Rzehulka. Zeit. des Oberschl. Berg-u. H. Vereins, June, 1913; 7¾ pp., illus. 40c.

Production of Ammonium Sulphate by Means of the Sulphur Contained in Coke-Oven Gases. Communication from the Coke Works Commission. (Ueber die Gewinnung von Ammoniumsulfat mit Hilfe des in den Kokereigasen enthaltenen Schwefels.) J. Reichel. Stahl u. Eisen, June 12, and 19, 1913; 8¼ pp., illus. 80c.

The Pishel Coking Test. M. A. Pishel. Coll. Engr., July, 1913; 5¼ pp., illus. 40c.

The Modern Byproduct Coke Oven. (Paper by C. A. Meissner read before A. I. & S. I. meeting May, 1913.) Iron Coal Tr. Rev., June 13. 1913; 1¾ pp. 40c.

Coppee Byproduct Coke Oven Installation at Lancaster's Steam Coal Collieries, Cwmtillery. Iron Coal Tr. Rev., June 27, 1913; 3 pp., illus. 40c.

DRAINAGE, PUMPING, ETC.

An Oklahoma Water Hoist. E. C. Reeder. Coal Age, June 28, 1913; 1¾ pp., illus. 10c.

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Electricity in Coal Mines. Elec. Rev., March. 1913; 7½ pp., illus. 20c.

Electrically Equipped Coal Mines in Nova Scotia. C. H. Wright. Elec. Wld., Feb. 1, 1913; 2¾ pp., illus. 20c.

Electrical Plant at Dalbeath Colliery. (Paper read by W. M. Peat before the East of Scotland Branch of the A. M. E. E.) Iron Coal Tr. Rev., July 4, 1913; ½ p. 40c.

Insulated and Bare Copper and Aluminum Cables for the Transmission of Electrical Energy, with Special Reference to Mining Work. (Paper read by B. Welbourn before I. M. E.) Coll. Guard., June 13, 1913; 1¼ pp., illus. 40c.

Influence of Hydro-Electric Power on Coal Trade. Black Diamond, June 14, 1913; 1½ pp. 20c.

Pressure Regulation for Hydro-Electric Plants. C. A. Tupper. Min. and Eng. Wld., June 21, 1913; 4 pp., illus. 20c.

Use of Purchased Power in Coal Mines. H. D. Jackson. Coal Age, June 28, 1913; 2 pp., illus. 10c.

Electric Wiring in Mines. C. M. Means. Coal Tr. Bull., June 6, 1913; 1½ pp. 25c.

EXPLOSIONS

A Record of the Origin of the Principle of Stonedusting for the Prevention of Colliery Explosions. (Paper read by W. E. Garforth before the I. M. E.) Coll. Guard., June 6, 1913; ½ p. 40c.

Development of Coal Dust Explosions. (Fourth Report of Explosions in Mines Committee.) Coll. Guard., June 20, 1913; 3½ pp., illus. 40c.

Explosions at the Cadeby Main Colliery. Coal Age, June 21, 1913; 3½ pp., illus. 10c.

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The Scott Colliery Disaster. Coll. Engr., July, 1913; 1¼ pp., illus. 40c.

FUEL TESTING

Methods and Results in Testing Fuels. Communication from the Royal Material Testing Laboratory at Berlin-Lichterfelde-West. (Verfahren und Ergebnisse der Prüfung von Brennstoffen.) Dr. F. W. Hinrichsen and S. Taczak. Glückauf, May 17, 24 and 31, 1913; 13 pp., illus. $1.20.

GENERAL

A Notable Scottish Colliery. First Worked before the 13th century, now equipped with most modern machinery giving large output. Coll. Engr., July, 1913; 3 pp., illus. 40c.

Assessing and Taxing Coal in the Ground. Wm. Griffith. Coll. Engr., July, 1913; 1½ pp. 40c.

Coal Mines Operated by Bureau of Mines. Min. and Eng. Wld., June 13, 1913; 1½ pp. 20c.

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Eastern Kentucky Coal and the Panama Canal. G. D. Crain, Jr. Coal & Coke Op., July 3, 1913; 1¼ pp. 20c.

Economy in Purchasing and Using Coal. A. O. Doane. Eng. Mag., June, 1913; 7 pp. 35c.

Examinations for Certificates of Competency under the Coal Mines Act. Iron Coal Tr. Rev., June 13, 1913; 1¼ pp. 40c.

Experiments and Improvements in Prussian Mining Practice During the Year 1912. Copious information on many branches of equipment and methods in coal and other branches of mining. (Versuche und Verbesserungen beim Bergwerksbetriebe in Preussen während des Jahres 1912.) Preus. Zeit. f. B. H. u. S., No. 1, 1913 (Vol. 61); 50½ pp., illus.

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Notes on the Groundhog Coal Field. Amos Godfrey. Coal Age, June 28, 1913; 1¼ pp., illus. 10c.

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The Earning Power of Chemistry in the Coal Mining Industry. E. M. Chance. Coll. Engr., July, 1913; 1¾ pp. 40c.

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Geology of the Pittsburgh Coal Beds. (Address by J. W. Boileau at C. M. I. A. meeting held at Pittsburgh, June 17.) Coal & Coke Op., June 19, 1913; 1½ pp. 20c.

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The Concealed Coal Field of Yorkshire and Nottingham. (From memoir of Geol. Sur. England and Wales.) W. Gibson. Coll. Guard., June 13, 20, 27, July 4 and 11, 1913; 6¾ pp., illus. $1.50.

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HOISTING AND HAULAGE

An Adequate Winding Engine Brake. Min. Eng., July, 1913; 3½ pp., illus. 40c.

Splicing Transmission Rope. Eng. & Min. Jl., July 19, 1913; 1¼ pp., illus. 25c.

Three-Two Method of Rope Splicing. Alex Wilson. Coll. Engr., July, 1913; 1 p., illus. 40c.

Wire Ropes Applied to Mining. Sci. & Art Min., June 21, 1913, ¾ p., illus. 40c.

An Italian Aërial Tramway. Coal Age, June 28, 1913; 4¼ pp., illus. 10c.

Underground Conveying. (Paper by S. Mavor, read before the South Wales Inst. of Engrs.) Coll. Guard., May 30, June 6, 13 and 27, 1913; 3 pp., illus. $1.20.

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The Flash Point of Oils. I. C. Allen and A. S. Crossfield. Bureau of Mines, Tech. Paper 49; 19 pp., illus.

Mixed Lights in Mining. J. T. Beard. Coal Age, June 14, 1913; 1 p. 10c.

A New Mining Lamp. Coal Age, June 21, 1913; ¾ p., illus. 10c.

MINE GASES, TESTING

An Investigation into the Effect of Atmospheric Pressure on the Height of the Gas-Cap. C. J. Wilson. Trans. Min. Inst. of Scotland, Vol. XXXV, Part 3, 11½ pp., illus.

PREPARATION

Taking Screenings from Wagon-Loading Chutes. Black Diamond, July 12, 1913; ¾ p., illus. 20c.

A Model Preparation Plant. M. J. Williams. Coal Age, June 7, 1913; ¾ p. 10c.

Combination Picking Tables and Loading Booms. F. C Perkins. Coal & Coke Op., July 10, 1913; 1¼ pp., illus. 20c.

Shaking Screens in a Concrete Tipple. O. G. Petersen. Coal Age, June 21, 1913; 2½ pp., illus. 10c.

SAFETY APPARATUS

Cage with Munzner Safety Catches. Eng. & Min. Jl., July 19, 1913; 1¼ pp., illus. 25c.

Mine-Rescue Van for South Staffordshire. Coll. Guard., June 13, 1913; ⅓ p., illus. 40c.

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Safety Clutches and Hoisting Controllers Make Mine Elevators Safe. Coal Tr. Bull., July 15, 1913; ½ p. 25c.

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The Reopening of Norton Colliery with Self-Contained Breathing Apparatus After an Explosion. (Paper by J. R. L. Allott read before the I. M. E.) Coll. Guard., June 6, 1913; 1¼ pp. 40c.

SANITATION, DISEASES

Bath House at Cameron Colliery. Coll. Engr., July, 1913; 1¼ pp., illus. 40c.

Baths for Miners. (Address by Wm. Walker before Scottish Federated Inst. of Min. Students.) Iron Coal Tr. Rev., July 11, 1913; 1¼ pp. 40c.

H. C. Frick Welfare Plans. Coal Age, June 21, 1913; ½ p. illus. 10c.

State Miners' Hospital at Fairmont, W. Va. A. W. Hesse. Coal Age, June 14, 1913; 2¼ pp., illus. 10c.

SHAFTS, SHAFT SINKING

The Shaft Plant VIII, IX of Constantine the Great Colliery. (Die Schachtanlage VIII/IX der Zeche Constantin der Grosse.) Illgen and Wollenweber. Glückauf, May 24 and 31, 1913; 15 pp., illus. 80c.

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A New Mine-Rescue Telephone. Coal Age, June 21, 1913; 1¼ pp., illus. 10c.

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The Slow Combustion of Coal Dust and its Thermal Value. (Paper read by F. E. E. Lamplough and A. M. Hill before the I. M. E.) Coll. Guard., June 6, 1913; 1 p., 2 tables. 40c.

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German Practice in Coal Stores. Eng. Rev., Apr. 15, 1913; 1¼ pp., illus. 40c.

Value of Storage Space and How to Obtain It. H. J. Edsall. Black Diamond, June 21, 1913; 1¼ pp., illus. 20c.

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An Ideal Method of Mining. J. C. Edwards and H. M. Gibb. Coll. Engr., July, 1913; 4¼ pp., illus. 40c.

Recent Developments in Open-Cut Coal Mining in Kansas. W. S. Russell. Excavating Engr., April, 1913; 5 pp., illus. 20c.

A Modern Coal Stripping Plant near Pittsburg, Kansas W. S. Russell. Excavat. Engr., July, 1913; 2¾ pp., illus.

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Improvements Relating to the Anemometer and Hygrometer. Henry Briggs. Trans. Min. Inst. of Scotland, Vol XXXV, Part 3; 5½ pp., illus.

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DEVOTED TO COAL MINING AND COKE MANUFACTURE

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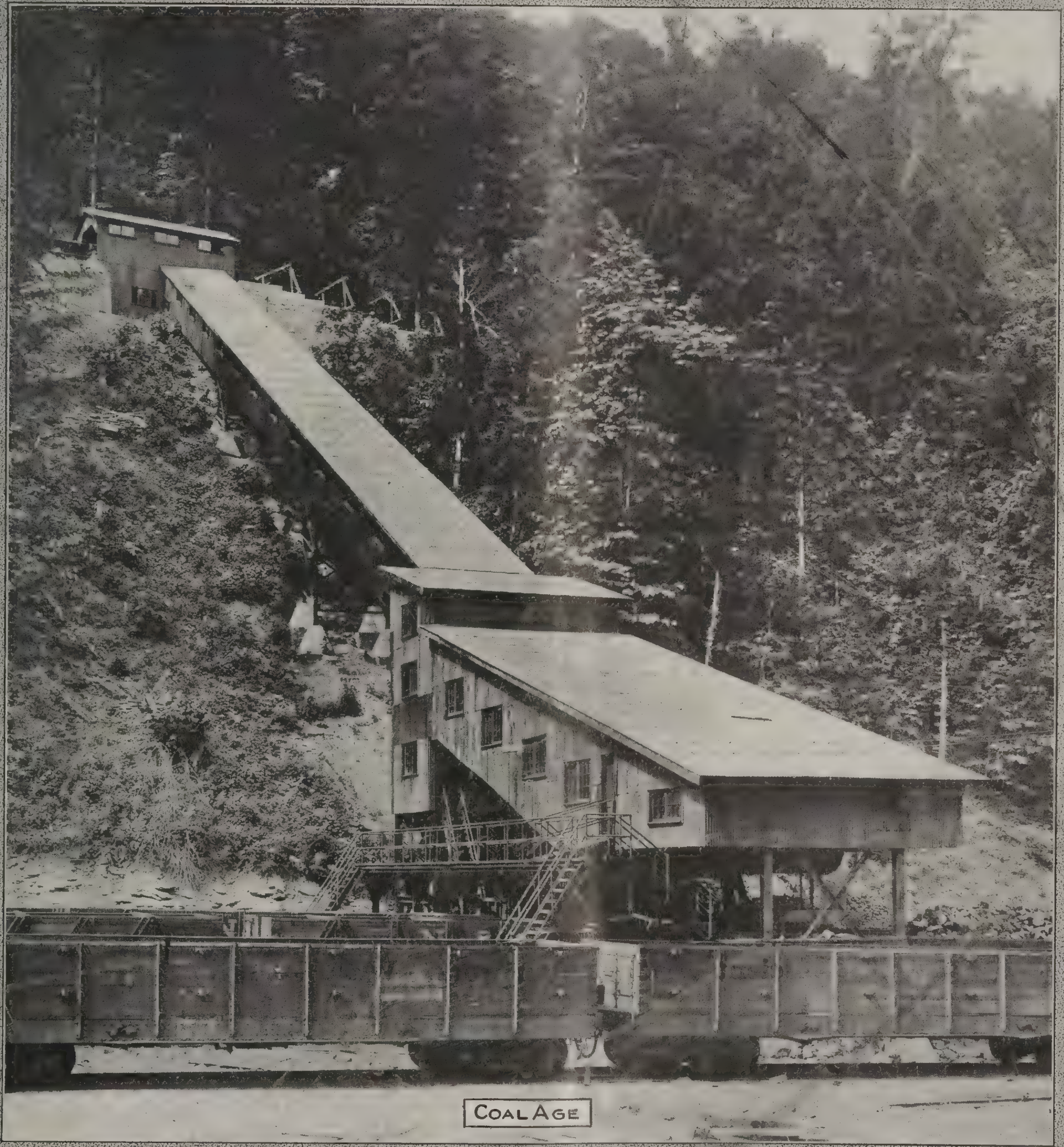

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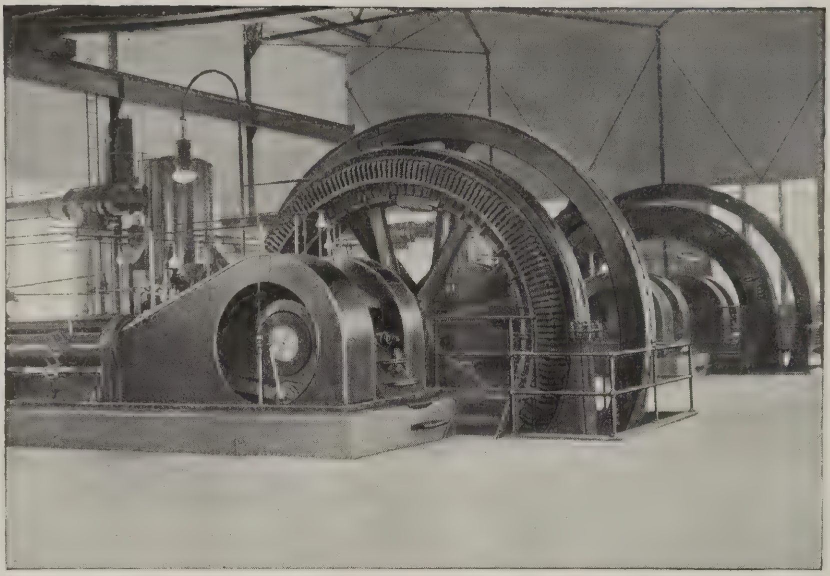

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COAL AGE

FLOYD W. PARSONS, *Editor.*

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The New Conception Of Advertising

The Weekly Ad-Talk Page

Printers' Ink, in its 25th Anniversary number, says editorially, in reference to advertising in the last 25 years:

". . . more advertising has been done and more has been learned about advertising than during all of the ages that have preceded them. The activities of these years have unusual significance, as marking the close of an old order and the beginning of a new. All of which activities Printers' Ink might say, in paraphrase of the classical historian, it has seen and a great part of which it has been.

Unquestionably the greatest gain to advertising during this time has been the new conception men have of it. A quarter of a century ago advertising was "magic" to the great majority, even of advertising men, and not always white magic either.

At the worst a lie, at the best often a mere whirl of words, the ad of the period showed the relatively low estimate in which the public was held.

Credulous and unsophisticated, it was too vague to be catered to, it was only just something to be manipulated.

The history of the past twenty-five years has been one of an increasing sophistication of the public and a growing respect on the part of the advertisers.

It has been a growing education, in which the instruction has been given by all of the interests in competition with each other. And this has unfailingly ushered in the new conception of advertising—advertising as a *service to the public*, to list its needs, explain and tell how and where they may be satisfied.

The conception is not widely held as yet or acted up to, but it is seen and practiced by some, and it is having its reactions in all directions. New and definite ideals are rising out of the hurly-burly, ideals of service, of efficiency, of plain, downright honesty.

Advertising men are finding in honor a better armor than was a thick skin. The professional spirit has crept in and they are beginning to be exceedingly proud of their work."

Advertisers have come to that point where they realize that readers of ads must be told the truth about goods if the advertising is to pay.

Which is why the maker of worthless goods, of goods that will not bear investigation, cannot as in days of yore use advertising as a means of "fooling the public" into buying his product.

Not only do readers of advertising today demand truth in advertising.

Not only do advertisers of good goods realize the importance of telling "the truth, the whole truth and nothing but—"

But the publishers of responsible publications refuse to accept advertising that is untruthful.

So that to you—the ad reader—the selling section of your paper represents a trustworthy guide—a guide who helps you secure the right equipment, the right tools, the kind of goods that give you the service you expect of them.

In these days of truthful advertising you can find *no better guide.*

COAL AGE

Vol. 4 NEW YORK, AUGUST 9, 1913 No. 6

Have you ever realized the value of *expressed appreciation* as an aid in the successful handling of your employees? We are all too prone to be thoughtless in observing the little amenities that lubricate life's machinery.

Real men do not exact or expect much in the way of appreciation—they are accustomed to bestow rather than receive—yet a certain amount of praise and thanks is always welcome to the diligent and faithful.

Appreciation is not, like the exercise of many virtues, difficult and painful, but is attended with so much pleasure that were there no positive command which enjoined it, nor any recompense laid up for it hereafter, a generous mind would indulge in the practice for the natural gratification it brings.

Have you ever considered the possibility of capitalizing the loyalty of your co-workers and subordinates through the expression of your appreciation of their meritorious efforts when they strive to win your approval? We do not mean in a purely mercenary sense, but as a means to bring out the better side of human nature, and to develop talents that lie dormant because you have failed to encourage well directed effort.

Do you realize that many men are discouraged because their work has not elicited the expressed approval of their superiors? And, oftentimes feeling that it would be unappreciated, they are deterred from applying their personal initiative to the solution of problems which confront them.

Look around in your own industrial circle and see if it is not the man who judiciously expresses his appreciation of the work of his employees who is supported by the most loyal and efficient organization.

The ability to bestow a word or look of approval at the proper moment is often the determining quality in individual success.

If you lack sympathy, the men about you will reflect your spirit; they will not exert themselves to further your interests. It is also true that an unappreciative employer is generally an undervalued individual, and his organization is usually inefficient, due to internal dissensions.

If you are one of those men who appreciate good work, but have not realized the value of expressing your thought, commence a new policy at once. Perhaps you will soon learn why you have not had the cordial support of your subordinates, or maybe you will discover why you lost a valuable employee to a nearby competitor.

Men are anxious to work for the fellow who gives credit where credit is due. Such an employer always has able applicants on his waiting list. A boss can often do more good by the exercise of sympathy than by his labors, and he can render the world a more lasting service by the recognition of merit than he could ever render by the straining efforts of personal ambition.

To the great majority there come hours when life loses its song. Every man has moments when the iron seems to disappear from his blood. *Meet the next deserving but disheartened employee who comes into your office with a word of appreciation, and if the change in his demeanor and the lightness of his step when he leaves don't repay your effort, then we surely miss our guess.*

IDEAS AND SUGGESTIONS

The Liquor Problem in Mining

By Mine Superintendent

I have been a constant reader of Coal Age from the beginning of its history, and have noted with much interest the pages devoted to "Discussion by Readers." The various articles relating to the "Liquor Problem in Mining," have been of especial interest to me.

This interest is, no doubt, augmented by the fact that the "liquor traffic," and especially the "beer wagon" end of it, has been one of the most serious problems in the management of the properties over which I have the supervision; in fact, from the beginning of our operations until the present time, the beer wagon has been a constant menace, and is annually costing our company thousands of dollars.

In the earlier stages we were sometimes able to bluff the drivers and by threats of law enforcement keep them off the property for limited periods, but in a short time some new driver would make a trip, and as it is impossible to at all times keep a close supervision over the houses, would make deliveries, and a shut down, or operation with a reduced force of men, at greatly increased expense to the company, would be the invariable result.

We are located in a "dry" township, with seemingly no restrictions on the liquor traffic, except that no licenses are granted. Trucks and wagons delivering beer are a daily evidence that the solicitor is getting in his work and that the will of the majority who have voted the township dry is being defeated, and that there is either no law covering the situation, or that such a statute is not enforced by those whom we have elected to enforce the law, and whose oath of office binds them to such a course of action.

I have personally appeared before the district attorney of the county in which we are located, with names of persons who would testify to giving their orders and money to a solicitor, and to the beer being delivered to them by wagons within a few days, and have been told that we could get no prosecution in such cases, as it is impossible to prove a sale.

Travelers along the county road can see large piles of full cases and kegs left there by the trucks for the delivery wagons, or empties gathered by the deliveryman ready for the truck to return to the brewery.

Now my claim is that the liquor traffic is a menace to the coal operator, and a serious handicap in the working of mines. Furthermore, the law should be enforced in order that we may successfully operate our mines six days per week.

As a mine superintendent, I am expected by my employers to get results, and have a right to their aid and coöperation in making working conditions such that results will be obtainable. Yet the great body of coal operators who have power or influence in political affairs, do nothing to bring about the prohibition of this traffic that is lessening their profits, restricting their output, endangering their property and the lives of their employees. They are thus placing, or permitting to be placed a serious handicap upon every superintendent and foreman they put in charge. I feel that coal operators should, in justice to their investments, their management and their many employees, unite in their efforts to eliminate this traffic, which is doing more than any other one agency to restrict output and increase the cost of production.

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Some Plain Facts about Anthracite

By Special Correspondent

How passing strange it is how long an evil reputation, no matter how undeserved it may be, will cling to a person, a business or an institution, even surviving long after all of the original parties to it are dust.

That applies cogently to the anthracite-coal industry, as both miner and operator have, as a whole, been the objects of severe and wholly undeserved public censure, because of the actions of an almost negligible portion of each. In the mind of the general newspaper reader the anthracite-coal operator is pictured as a combination of bandit and Shylock, battening upon the necessities of mankind, extorting the last penny from the poor on one hand and heartlessly oppressing and plundering his employees on the other.

A patient and unbiased investigation will reveal that 99 per cent. of the above picture is colored with wanton falsehood, frank ignorance and the political necessities of demagogues who seek to ride into office by advocating chimeras or by posing as the miners' friend and creating hatreds between employer and employee as a sign of their good intentions toward their clients. It is one of the unsoluble enigmas of our day that the more lurid and baseless an attack on an anthracite operator is, the more it is welcomed and the more prominence is given it in the columns of the press, while colorless truth and exact facts set forth by the operator are given little or no credence in the newspaper sanctums, and if referred to at all editorially, usually with a mingled sneer and derisive incredulity, the operator being held as a scoundrel *per se*.

About every demagogue in Congress, in the various state legislatures and in the city councils, has offered a "resolution to investigate the anthracite-coal monopoly," as though there were one, and said demagogue is prolific of sentiments saturated with libelous and unwarranted adjectives portraying the operator as the sum of unvarnished saturnine villainy.

In the loose terminology generally employed in discussing the anthracite situation, that industry is habitually written or spoken of as a "trust." The statement has no foundation in fact, save that created by nature herself, the inventions of mine appliances and the legislative enactments in behalf of the mine worker. Those three things are solely responsible for whatever resemblance the industry has to a trust. That can be proven as clearly as a problem in Euclid.

While hunting in 1792, Philip Ginter built a camp fire and accidently set fire to the "black stones," lying loose on Moosic Mountain. That was the genesis of the anthracite-coal industry. Its progress was slow, for in 1814 Jesse Fell, a pioneer operator, recorded in his diary that he had sold 50 tons, while the year previous his sales were but 22. It may be set down as an irrefutable fact that for a century after its discovery the investor in an anthracite-coal mine had about the same chance to get principal and interest back, as the usual run of "birdmen" have of safely returning to earth. There were enough exceptions to prove the rule, of course, yet until 1892-5, when the large anthracite properties were virtually forced upon their present owners by bankrupt and disheartened investors, the stocks of the general run of anthracite-coal companies were shunned by far-sighted and prudent investors.

The truth of the matter is that the present owners of the mines, continually spoken of as a trust, were very reluctant to invest in the mining properties at all, and the stocks were virtually forced upon them. No secret is betrayed when it is declared that the men who disposed of their stock to the supposititious "trust" believed, as some of them also stated, that they had gotten rid of a "dead horse." It is one of the peculiar facts of that sale that one of the three men principally responsible for the selling owned the newspaper which has been the most persistant and virulent critic of the "anthracite coal trust." There is a tale connected therewith which, if set forth plainly, would throw a flood of light upon business, political and financial affairs in Pennsylvania.

In reply to the criticism, iterated and reiterated ten thousand times last fall and winter, that the "anthracite-coal trust was extorting exorbitant prices for coal from the poor," the operators in sober truth replied that "no change whatever has been made in circular prices;" still the charge was made.

To the further assertion of the operators that by buying a supply in summer, the consumer would not only get coal cheaper, but he would also prevent any chance of a "coal famine" in cold weather, the "learned Thebans" of the press reply that the poor man has neither the cash to buy a supply nor a place to store it. To this branch of consumer then we will try to show plainly that the operator has no part whatever in causing him to pay more than a fair price for anthracite coal.

Standing on South Halstead Street, Chicago, I heard the following colloquy between a woman who sought to buy some coal and a retailer who, among other commodities, sold coal by the pail and basket.

"What," asked the woman, "is the price of a basket of hard coal?"

"Forty-five cents delivered, or forty cents if you take it yourself," replied the dealer.

"How much does it weigh?" queried the woman.

"Fifty pounds, full weight," answered the dealer.

The woman bought a basket and asked why coal was always getting higher in price, to which the dealer replied by emitting the usual tirade against the operator, the least objectionable term he used in characterizing the coal producer being that of "robber," and at the same time he expressed the greatest sympathy with the poor.

Outwardly I paid no attention to the transaction or conversation, but upon my return that evening I bought a basket of coal, which the dealer repeatedly told me was the genuine Scranton hard coal. Upon weighing it at home, I found it was four pounds short in weight. That is to say, I paid at the rate of $17.38 for 2000 lb. of "genuine Scranton hard coal."

But the short weight was not the worst part of the transaction by any means. Taking the coal from the bag, I spread it out on a paper on the floor and found that a little over half the coal was Indiana block coal, screened to the chestnut size. Now examine the proposition in its true light.

The Indiana block coal cost that small dealer $4 per ton from the retail coal yards, while the "genuine Scranton hard coal" cost him $8 per ton at the lake front. Let us say, in order to be within the truth, that that basket of coal was mixed with equal parts of both kinds of coal, then that small dealer got $17.38 for coal that cost him but $6.

That transaction aroused my curiosity, and I made a searching examination among that class of coal dealers, calling on over thirty petty salesmen in various parts of Chicago, and short weight was an almost unbroken feature. Where coal was bought by the bucket, the rate at which it was sold was seldom under twenty dollars per ton.

Another almost universal feature was that these petty dealers never lost a chance to defame and vilify the operator, whether the coal sold was anthracite or bituminous. Do not for a moment think that the retail dealer with a yard and scales of his own resorted to any such practice or used any such language. It was in all cases a dealer whose stock seldom reached ten tons at a time.

It is within the bounds of truth to say that fully twenty-five thousand families in Chicago buy their coal in that way, and are habitually subjected to short weight and extortions and the extortioner invariably places the blame upon the operator. Just as a wave widens when a stone is thrown in a body of water, so the multiplicity of these baseless charges have created a wave of resentment and ill-will toward the coal operators that finds expression in editorial comment and the senseless and crippling legal enactments which create the very conditions their authors design to prevent by them.

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The Cost of Bath Houses

The cost of installation of baths and fittings does not vary much, according to William Walker, Division Inspector of Mines for Scotland. In Germany the average cost is $25 and in Belgium $20 per person using the facilities. One bath house in Belgium, which was 123 ft. long by 74 ft. wide by 39 ft. high, and was completely fitted out with walls of glazed brick, cost $24,000. This accommodated 800 men. The Belgian law has the peculiarity that the men are not permitted to bathe in sight of one another, but each must have a separate compartment in which to take his bath.

A bath house in Westphalia which was built of a size to allow 2000 men to bathe in three-quarters of an hour, cost $50,000. At the Wharncliffe Silkstone Colliery in England a bath house was built at a cost of $3000, having 14 baths and 48 lockers. The cost of upkeep of this bath house is about $7 a week.

Coal Shipping on the Great Lakes

By J. W. Chamberlin*

SYNOPSIS—The movement of coal up the Lakes during the summer season is one of the most interesting transportation problems in the coal industry. The Lake shippers believe they have the most advanced and modern systems of handling coal. The necessity of such is obviously much more essential, due to the short haul and relatively greater proportion of time required in loading and unloading. This is the first of a series of articles that will discuss all phases of the Lake trade.

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The coal trade of the Great Lakes, although comparatively new, has already attained to great proportions. Pennsylvania produced less than 2000 tons in 1820, but as there are no mines within mule-hauling distances of the Lakes, it is certain that the railroad, in 1830, must have preceded that traffic. "Railroading" began with the completion of the Erie to Dunkirk on Lake Erie in 1851. The first real incentive to lake navigation, at least from one lake to another, must have been given by the growth of Chicago, which was not settled till 1831.

Ashtabula Harbor, One of the Largest Coal and Ore-Handling Ports in the World

Early History of Lake Transportation

There was, however, a big impetus given to the coal trade by the opening of the Erie Canal, connecting the lakes with tidewater, in 1825. Coal, practically all anthracite, came to be one of the common articles carried by the canal. It was taken by canal-boats in probably not more than 100-ton lots to Buffalo, where it was hoisted by derrick to the lake wharf and was loaded on sailing vessels for the most part with wheelbarrows. An old Buffalo ship-store owner states that once a very big record was made by the wheelbarrow process in loading the ship "Erastus Corning" with 1400 tons of coal in 14 hours!

Lake vessels are now being loaded at the rate of 1000 tons an hour. Buffalo in those days received anthracite by canal through Seneca and Cayuga Lakes and from Rondout on the Hudson. It appears that since the days of the "Erastus Corning," which was built in 1867, both carrying and handling capacity have increased tenfold, for there are quite a number of modern steamers that will carry more than 14,000 tons of bulk freight on maximum draft. It is, of course, the shallow depth of the lake harbors and connections that makes it necessary to build all lake craft so broad and flat and which unsuits them for ocean carrying and *vice versa,* except in a limited way. Sometime in the '80's the steamer "Roanoke" was brought up from Tampa Bay to the lakes, and, though she could load down to about 26 ft., she could hardly get into any lake harbor with a cargo of more than 600 tons.

Water Depths and Methods of Handling Coal

As a rule, all lake craft must be loaded to a depth of less than 20 ft. and there are a good many harbors, especially in the upper-lake lumber districts, that are not more than 15 ft. deep. In these the primitive "horse dock," the terror of the coal shipper, still prevails. The vessel must wait for its coal to be hoisted out by a bucket moved by horses so that extra freight paid, at least 10c. a ton, is demanded to these points, with tonnage hard to get at any rate. Such shallow harbors are disappearing now, however, for if there is natural traffic enough to warrant the outlay they are deepened, and if not they are soon distanced by the rush of improvement elsewhere. The report from the two inter-lake passages, on which the shipmaster relies for his depth of draft (the Lime Kiln crossing below Detroit and the Poe Lock at Sault Ste. Marie) for the opening of this season, makes the former navigable at 20 ft. and the latter at 18.08 feet.

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*90 Johnson Park, Buffalo, N. Y.

THE PITTSBURGH COAL CO.'S FUEL LIGHTER "PITTSBURGH"

Up to the organization of the Lake Carriers' Association at Buffalo in 1885, the government had given anything but cordial aid to lake navigation, the tidewater and general Eastern and Southern marine interests claiming the lion's share of assistance and getting it. Since that time, government aid has become much more liberal all over the lakes, till they now boast many important improvements, such as the Poe Lock at the Sault, the Livingstone channel in Detroit River, the Straight channel at Toledo, the four-mile breakwater at Buffalo, etc. All these assist navigation in some special way, largely by deepening draft. The much-canvassed Chicago drainage canal, government permission for which was given in 1901, should have a tendency in the opposite direction. The Lake Carriers' Association, in a recent report, gives some color to the belief that it reduces lake levels from 0.5 to 0.8 ft. Natural causes so influence these levels that it is not easy to determine the amount.

The anthracite trade by lake early found that the best method of handling from car to vessel was by trestle, the loaded cars being run upon it by locomotive or stationary machinery and the coal dumped or shoveled into the pockets beneath, from which it is rapidly spouted down the hatchways of the vessel. The trestle of the Delaware, Lackawanna & Western, at the mouth of Buffalo River, is an excellent example in this line. This trestle was built in 1879 and is now the oldest of its kind in Buffalo. It has 41 pockets, which vary in size according to the elevation of the tracks above them; these latter are laid on a gravity plane to facilitate the moving of a car after it is hoisted to the top of the trestle. The entire pocket capacity is about 4500 tons, the iron-lined wooden pockets being filled from three parallel tracks.

LOADING TRESTLES

When the lake craft was comparatively small it was easy to spout the coal into the hold from the pockets, but the decks of the 400- and 500-ft. steamers, when light, are much higher from the water, so that it is now occasionally found necessary to adopt various devices to list them over so the coal will flow down the spouts.

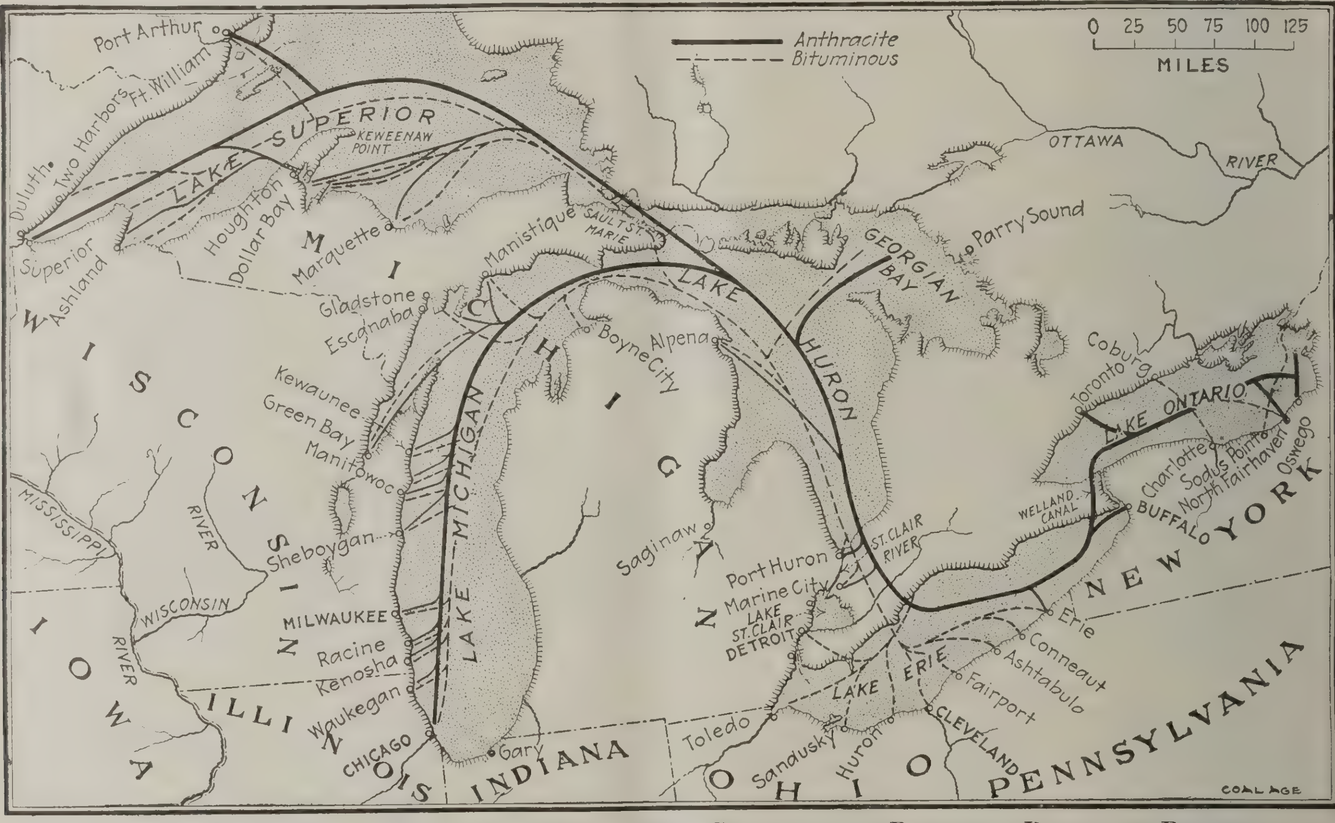
There are now four water-shipping trestles in Buffalo

STEAMER "SULTANA" OF THE TOMLINSON LINE PASSING OUT OF THE AMERICAN "SOO" LOCKS

Harbor, the Delaware, Lackawanna & Western just mentioned, the Lehigh Valley, the Erie (operated by Williams & Peters) and the Philadelphia & Reading. All hoist the loaded cars by stationary machinery, except the last named, which is operated by a locomotive incline. There are also a number of docks or trestles for fueling the steamers, including those of Frank Williams & Co., E. L. Hedstrom, Pickands, Mather & Co. and the Buffalo, Rochester & Pittsburgh R.R. The coal (always bituminous) is dumped into small pockets from the cars, whence it is drawn out into five-ton iron buckets and hoisted to the flat deck of a fuel scow, which is then towed to the lake steamer, or propelled by its own steam, and the buckets dumped into the bunkers. This is an improvement over having the steamer to go to the fuel dock for bunker coal, especially in the saving of time. Where the steamer takes a cargo of coal the fueling is done from the trestle that furnishes the cargo.

Buffalo does not ship bituminous coal by lake. Rail freight rates are too high, as compared with those to Erie or the Ohio ports. The rate from the Allegheny Valley mines to Buffalo is $1.10, as compared with 78c. from Pittsburgh to the Ohio ports, and a still lower rate has been made this season to Erie. Quite a number of years ago the Rochester & Pittsburgh, having its own coal and railroad, undertook to meet this competition and one season shipped about 150,000 tons of bituminous by lake, but it dropped out of the business after two or three seasons. The only port that ships both anthracite and bituminous extensively by lake is Erie, which till lately used the trestle chiefly for anthracite and the car dump for bituminous. There are no car dumps in use at lake ports below Erie. The Buffalo, Rochester & Pittsburgh R.R. put one in at Buffalo for loading its bituminous lake shipments, but took it out on retiring from that trade. Though either sort of coal could be handled by either trestle or dump, the conditions favor the trestle for anthracite and the car dump for bituminous.

The coal trade of Lake Ontario is in a peculiar condition. It is essentially separated from the other lakes by the fact that the Welland Canal connecting it with Lake Erie and the upper lakes admits vessels of only about 14 ft. draft and there are but few that can load more than 2000 tons on that draft and at the same time accommodate themselves to the canal locks, which are only 270 ft. long by 45 ft. wide. On that account the trade of Lake Ontario is largely confined to ports on that lake or on the St. Lawrence River, though two or three shippers of anthracite at Oswego still send cargoes to the upper lakes. For instance, of the 686,417 gross tons of anthracite shipped in 1911 from Oswego, 209,948 tons cleared for the upper lakes. The other ports on that lake, North Fairhaven, Sodus Point and Charlotte, practically confine their operations to ports below the Welland Canal.

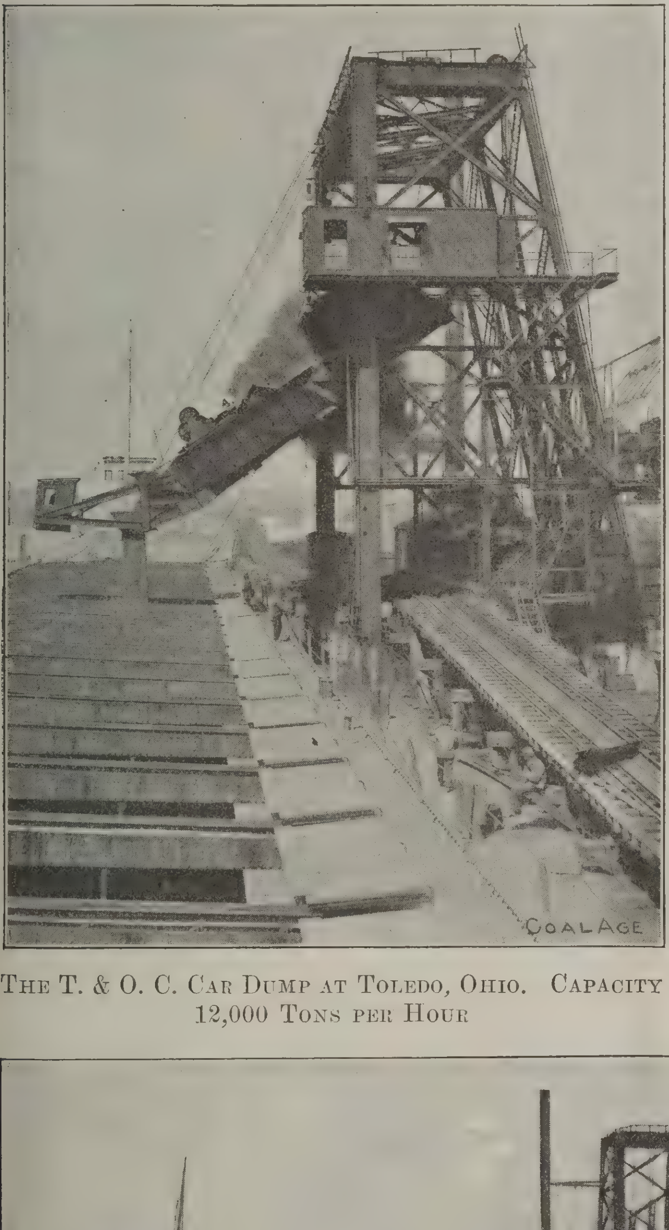


Map of the Great Lakes Showing Principal Shipping and Receiving Ports and Routes

On this account the tonnage on Lake Ontario is very small, cargoes often running down to 200 or 300 tons and vessels hard to get at that. Still the coal trade on that lake keeps up and in some instances increases. Anthracite shipments from North Fairhaven were 100,000 tons in 1911 and 150,000 tons in 1912, and the other shipping ports were holding their own well. There are three shipping trestles at Oswego, the New York, Ontario & Western, the Delaware, Lackawanna & Western and the Delaware & Hudson, the last not shipping heavily by water since the opening of its rail line to Montreal. Anthracite only is shipped from Oswego, and this is also the chief product shipped out of North Fairhaven, where the Lehigh Valley Co. has a trestle. The principal shipments from Sodus Point, where the Pennsylvania R.R. has a trestle, are bituminous. At Charlotte the Buffalo, Rochester & Pittsburgh R.R. and the Grand Trunk Ry. operate a joint car ferry to Coburg, Canada, which handles practically all the water coal there; this was formerly about all bituminous, but it is reported that the anthracite shipments will be increased this season. The ferry runs all winter.

Freight Rates

There has been little change in the numerous receiving coal ports on Lake Ontario and the St. Lawrence River in late years. Most of them receive coal in small amounts, the leading ports being Montreal and Toronto. Hamilton, a large coal port some years ago, has shifted to all-rail traffic. Canadian consumption of Pennsylvania coal is increasing, and it appears that the Lake Ontario route is to get its share. There is much need of more tonnage and larger vessels. Some shippers in Buffalo and elsewhere not long ago became tired of conditions on Lake Ontario and sent their coal to Erie, Conneaut and other Lake Erie ports, for shipment to the Lake Ontario listrict, but rates have gone up so sharply that they are likely to return to the old routes. The water rate from Lake Ontario to the upper lakes is usually 40c. a gross ton over the Buffalo rate; other rates vary. Buffalo water rates are always reckoned per net ton.



The T. & O. C. Car Dump at Toledo, Ohio. Capacity 12,000 Tons per Hour

Coal-freight rates from Lake Erie have undergone a great decline in recent years, though anthracite and bituminous freights do not differ much during the same season. The palmy days of the wooden vessel, commonly a steamer with one or more consorts, was in the '80's, coal rates reaching their maximum about 1888, when the rate, Buffalo to Chicago, was 75c.@$1; to Milwaukee, 75@90c.; to Duluth, 50@60c.; to Toledo, 25@50c. But the steel vessel was already in the trade and making itself felt, so that the rate in 1889 fell to 45@60c. to Chicago and Milwaukee and 25@50c. to Duluth. From that time the decline was steady, settling down early in this century to 40c. to leading Lake Michigan ports and 30c. to Duluth and most other Lake Superior ports.

Moreover, these later rates are practically without fluctuation the season through, for they are entirely controlled by the shipper; because of the large amount of tonnage between Lake Erie and the upper lakes, a high rate is possible only just at the close of the season, when none but the more venturesome of vessel owners would send a steamer out. In the old days the situation was largely controlled by the vessel, as the tonnage was generally inadequate to shippers' needs and was always in demand. For this reason fluctuations in rates were often of almost daily occurrence.

The lake trade has almost always been highly profitable to vessel owners until quite recently, one reason being that it has been easy to obtain full cargoes both ways. Perhaps for the money invested and the simplicity of the undertaking no traffic in fairly recent times was more satisfactory and generally profitable than in these same '80's, when the "canal-schooner" trade was so brisk between Buffalo and Toledo. The up-trip, just the length of Lake Erie, was made with 600 tons of coal at 50c. a ton and the return with 20,000 bushels of wheat at 2@3c. a bushel.

(To Be Continued)

Freighter "Champlain," 8500-Ton Capacity, Loading at the T. & O. C. Dock at Toledo

Coal-Cutting Machinery in England

By Sydney F. Walker

SYNOPSIS—A résumé of some of the circumstances and conditions which have made the introduction of coal-cutting machines rather more backward in England than it has been in this country.

⁂

Coal-cutting machines have been employed to a much larger extent in America than in either the United Kingdom or in Continental Europe. Americans, as a rule, appear to be able to use and handle machinery that has been designed to economize labor, much better and more intelligently than the bulk of men who are employed for the same purpose in the countries east of the Atlantic.

The compressed-air coal puncher which has been largely used in America, has almost entirely failed in England, and at the present time there are but few of these machines in use in the United Kingdom.

A machine, which has taken the place in Great Britain which appears to be occupied in America by the puncher, is the radial coal cutter, which goes by various names. It is really a precision drilling machine, arranged to sweep out an arc in any direction; horizontal, vertical or at any angle that may be desired. In narrow working places, such as are employed in the north of England, it is nearly always necessary to "nick" the coal, as it is termed. This is to cut a vertical incision on each side of the working face as well as undercut it, in order to minimize the use of explosives and bring down the material in convenient form. The radial coal-cutting machine, which may be taken down until the parts can be easily carried from place to place, is handy indeed for nicking as well as undercutting in this class of work.

Practically the only reason for the employment of coal-cutting machines in the United Kingdom is the reduction in cost which may be effected. Take, for example, a seam of coal 18 in. thick in a certain Yorkshire colliery, the cost for undercutting by hand was $1.75 per ton; this expense was sufficient to practically debar the coal from the market. When the diamond disk machine was introduced, the cutting cost was reduced to 75c. and the whole of the seam in question could then be worked and sold to advantage.

Machines Produce Less Slack

Some years ago, it was claimed by the makers of coal-cutting machines, and this claim has been borne out to a large extent by experience, that a much smaller proportion of fine coal was made by a machine than by hand cutting. This, of course, is a natural result. The disk or bar machines cut a kurf under the coal of just sufficient vertical height to allow the passage of disk or bar and provide for the coal coming down. Except where the ground is much broken up by nodules of iron pyrites or by irregularities in the strata, this kerf is fairly uniform in section.

In order to cut well under the coal, in hand mining the miner is compelled to remove a sufficient quantity to allow his head and shoulders going under the outer edge of the face. He must also chip out enough material to allow the swinging of his pick. Such a process necessarily produces a large amount of slack.

After the successful introduction of coal-cutting machines, it was found in many cases where undercutting had been performed and the shots fired that the coal simply settled onto the strata below in some cases at least, breaking up but very little. This entailed additional labor for reducing the large blocks to such sizes as could be easily loaded into the mine cars.

It should be noted that the coal puncher closely approaches the results obtained in hand mining and makes practically as much small coal as the latter method. Where the output of the mine goes to coke ovens, it is immaterial, so far as the mining process is concerned, how much slack is produced since it is all ground or pulverized before being coked.

Machines Advance More Regularly

In working coal measures on the longwall system, there are other advantages which may be obtained by the employment of coal-cutting machines; among these might be mentioned more regular working, a more uniform advance of the face and greater safety in working conditions generally. With hand undercutting, the face may be and frequently is, advanced in an irregular manner, while with machine work the whole face advances at the same rate. This leads to economy in the use of timber and safer working conditions generally.

In a considerable number of British collieries, the coal overlies a fireclay, which may be either hard or soft in its consistency. Not infrequently the undercutting is done in this material, and the inconvenience and difficulty encountered because of the soft and yielding floor, may be overcome by mounting the machine on skids rather than wheels. There seems to be a general tendency toward skids, more and more in place of wheels and rails, for although the power required to draw the apparatus along the face is greater, yet the machine itself is more independent and flexible. Furthermore, when employing skids or similar devices, it is not necessary to have the face of the coal either level or straight.

The only locations in Britain where the economy of the coal-cutting machine is questionable are in the collieries mining a particularly soft coal. This is especially true of the mines in South Wales, where the coal is peculiarly soft, and may be cut and brought down with extreme ease. It is here difficult to devise a machine that will show marked economy over hand labor, in spite of the fact that the miners are paid large wages.

In some of the English collieries the method of working is such that the coal face is extremely long. In Yorkshire, in some cases, the working face is 900 yd. in length, there being several such faces in a single colliery. The ideal of one mining engineer who had been largely instrumental in the development of the coal-cutting machines, was a continuous circular face with a number of machines continuously chasing each other, so to speak, around it, the machines being spaced a sufficient distance apart to allow the coal which was cut each night to be loaded out during the next day. In Scotland, the practice, in some collieries at least, is to have a working face about 100 yd. in length, which is cut across during each cutting shift and the coal loaded out during the following haulage shift, the same as in Yorkshire.

Mines of the Continental Coal Corporation

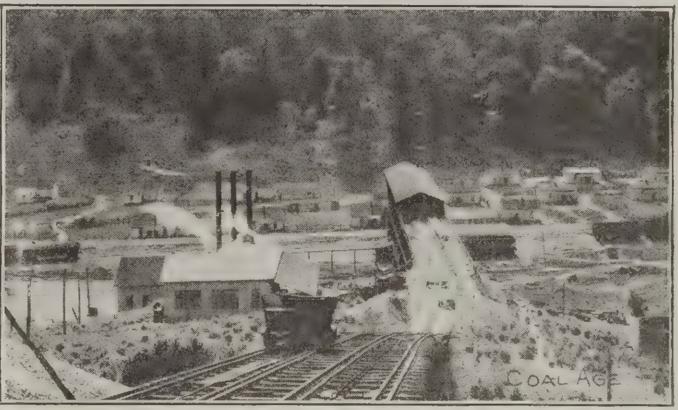
SYNOPSIS—The Continental Coal Corporation, having acquired 16 independent mines, is about to operate them all from a central station.

⁂

The Continental Coal Corporation was formed through the consolidation of nearly a dozen different companies, operating 18 different mines in southeastern Kentucky and mining a high quality of coal. The work of uniting the operations of the mines has not been completed, but it is intended to effect economies in operation through central power houses, etc.

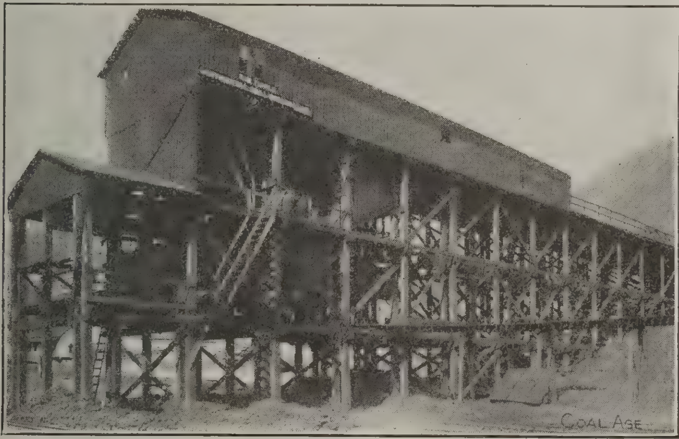
RIM NO. 4, BELL COUNTY, KY.

(This mine, having an output of about 1000 tons a day, is in the Four Mile Creek district, and is one of the two mines working the High Rim or Hickory seam.)



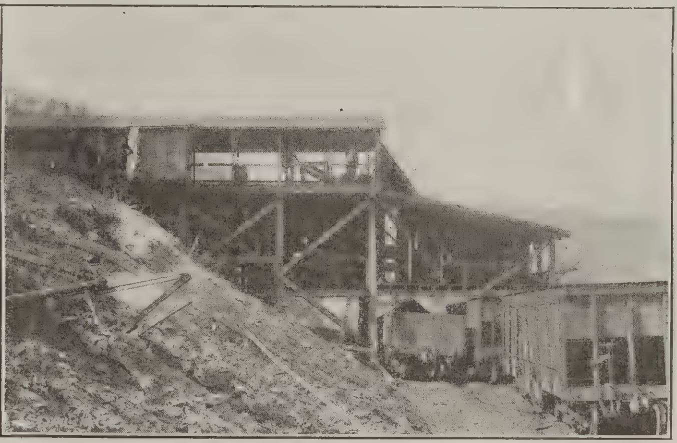
INCLINE AT RIM NO. 4

(The cars passing down this slope are restrained by a barney. The coal thus lowered is dumped to supply the locomotives of the Louisville and Nashville R.R.)



TIPPLE AT RIM NO. 4

(One of the big tipples of the Continental Coal Corporation.)



TIPPLE AT ARJAY, KY.

(A less pretentious tipple of the same company.)

The holdings of the companies reach a total of about 35,000 acres in Bell County, eastward and northward from Pineville, Ky. They are situated along the Cumberland Valley division of the main line of the Louisville & Nashville R.R., which serves the mines through its various branches. Eastward from Pineville, up Straight Creek and its forks, are nine mines, named Geraldine, Glendon, Arjay, Cory Nos. 1, 2 and 3, Castro and Barker Nos. 2 and 3. A mile down the Cumberland River, northwest from Pineville at Wallsend, are two mines, Nos. 1 and 3. Three miles farther down the river, and up Four-Mile creek, are seven mines, known as Black Raven, Rim Nos. 1, 3 and 4, No. 5, Black Bear and Cub. Of a total of 18 separate mines, some are so located as to permit one tipple to handle the coal from two or three openings. The duplication of mine numbers is due to the separate ownership preceding the consolidation.

All but two of the mines are working the Straight Creek bed of coal, which is of a high quality. Mines Nos. 4 and 5 on Four-Mile creek work the Rim or Hickory seam, lying about 90 to 100 ft. above the Straight Creek bed at this point. There are numerous other available seams higher in the hills as well as below drainage.

The Straight Creek coal is a free-burning bituminous suited for steam, gas and domestic uses. An analysis made by the United States Navy Department gave the following results:

Carbon	63.40
Volatile matter	33.17
Moisture	2.23
Ash	1.20
Total	100.00
Sulphur	0.68
B.t.u. per lb. dry	15.103

The company has introduced many forms of social betterment. A thoroughly equipped hospital is maintained in Pineville and five physicians are in the service of the company at the several groups of mines. First-aid corps are maintained, one of the crews winning the first-prize trophy at the meeting of the Kentucky Mining Institute in May of the present year. At each of the camps there are baseball and basketball teams which are the champion organizations of southeastern Kentucky.

The height of coal that is being mined varies from 5½ ft., as at the Rim No. 4 mine, where the Rim seam is being worked, to 30 in. in the Wallsend mine, working the Straight Creek bed. The coal is all machine mined, being undercut by shortwall machines.

Two Exterior Views of the Barker Mine

(The grade at Barker favors the loaded cars. Nevertheless it is not customary to let the locomotive follow the wagons out of the mine. Instead it takes the lead and crosses over by the connection shown, and is attached to the front end of the empty trip.)

(Hauling a trip of loaded cars from No. 2 opening of the Barker mine by a 10-ton Goodman, single-motor, electric locomotive. The distance from the tipple to the mine opening is about a quarter of a mile. The cars are gathered inside by a 6-ton locomotive.)

Two Interior Views at the Wallsend Mine

(A low-type Goodman locomotive chaining loaded cars to the end of a rope-haulage system. The cars in the rooms are pushed both ways by the miners and trips are gathered on the entries by a 5-ton locomotive.)

(A Goodman shortwall machine entering a low room. These machines stand 25¼ in. above the rails. Consequently they can enter rooms only 30 in. high on tracks laid on the floor. No rock is taken down in the rooms.)

⁂

Illinois' Eight-Million-Dollar Coke Production

The production of coke in Illinois in 1912, amounted to 1,764,944 short tons, valued at $8,069,903, against 1,610,212 tons, valued at $6,390,251 in 1911, acording to E. W. Parker of the U. S. Geological Survey. The average value per ton advanced from $3.97 to $4.57. In spite of the increase in production Illinois dropped from fourth to fifth place in rank among the states, because of the much larger increase in Indiana that followed the putting in blast of the entire plant of 560 koppers ovens of the United States Steel Corporation at Gary, which advanced that state from sixth to third place.

All the coke produced in Illinois in 1911 and 1912 was made in byproduct ovens, much of the coal being drawn from West Virginia mines. No bee-hive coke was produced in the state. In some of the ovens the charge consists of a mixture of West Virginia and Illinois coal in the proportions of 4 to 1. This has been found to make an entirely satisfactory coke.

There were four retort plants with a total of 568 ovens in operation in 1912. One of these plants consisted of 240 Semet-Solvay ovens operated by the By-product Coke Corporation at South Chicago. This plant has been enlarged three times, the latest addition of 40 ovens being completed in 1912. Thirteen of the same kind of ovens were operated by the North Shore Gas Co., at Waukegan, having been completed in 1912. These ovens are heated by producer gas made from the coke.

A plant of 280 koppers ovens was operated by the Illinois Steel Co., at Joliet, built in 1908 and 1909, and another of 35 by the Coal Products Manufacturing Co., also at Joliet, completed in 1912. The surplus gas from the former is used at the steel plant.

Nonfatal Injuries in Bituminous Mines

By F. L. Hoffman*

SYNOPSIS—The nonfatal-accident rate in bituminous mines is almost equal to that in anthracite workings. The conjugal relations of the injured are closely the same in both fields and the main differentiation between the regions is to be found in the fact that the percentage of injuries to the head and arms is greater in the anthracite region. In the bituminous field the workers receive a larger percentage of injuries to the body and lower limbs.

⁂

In Coal Age of May 31, 1913, I had occasion to discuss at some length the nature of nonfatal injuries in anthracite mines. To make the study complete and to provide the required data for comparison I have brought together the corresponding information for the bituminous coal mines of Pennsylvania, also for the period 1907-1911. There were, in the aggregate, 5602 nonfatal accidents, or 6.04 per 1000 men employed. The inside nonfatal accident rate was 7.22, and the outside rate, 0.42 per thousand. These rates require only to be stated to emphasize the incompleteness of the returns, which are obviously limited only to the more serious casualties.

The same conclusion applies to the anthracite statistics, for, as shown in the article to which reference has just been made, the nonfatal-accident rate for the anthracite region was 6.71 per 1000. Whether the risk is really less in the bituminous region is a matter of conjecture, for there are no means by which it is possible to determine whether the returns are more complete for the one coal field than for the other. In view of the ever-increasing agitation for adequate workmen's compensation laws it is, however, of the utmost importance that all accidents causing disablement for work should be reported, so that a complete statement of the facts may be available and may properly guide those charged with the responsibility for framing more or less far-reaching statutory requirements. Table I exhibits in a convenient form the nonfatal accidents in Pennsylvania bituminous coal mines for the period 1907-1911, together with the comparative rates for anthracite mines, discussed in my previous article.

TABLE I. NONFATAL ACCIDENTS IN PENNSYLVANIA COAL MINES, 1907-1911

	Bituminous		Rate per 1000	Anthracite		Rate per 1000
Year	Employees	Accidents	employed	Employees	Accidents	employed
1907.......	183,121	1207	6.59	168,774	1369	8.11
1908.......	181,840	1026	5.64	174,503	1170	6.70
1909.......	185,921	1126	6.06	171,195	1034	6.04
1910.......	193,488	1142	5.90	168,175	1048	6.23
1911.......	182,653	1101	6.03	173,338	1124	6.48
Total....	927,023	5602	6.04	855,985	5745	6.71

Liability to Accident as Affected by Age

Table II exhibits the age distribution of the injured as determined by means of a special analysis of the facts reported in detail in the returns to the Department of Mines, and for purpose of comparison I also add the corresponding percentages for the anthracite mines.

According to this comparison the age distribution of the injured was about the same in both mining districts, for if the age periods are combined in more convenient form it appears that at ages under 25 the proportion of injured was 30.4 per cent. for the bituminous region, against 32.1 per cent. for the anthracite, whereas at ages 50 and over, the proportion was 7.6 per cent. for the bituminous, against 8.6 per cent. for the anthracite. In other words, the proportion was slightly higher for the two extremes of life in the anthracite region, but the differences are not of sufficient importance to indicate material variations in the accident liability of anthracite and bituminous mining as affected by the ages of the employees. It is a matter of regret, however, that the corresponding age distribution of the employed should not be available for the correct calculation of casualty rates, by divisional periods of life, but even under the present limitations the foregoing table is of much interest and some practical utility.

TABLE II. AGE DISTRIBUTION OF PERSONS INJURED IN NONFATAL ACCIDENTS IN PENNSYLVANIA COAL MINES, 1907-1911

	Bituminous		Anthracite	
Ages	Number Injured	Per cent. of Total	Number Injured	Per cent. of Total
Under 15	18	0.3	18	0.3
15—19	580	10.4	825	14.4
20—24	1104	19.7	1000	17.4
25—29	1158	20.7	949	16.5
30—34	824	14.7	809	14.1
35—39	688	12.3	686	11.9
40—44	462	8.2	543	9.5
45—49	335	6.0	418	7.3
50—54	228	4.1	251	4.4
55—59	119	2.1	135	2.3
60—64	50	0.9	60	1.0
65 and over	29	0.5	49	0.9
Unknown	7	0.1	2	0.0
All Ages	5602	100.0	5745	100.0

Slavonians Lead List of Foreign Born Injured Nonfatally

Table III exhibits the nativities of those injured in bituminous coal mining, together with the corresponding percentages for the anthracite coal field.

This comparison is quite instructive and makes clear the wide difference between the nativities of the mining populations in the two coal regions. It is shown that the proportion of Americans injured was about the same, but that the predominating foreign nativities appearing in the accident returns of the bituminous coal regions

TABLE III. NATIVITY OF PERSONS INJURED IN NONFATAL ACCIDENTS IN PENNSYLVANIA COAL MINES, 1907-1911

	Bituminous		Anthracite	
Nativity	Number Injured	Per cent. of Total	Number Injured	Per cent. of Total
American....................	1307	23.3	1530	26.6
Austrian....................	301	5.4	161	2.8
Belgian....................	21	0.4	0	0.0
Bohemian....................	37	0.7	2	0.0
Bulgarian....................	7	0.1	0	0.0
English....................	192	3.4	157	2.7
Finnish....................	25	0.5	7	0.1
French....................	45	0.8	6	0.1
German....................	175	3.1	147	2.6
Greek....................	12	0.2	12	0.2
Horvat (Croatian)..........	45	0.8	3	0.1
Hungarian....................	363	6.5	144	2.5
Irish....................	96	1.7	308	5.4
Italian....................	790	14.1	391	6.8
Lithuanian....................	119	2.1	529	9.2
Polish....................	629	11.2	1442	25.1
Russian....................	179	3.2	261	4.5
Scotch....................	87	1.6	19	0.3
Slavonian....................	1066	19.0	379	6.6
Swedish....................	55	1.0	11	0.2
Syrian....................	1	0.0	3	0.1
Tyrolean....................	1	0.0	18	0.3
Welsh....................	35	0.6	209	3.6
All others....................	14	0.2	6	0.1
Total....................	5602	100.0	5745	100.0

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*Statistician, Prudential Insurance Co. of America, Newark, N. J.

were: Slavonians, Italians, Poles, Hungarians and Austrians, in the order named, and in the anthracite region: Poles, Lithuanians, Italians, Slavonians, Irish and Scotch. In the bituminous region the proportion of accidents which occurred to men born in countries where English is spoken was 30.7 per cent., against 38.7 per cent. in the anthracite mines.

It is impossible to state what percentage of the men of any nativity received nonfatal injuries since the miners having any given nativity have not been separately enumerated. If it were feasible to calculate precise death rates by nativity much valuable information would be gained regarding the greater or lesser accident liability of some foreign elements than of others. Some have possibly a better aptitude for underground work or a longer mine experience, which, it may safely be assumed, counts for much, although accidents are likely to occur even in the case of the most careful men with many years of underground experience.

TABLE IV. CAUSES OF NONFATAL ACCIDENTS IN THE BITUMINOUS COAL MINES OF PENNSYLVANIA, 1907–1911

	Fall of coal	Fall of rock or slate	Falls into shafts	Mine cars	Explosions of— gas or dust	powder	blasts	boilers	Machinery	Electricity	Horses or mules	Timber	Miscellaneous	Total
Inside employees														
Mine foremen	1	7	2	15	3	2	0	0	6	4	1	1	3	45
Asst. mine foremen	0	6	0	1	2	0	0	0	0	0	0	0	0	9
Firebosses	0	4	0	3	4	1	1	0	0	0	0	0	2	15
Miners	686	1331	9	442	44	108	92	0	19	7	12	30	74	2854
Machine runners	24	36	0	22	2	0	2	0	39	2	8	0	3	138
Machine loaders	150	552	6	184	15	18	29	3	15	4	3	4	33	1016
Machine scrapers	34	22	2	11	1	3	0	4	13	2	3	0	2	97
Drivers and runners	10	47	11	715	2	5	0	1	18	30	50	1	41	931
Doorboys and helpers	1	2	0	47	0	1	0	0	3	4	1	0	3	62
Company men	7	64	7	104	10	1	1	0	10	4	2	4	21	235
Other inside	5	24	5	52	4	5	7	2	3	4	4	0	17	132
Total	918	2095	42	1596	87	144	132	10	126	61	84	40	199	5534
Outside employees														
Superintendents	0	1	0	3	0	0	0	0	0	1	0	0	0	5
Foremen	0	0	0	0	0	0	0	0	1	0	0	0	1	2
Blacksmiths and carpenters	0	0	2	5	0	0	0	0	4	0	1	0	2	14
Engineers and firemen	0	1	2	6	0	0	0	1	6	1	0	0	4	21
Coke employees	0	0	0	3	0	0	0	0	0	0	1	0	0	4
Bookkeepers, etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other outside	0	0	2	16	1	0	0	0	1	0	0	0	2	22
Total	0	2	6	33	1	0	0	1	12	2	2	0	9	68
Grand total	918	2097	48	1629	88	144	132	11	138	63	86	40	208	5602
Per cent	16.4	37.5	0.8	29.1	1.6	2.6	2.3	0.2	2.5	1.1	1.5	0.7	3.7	100.0

The Accidents of Married Men Roughly Equal in Number Those of the Unmarried

The statistics of injured mine employees differentiate only the married and single, and do not mention the widowers, although it would be of considerable importance to have this fact stated, since in workmen's compensation legislation the awards are made to depend more or less upon the number, and degree of dependence, of surviving members of the family. It is, however, extremely suggestive that even according to the present crude nonfatal-accident statistics in Pennsylvania coal mines the conjugal condition of the injured should be shown to be almost the same. The proportion of injured married employees, for illustration, in the bituminous coal mines of Pennsylvania was 55.5 per cent., against 56.1 per cent. for the anthracite region. Recalling that much the same result was obtained in the analysis of the age distribution of injured employees, the conclusion would seem warranted that there are probably no pronounced differences in the method of reporting nonfatal accidents, for, in both mining sections only the more serious casualties appear to be recorded.

The causes of injuries have been classified in reasonable detail in the table which follows, and the minor occupations have been grouped on account of the required limitation of space. As pointed out in the previous article, for scientific purposes, reference to the occupations in detail would be useful, but the value of the analysis diminishes with the decreasing numbers yielded by a minute classification, which can only be made to advantage for a much longer period of time or upon the basis of much more complete returns than are at present available.

For a full understanding of the accident problem in bituminous mines it is necessary to take into account the relation of particular occupations to the prevailing causes of accidents, as quite fully set forth in Table IV, which also shows the percentage distribution of such causes for inside and outside employees combined.

Table IV is self-explanatory and requires no extended discussion. It is shown that the most common causes of accidents in bituminous mines were falls of slate or roof, accounting for 37.5 per cent. of the total, followed by mine cars, accounting for 29.1 per cent., and accidents due to falls of coal, responsible for 16.4 per cent. of the nonfatal injuries from all causes. These three principal groups of causes, therefore, accounted for 83 per cent. of the nonfatal accidents from all causes.

The next and most important table of the present discussion (Table V) exhibits in considerable detail the parts of the body injured in nonfatal accidents in the bituminous mines of Pennsylvania. The table conforms in its arrangement to the corresponding table for nonfatal accidents in anthracite mines as published in the article to which reference has previously been made. This analysis, as far as known, is the first contribution of its kind to a more scientific study of the accident problem in mining, and the table is deserving of the most careful study on the part of mine managers, mine physicians, and all others interested in the safety and comfort of mine employees.

The table emphasizes the great importance of thoroughly equipped departments of first aid to the injured, although as previously pointed out, a large number of the minor nonfatal accidents are unquestionably not reported at the present time. The proportion of unspecified injuries in the case of bituminous mines was only 3.2 per cent., against 7.5 per cent. for the anthracite region, and the proportion of multiple injuries combined and not available for tabular analysis was also less in the bituminous than in the anthracite, or, respectively, 4.1 per cent. against 6.5 per cent. In time, as mine man-

TABLE V. PARTS OF THE BODY INJURED IN NONFATAL ACCIDENTS IN THE BITUMINOUS MINES OF PENNSYLVANIA, 1907–1911

Occupation	Employees	Head	Face	Eye	Eyes	Nose	Shoulder	Shoulders	Arm	Arms	Wrist	Wrists	Hand	Hands	Finger	Fingers	Collarbone	Rib	Ribs	Trunk	Hip	Hips	Leg	Legs	Knee	Knees	Ankle	Ankles	Foot	Feet
Inside employees																														
Mine foremen	6,048	2	0	0	0	0	0	1	2	0	0	0	1	1	0	2	0	0	0	3	1	0	12	0	0	0	0	1	4	0
Asst. mine foremen	1,813	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Fire bosses	4,434	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	2	0	0	1	0	1	0	0
Miners	358,802	94	42	20	5	5	44	1	99	0	11	1	31	6	42	22	140	13	74	293	50	33	979	23	7	0	82	0	110	22
Machine runners	21,368	5	2	1	0	1	0	0	5	0	1	0	7	0	5	3	1	0	2	10	1	1	51	3	1	0	6	0	10	0
Machine loaders	221,512	29	7	4	1	0	11	1	34	0	3	0	8	2	12	6	19	8	10	111	27	3	393	13	6	0	37	0	67	2
Machine scrapers	20,215	0	1	0	0	0	1	1	3	1	1	0	2	1	3	0	3	0	5	7	1	2	28	0	8	0	1	0	8	0
Drivers and runners	50,382	37	8	0	0	3	8	4	63	1	10	0	27	3	14	15	45	4	22	67	8	13	203	10	13	1	29	0	93	2
Doorboys and helpers	9,603	2	0	1	0	0	1	0	4	0	1	0	0	0	0	3	2	0	0	2	2	0	25	0	0	0	1	0	7	0
Company men	50,484	16	0	0	1	1	1	1	21	0	2	0	5	0	6	2	11	0	2	13	6	2	65	4	3	0	9	1	11	1
Other inside employees	22,127	4	0	0	0	1	3	3	6	2	1	0	6	0	4	4	2	1	3	3	2	4	37	4	4	0	1	0	6	0
Total	766,788	189	62	26	7	11	69	12	242	4	30	1	87	13	86	57	223	27	118	513	93	66	1887	57	42	2	166	3	316	27
Outside employees																														
Superintendents	3,769	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0
Foremen	2,802	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blacksmiths and carpenters	13,265	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	2	0	0	7	0	0	0	0	0	1	0
Engineers and firemen	16,783	1	0	0	0	0	2	2	2	0	0	0	1	0	0	1	1	0	0	1	0	0	1	0	1	0	0	1	2	0
Coke employees	56,295	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bookkeepers and clerks	5,375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other outside employees	61,946	4	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	1	0	0	6	0	0	0	0	0	4	0
Total	160,235	7	0	1	0	0	4	2	3	0	1	0	2	0	3	1	2	1	1	4	1	0	16	0	1	0	0	1	8	0
Grand total	927,023	196	62	27	7	11	73	14	245	4	31	1	89	13	89	58	225	28	119	520	99	66	1903	57	43	2	166	4	324	27
Percentage		3.5	1.1	0.5	0.1	0.2	1.3	0.2	4.4	0.1	0.6	0.0	1.6	0.2	1.6	1.0	4.0	0.5	2.1	9.3	1.8	1.2	34.0	1.0	0.8	0	3.0	0.1	5.8	0.5

Inside employees	Toe	Toes	Internal	Not Specified	Eye and other	Eyes and other	Leg and other	Legs and other	Foot and other	Feet and other	Hip and other	Hips and other	Hand and other	Hands and other	Rib and other	Ribs and other	Finger and other	Fingers and other	Arm and other	Arms and other	Collarbone and other	Face and other	Head and other	Other combinations	Total	Rate per 1000 employed
Mine foremen	1	1	0	3	0	1	0	0	2	0	1	0	0	1	1	0	0	0	1	0	0	0	0	3	45	7.4
Asst. mine foremen	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	0	0	9	5.0
Firebosses	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	1	0	0	15	3.4
Miners	12	12	32	97	4	4	90	7	14	0	3	5	12	14	5	19	9	4	11	9	26	53	15	140	2854	8.0
Machine runners	1	1	3	2	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	8	138	6.5
Machine loaders	6	11	9	32	1	0	34	4	3	5	7	3	5	11	4	5	0	0	6	1	1	16	0	38	1016	4.6
Machine scrapers	3	1	3	5	0	2	1	0	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	97	4.8
Drivers and runners	11	12	12	14	1	0	10	3	0	2	7	2	1	1	2	6	3	0	5	1	4	4	1	28	931	18.5
Doorboys and helpers	0	1	1	2	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3	62	6.5
Company men	1	0	5	16	1	0	4	0	1	0	2	0	0	1	1	2	0	0	0	0	0	6	5	6	235	4.7
Other inside employees	2	1	2	5	1	1	2	1	0	0	0	0	1	4	1	1	0	1	2	2	0	1	0	3	132	6.0
Total	37	40	67	177	9	9	144	16	22	7	20	10	21	39	14	34	12	5	27	13	33	84	21	229	5534	7.2
Outside employees																										
Superintendents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.3
Foremen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.7
Blacksmiths and carpenters	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	14	1.1
Engineers and firemen	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	21	1.3
Coke employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.1
Bookkeepers and clerks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other outside employees	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	22	0.4
Total	0	1	0	1	0	0	1	0	0	0	0	0	1	3	0	0	0	0	2	0	0	0	0	0	68	0.4
Grand total	37	41	67	178	9	9	145	16	22	7	20	10	22	42	14	34	12	5	29	13	33	84	21	229	5602	6.0
Percentage	0.7	0.7	1.2	3.2	0.2	0.2	2.6	0.3	0.4	0.1	0.4	0.2	0.4	0.7	0.2	0.6	0.2	0.1	0.5	0.2	0.6	1.5	0.4	4.1	100.0	

agers, physicians and inspectors realize the importance of accuracy and completeness of accident reports, the number of ill-defined or incomplete returns will naturally diminish. In this respect, however, the returns for the bituminous region are apparently much more satisfactory than the statistics of the anthracite coal field.

THE PERCENTAGE OF INJURIES OF THE HEAD AND ARMS TO INJURIES OF THE WHOLE BODY IS LOWER IN BITUMINOUS THAN IN ANTHRACITE MINING

The information contained in the preceding table is summarized in a more convenient form in Table VI, which follows, and which, for purposes of comparison, includes the corresponding percentage distribution of injured parts for the anthracite region.

This comparison is particularly suggestive and an important contribution to the scientific study of the mine-accident problem of Pennsylvania. Although the nonfatal-injury rates are about the same, or, as stated at the outset, 6.04 for the bituminous, and 6.71 per 1000 for the anthracite region, the nature of the injuries differs materially, or, as shown by the table, in the bituminous region 7.6 per cent. of all the accidents are injuries to the head, face, eyes and nose, against 12.1 per cent. for the anthracite region; and 13.2 per cent. of the injuries are to the shoulders, arms, rwists, hands and fingers, in the bituminous region, against 21.1 per cent. in the anthracite. In marked contrast, injuries to the collar bone, ribs, trunk and internal parts of the body are much more frequent in the bituminous region, accounting for 18.6 per cent. of the total injuries, against 11.3 per cent. for the anthracite mines.

Injuries to the lower extremities are also more common in the bituminous region, accounting, respectively, for 53.4 per cent. of the total, against 41.5 per cent. for the anthracite. An element of error, however, underlies these figures on account of the larger proportion of ill-defined and unclassified injuries in the anthracite region, or, respectively, 14 per cent., against only 7.3 per cent. for the bituminous.

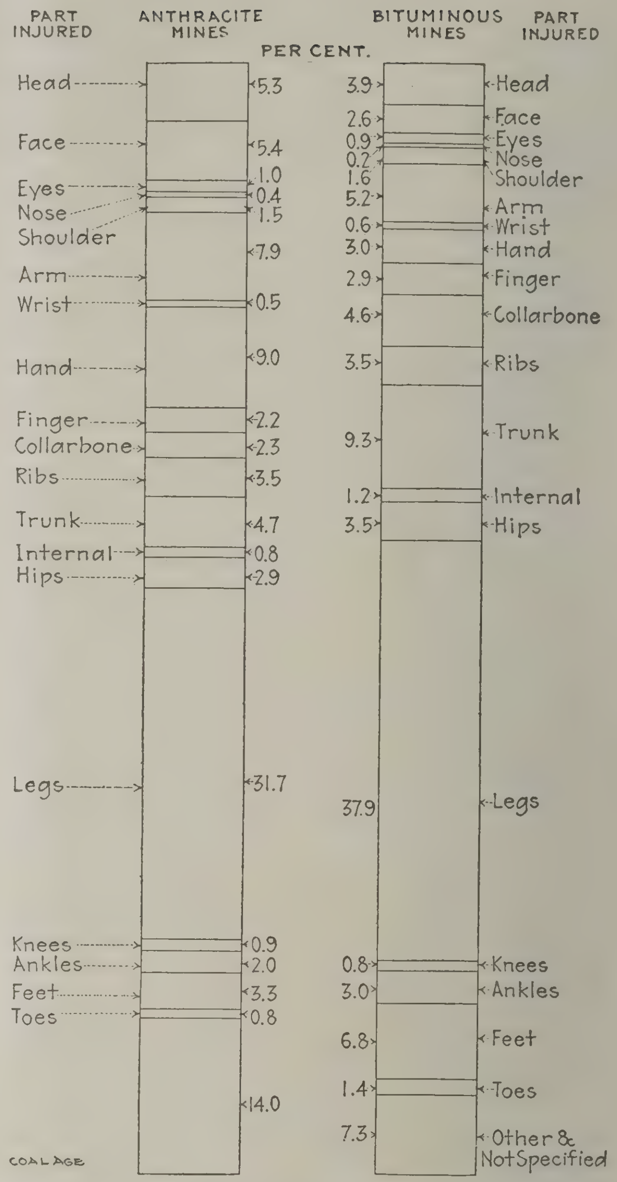
Cost of Compensation

It does not fall within the limits of the present discussion to apply the preceding analysis to the concrete problem of workmen's compensation, and the question of aggregate expense which would fall upon the mining industry if all of these injuries were paid for in conformity to a specific and scientific schedule. We should take into consideration that, in all probability, a considerable number of nonserious injuries in the mining industry are not reported at the present time, but a large number of such casualties would at once become a matter of official record and require compensation in the event of the adoption of a liberal workmen's compensation statute for the benefit of those employed in the anthracite- and bituminous-mining industries.

TABLE VI. PARTS OF BODY INJURED IN NONFATAL ACCIDENTS IN PENNSYLVANIA COAL MINES, 1907–1911

	Bituminous			Anthracite		
Part Injured	Number Injured	Rate per 1000 Employed	Per cent. of Total	Number Injured	Rate per 1000 Employed	Per cent. of Total
Head......	217	0.23	3.9	306	0.36	5.3
Face......	146	0.16	2.6	308	0.36	5.4
Eyes.......	52	0.06	0.9	56	0.07	1.0
Nose.......	11	0.01	0.2	24	0.03	0.4
Total....	426	0.46	7.6	694	0.81	12.1
Shoulder...	87	0.09	1.5	86	0.10	1.5
Arm........	291	0.31	5.2	453	0.53	7.9
Wrist......	32	0.03	0.6	28	0.03	0.5
Hand......	166	0.18	3.0	519	0.61	9.0
Finger.....	164	0.18	2.9	129	0.15	2.2
Total....	740	0.80	13.2	1215	1.42	21.1
Collarbone .	258	0.28	4.6	130	0.15	2.3
Rib......	195	0.21	3.5	201	0.23	3.5
Trunk.....	520	0.56	9.3	270	0.32	4.7
Internal....	67	0.07	1.2	47	0.05	0.8
Total....	1040	1.12	18.6	648	0.76	11.3
Hip........	195	0.21	3.5	164	0.19	2.9
Leg........	2121	2.29	37.9	1820	2.13	31.7
Knee.......	45	0.05	0.8	49	0.06	0.9
Ankle......	170	0.18	3.0	115	0.13	2.0
Foot.......	380	0.41	6.8	188	0.22	3.3
Toe........	78	0.08	1.4	47	0.05	0.8
Total....	2989	3.22	53.4	2383	2.78	41.5
Other and not specified	407	0.44	7.3	805	0.94	14.0
Grand total	5602	6.04	100.0	5745	6.71	100.0

As pointed out in the previous article, on the British basis of $24.70 per accident, the aggregate cost of a fairly liberal compensation plan would entail a total expenditure of about three and a half million dollars upon the anthracite-mining industry, and on the basis of the same estimate the corresponding expense to bituminous mining would be $3,855,942. These estimates are based on the assumption that the British nonfatal-accident rates, which are accurately determined as a result of the workmen's compensation law, prevail in the Pennsylvania mining industry, although there are reasons for believing that in actual experience the true rates are probably higher. This conclusion would seem warranted in view of the employment of less experienced labor in Pennsylvania bituminous and anthracite mines, and possibly on account of more dangerous mining methods and the larger proportionate use of coal-cutting machines.



Relative Frequency of Mining Accidents to Various Parts of the Body

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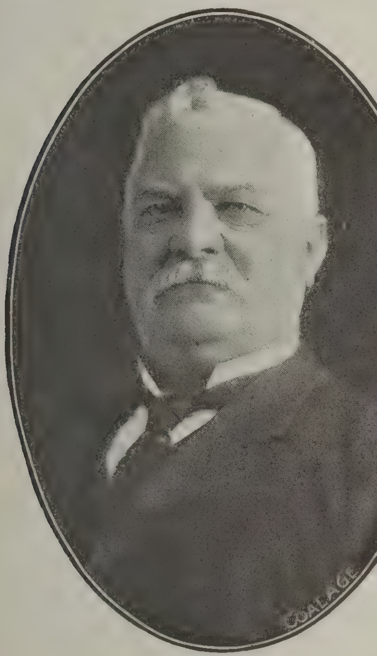
A Canadian Coal Decision

The British Columbia Court of Appeals has given a decision in the litigation between James Dunsmuir and Mackenzie & Mann over the purchase by the latter of the Wellington and other Vancouver Island collieries for $11,000,000.

The court declares Mr. Dunsmuir entitled to all the earnings from the date of the option to the time when the purchase money was paid. Mackenzie & Mann are awarded all the collateral properties, including seagoing craft employed in transporting coal, which, as Dunsmuir claims, were not included in the deal. Both parties are dissatisfied with the decision and an appeal will be taken to the British Privy Council.

Death of a Veteran Inspector

It is with regret that we learned of the recent death of George Harrison, former chief mine inspector of Ohio, which was announced in Coal Age, July 26, p. 140. Mr. Harrison died Monday night, July 14, after an illness of nearly a year. Early last fall he was stricken with paralysis, from which he failed to recover, and a final stroke has now terminated his life. Mr. Harrison had two strokes of paralysis, previously, the first occurring June, 1910, while attending the Mine Inspectors' Institute Meeting, at Chicago, Ill.; and the second, two years later, when he fell from a street car, at the Union Station, Columbus, Ohio.



George Harrison

Mr. Harrison was born at Greenhead, Northumberland County, England, April 30, 1846. He was compelled to give up school at the early age of seven years, eight months, owing to the protracted illness of his father. As far as he was able, he assisted his mother in the support of the family, which consisted of three sisters and two younger brothers. Because of the growing needs of the family, he was unable to resume his studies and, at the age of 16, moved to Leadgate, County of Durham, where he entered the mines, doing a man's work.

A few years later he married and, in 1880, came to this country, leaving a wife and children, five girls and two boys, all under twelve years of age, who joined him after four months. The family located at Byesville, Guernsey County, later going to Wellston, where he was made superintendent of the Wainwright mine. He was an active member of the U. M. W. A., serving for a time as state organizer and, again, as member of the state executive board. He was an energetic worker and a man of unquestioned integrity of character. He has filled every position in the mine from trapper boy to superintendent and mine manager. He was appointed state mine inspector by former Gov. Herrick, May 25, 1904, serving for two terms, consecutively, extending to Aug. 5, 1912.

Mr. Harrison was a charter member of the Mine Inspectors' Institute, U. S. A., and served as president of that institute, from its organization, June, 1908, to June, 1911. Last February, Mr. Harrison moved from Columbus to Caldwell. He is survived by a widow and nine children, two sons and seven daughters, six of the latter being married. Mr. Harrison's service as chief mine inspector will cause him to be remembered long in the state.

The Employees' Magazine

The first number of the magazine published by the Lehigh Valley Coal Co., for the use of its employees, has just been issued. Its purpose, scope and policy are outlined in the foreword, which reads as follows:

> "A man is known by the company he keeps."
>
> Likewise a company is known by the men it keeps.
>
> In 1910, when this company established its mining schools, the object was to give its employees an opportunity to secure an education that would better them for their work. This venture, we are pleased to say, has proven a success. Through these schools, however, we have been able to benefit only a portion of our employees, and even for them our efforts along educational lines ceased after they graduated. This limitation pointed to the necessity of a medium that would help all the men all the time; and an employees' magazine, we believe, would best fill that need.
>
> The purpose of such a magazine, then, will be: to acquaint you with uptodate and efficient mining methods; to put you in touch with improvements in machinery, equipment, apparatus, modern construction, operation, etc.; to assist you in avoiding accidents and conserving life and property; and to enable you to exchange your ideas, suggestions and experiences, in order to better your conditions in every possible way. The only discussions that will not be allowed in this magazine are those on matters which are already provided for in agreements between employers and employees in the anthracite coal region. In presenting this first number to you, we trust that you will receive it as cheerfully as it is given, and that you will not only utilize it to your best advantage, but also lend it your aid and support.
>
> THE LEHIGH VALLEY COAL CO.

The new magazine has an attractive cover design in two colors, in the center of which appears the clasped hands of labor and capital outlined against a car of coal. That the publishers hope and desire that there will be such a mutual friendship and understanding is evidenced not only by the whole tenor of its contents, but by the fact that this magazine is published entirely at the expense of the company for free distribution among its employees.

The leading article is by F. H. Gonsolus, manager of the technical division of the duPont Powder Co., of Wilmington, Del., and treats of the proper method of handling and firing explosives. The article is illustrated with half-tones and diagrams; in fact, the whole magazine is handsomely illustrated throughout.

Descriptions of new devices, technical articles which are not too hard for the average mine worker to comprehend, an account of the closing exercises of the Lehigh Valley mine schools, including the record of colliery advancement of over 70 men, as a result of their studies, interesting news items from the various divisions, articles on first-aid work and answers to inquiries take up the bulk of the space, but the publication is not too solemn to publish some good jokes and a page for women, which will appeal to the mine workers' wives.

One interesting news item tells of an innovation which is spreading among the Lehigh Valley collieries. Instead of stopping work on the day of a funeral, as heretofore, the employees send a committee to the ceremony and on the following pay day take up a collection, to which the company contributes $100, for the benefit of the family.

Keen interest has been aroused among the collieries by the publication of the Annual Report of the Inspector of Equipment on the condition of all the collieries and on the ratings of the "Fire Squads" at each colliery. The place of honor this year is held by the Mineral Spring colliery of the Wyoming division with a mark of over 97 per cent.

POWER DEPARTMENT

The Carbon Coal Co's. Central Station

By W. Ewart James* and George W. Hall

SYNOPSIS—A brief history is here given of the inception of the Carbon Coal Co. and a description of its electrical equipment and recently constructed central power plant, together with operating costs and data.

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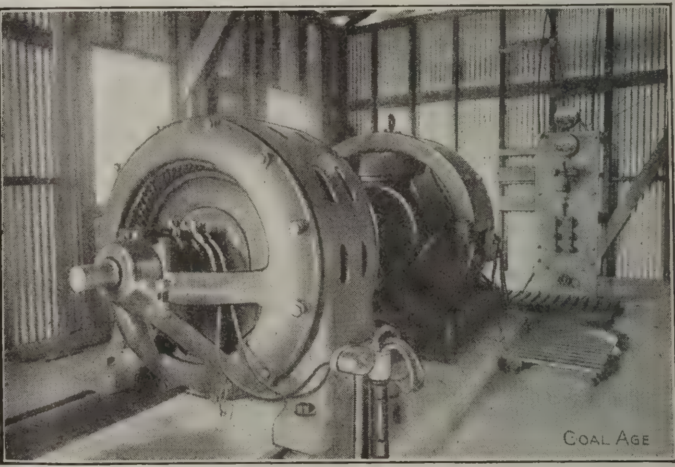
The growth of the Carbon Coal Co., Carbon, Kanawha County, W. Va., is intimately linked with the development of that section of the state through the mining and marketing of the rich coal deposits which nestle under the surface of the region. Less than eighteen years ago the surrounding country, through which flows Cabin Creek, was but a dense forest and had furnished a hunting ground for such men as Daniel Boone, the great hunter and Indian fighter. It is said that the creek derived its name from the fact that the renowned scout pitched his "tent" or "cabin" at its mouth, and that this landmark gave the creek the name it still retains.

General View of Power Plant



Motor-Generator Set in No. 1 Substation

For some time little was known of the buzz of industrial progress in this locality; and with the exception of a few lumber camps and saw mills which were scattered along the creek and its tributaries, the resources of this remarkable field lay dormant. Coal for a number of years was apparently of no commercial value, and was mined only in a desultory way until the Garrison interests commenced developing some coal lands in the vicinity of Miami in the year 1895. Four years later Messrs. Thomas, Cabell, Dickinson and others formed the Carbon Coal Co., and at the head of the creek on the waters of Trace and Fifteen Mile Forks commenced operations, which from small beginnings have developed into a gigantic corporation, whose workings extend into three counties, Kanawha, Raleigh and Fayette.

The following year these pioneers extended the railroad from Leewood to South Carbon. At the same time Mr. A. E. Humphreys and his colleagues of the West Virginia Colliery Co. constructed a similar means of transportation from Decota to the mouth of Coal Fork, and shortly afterward were engaged in extending their track up Long Branch to the No. 4 Mine. The Republic Coal Co. was inaugurated at about this time, and within the next few months had completed a branch line of railroad throughout its entire holdings. During this period of construction, it may be said that the rapid progress of development changed the very atmosphere of the community; instead of remaining the secure haunts of the bear and the deer, it was quickly transformed into a business center.

A Gradual Growth

The Carbon Coal Co., with its subsidiaries, the Republic Coal Co., and the West Virginia Colliery Co., has gradually been spreading out in all directions and is constantly looking ahead for new developments. The several companies are operated independently, but are controlled by the same management. Electric power for operating the various collieries was being generated in three separate and distinct power plants, which contained belt-driven generators that had been in use for quite a number of years. New installations were continually being added to these plants as necessity warranted, until each became a complicated arrangement of scattered mechanism; yet it still remained inadequate for the demands. It was therefore deemed expedient to resort to a more modern means of generating the motive power required.

The project of erecting a "central power plant" was carefully worked out; and though it was found by calculation that the initial outlay would inevitably be heavy, it was evident that the ultimate advantages would be overwhelmingly in favor of the proposed new installation.

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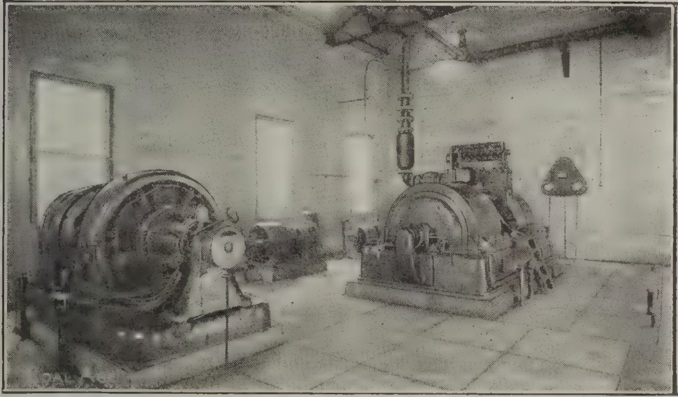
*Chief engineer, Carbon Coal Co., Carbon, W. Va.

It was therefore decided to proceed at once with the work, and Mr. James was authorized to design and superintend the construction.

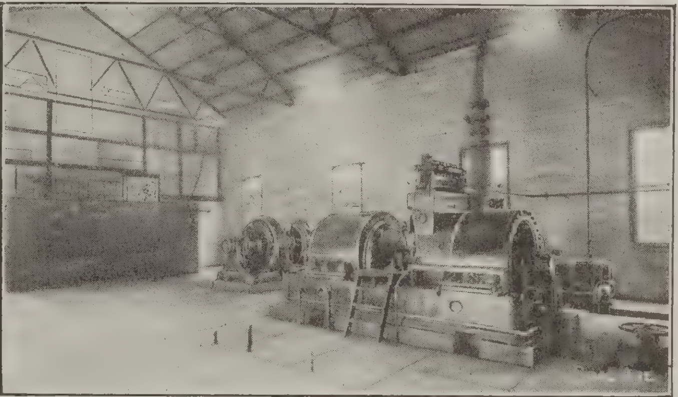
An absolutely fireproof building, designed not for the conditions of today, but for the requirements of tomorrow, houses the entire plant. It has a structural-steel frame with reinforced-concrete walls and is arranged so that another unit may be installed at any time with no extraordinary expense, the foundations being already set for a complete duplicate of the present installation, boilers included.

The boiler room, with its battery of two 440-hp. Stirling boilers, presents a pleasing appearance and is symmetrical in every detail. The ashes are dropped into a steel car, which operates in a concrete pit beneath the floor, and are transported to the end of the building where the car is elevated and dumped into an ashpit of large capacity. They are afterward hauled away to repair roads, etc., in the vicinity.

The fuel supply is obtained from an adjacent mine and is deposited by means of a conveyor in a car, which runs by gravity over a short trestle and then dumps the coal into a concrete storage bin of sufficient capacity to provide for a two weeks' run. Thus, in case of a breakdown at the mines the power plant will not suffer from lack of fuel.



Motor-Generator Set and Main Power Unit



The Turbo-Generator and Switchboard

Water for the boilers is obtained from a well sunk 150 ft. deep and operated by a 6x24-in. deep-well pump, which is driven by a 10-hp. electric motor. Before entering the boilers, the water is treated for scale prevention by a process prescribed by C. A. Cabell, general manager of the company. It is then pumped through a 2500-hp. heater, filtered and forced by a hot-water pump into the boilers at a temperature of 90 deg. C. (194 deg. F.). The boilers are equipped for a pressure of 150 lb., and draft is furnished by a circular stack 4 ft. in diameter by 100 ft. high, with damper regulators at the base so as to maintain a uniform heat. Each boiler is fitted with an automatic-feed arrangement, which keeps the water always at a fixed level. Both the hot- and cold-water pumps are 10x6x10-in. direct-acting type.

The Plant Is Strictly Modern

The new central power plant is designed and constructed along the most modern lines, and is equipped with the highest-grade machinery and apparatus. Provision has been made for any emergency that may arise, and the entire plant is worthy of a close inspection by those interested in the electrification of mines. An exceptionally noteworthy feature of the installation is the effective manner in which some of the old apparatus in the former isolated power plants has been utilized in the substations established in connection with the present central station. All the power-house equipment as well as the new substation machines were designed and built by the General Electric Co.

The proposition involved abandoning the three distinct plants, which were operating at a fair cost, and replacing them with a noncondensing turbo-generator central station, which has since been able to reduce this cost to a minimum, making the investment one of good value. The company was confronted with the question of disposing of about $10,000 worth of apparatus by placing it on the second-hand list or in some other manner, and it was a difficult matter at the time to understand wherein discarding this apparatus would warrant the expenditure of some $80,000 for a central power plant.

The problem was partly solved by retaining the old generators for the substations and building them into motor-generator sets by using synchronous and induction motors, operating through flexible coupling drives. There were four of these machines in all, one of which has since been sold to meet an emergency, and has been replaced by a new 150-kw., 600 rpm., 250-275-volt direct-current generator.

In the power plant is installed a 937-kv-a., 3600-rpm., 2300-volt, alternating, noncondensing, horizontal turbo-generator. Excitation for the unit is furnished by a 15-kw., 4500-rpm., 125-volt, noncondensing turbo-exciter and a two-unit motor-generator exciter set composed of a 25-kw., 1200-rpm., 125-volt generator direct connected to a 35hp. 2200-volt motor. The installation also includes a two-unit motor-generator consisting of a 200-kw., 720-rpm., 275-volt generator direct connected to a 300-hp. 2200-volt motor. A 12-panel switchboard, with the necessary generator and feeder circuits, which are metered by recording wattmeters that measure the power for each circuit, completes the equipment.

Five substations are at present in operation, each being located to suit the requirements of an allotted area, as shown on the annexted property map. They are all of similar design, but the installations vary slightly.

No. 1 substation is located at the Carbon Splint mine, 3200 ft. from the central station, and contains a 150-kw., 600-rpm., 250-volt generator coupled to a 220-hp. 2200-volt synchronous motor.

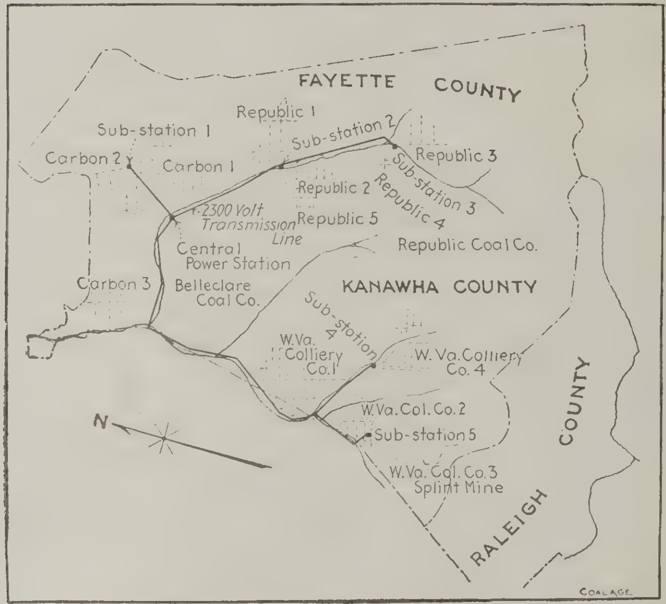
No. 2 substation is situated at Republic No. 2 mine, 6400 ft. from the plant, and its equipment consists of one 150-kw., 250-volt, 600-rpm. generator connected to a 200-hp. 2200-volt induction motor.

No. 3 substation is located at Republic No. 3 mine, 11,200 ft. from the main station, and has apparatus of the same capacity and characteristics as No. 1 substation.

No. 4 substation is situated at the entrance to the West Virginia No. 4 mine, 18,800 ft. from the power plant. It embraces practically the same equipment of apparatus as No. 2 substation.

No. 5 substation is at the mouth of the Gibson Entry of the West Virginia No. 2 mine, 18,400 ft. from the power station, and has precisely the same installation as No. 4 substation.

The various motors and machines which are operated from the substations are tabulated herewith: No. 1 substation—Two 3½-ton gathering locomotives, three 5-ton gathering locomotives, one 10-ton haulage locomotive, one 25-hp. stationary motor, four breast mining machines.



Property Map of the Carbon Coal Co.

No. 2 substation—Three 3½-ton gathering locomotives, three 5-ton gathering locomotives, two 6-ton haulage locomotives, six 10-hp. stationary motors, three breast mining machines.

No. 3 substation—Four 3½-ton gathering locomotives, one 6-ton haulage locomotive, one 15-hp. stationary motor, three breast mining machines.

No. 4 substation—Two 5-ton gathering locomotives, two 10-ton haulage locomotives, two 5-hp. stationary motors, one 7½-hp. stationary motor, two 10-hp. stationary motors, one 45-hp. stationary motor, six breast mining machines, and one short-wall mining machine.

No. 5 substation—One 5-ton haulage locomotive, one 6-ton haulage locomotive, one 5-hp. stationary motor, one 7½-hp. stationary motor, two 10-hp. stationary motors, one 25-hp. stationary motor, and four breast mining machines.

Motor-generator set in power house—One 3½-ton gathering locomotive, two 5-ton gathering locomotives, one 6-ton haulage locomotive, one 10-ton haulage locomotive, two 7½-hp. stationary motors, three 10-hp. stationary motors, one 15-hp. stationary motor, two 25-hp. stationary motors, one 45-hp. stationary motor, five breast mining machines.

The most satisfactory way to determine the relative superiority of one plant over another is to compare their merits on a basis of the cost of production in combination with their ultimate efficiency. There are no detailed accurate figures on record regarding the output obtained from the old plants, except that the average per month for the Carbon, Republic and West Virginia power plants combined was approximately 90,000 kw.-hrs. The actual cost of maintenance, including fuel, salaries and all other contingencies, amounted to $1368 per month on an average; thus the cost of production was $0.0152 per kw.-hr.

The Tabulation of Costs

The following table is compiled from the engineer's daily report and gives an accurate account of the amount and cost of power production at the central station from the commencement. It will be noticed that the cost per kw.-hr. for September, October and November was materially enhanced, owing to the recent labor trouble which invaded the coal field; that the power produced was infinitely less than when all the mines were running their full capacity, while the actual cost of maintenance was practically the same. A glance at the record for August discloses the fact that the greater the output the cheaper the power per kw.-hr.:

TABLE OF COSTS

Month	Cost of Fuel, Supplies and All Other Items	Salaries and Labor Cost	Kw.-hr.	Cost per Kw.-nr.
June	$345.95	$317.00	96,768	$0.0068
July	416.50	315.00	108,440	0.0067
August	430.10	310.00	113,700	0.0065
September	282.20	321.00	74,830	0.0080
October	300.90	314.00	57,080	0.0107
November	300.90	312.00	66,330	0.0092
	$2,076.55	$1,889.00	517,148	$0.0079

It will be seen that the actual productive cost for power generated in the new central station averaged $0.0079 per kw.-hr. during the six months' period as against a cost of $0.0152 per kw.-hr. for that generated in the three former isolated plants. Under the old régime the cost of production was slightly over $16,000 per annum. During the first six months of central station operation, practically the same amount of power was consumed as during the corresponding six months previous. Figuring on a basis of 2 cents per kw.-hr. and including ample allowance for depreciation, interest charges and all other essential incidentals, a saving has been effected of $1,221.67 in six months. This saving will more than double itself in the second half-year, since the central-power plant had only just been completed, during the first six months much in excess had been charged to the cost of production which really should have been debited to capital stock.

One important benefit derived in this instance since the introduction of central-station operation, which should not be overlooked, is the improvement in the facilities of the company for proper growth. With the old plants, the power was so inferior and inadequate that new developments were out of the question altogether.

EDITORIALS

To Save Lives

The question of what is a legitimate risk to be taken with the hope of saving lives believed to be in danger, or that may already have been sacrificed, has been raised by the recent remarks of Sir Thomas Holland, before the Indian Mining & Geological Club, at the Mining Machinery Exhibition, in the Royal Agricultural Hall, London. In the course of his remarks, Mr. Holland referred to the tragic death of the late president of the club, W. H. Pickering, who sacrificed his life in the attempt to rescue any possible survivors of the first explosion in the Cadeby Main Colliery, July 9, 1912, in the following words:

> Everyone present knows that, but for the great disaster at Cadeby last July, our revered president, in his inimitable way, would now be in this place expressing your appreciation of Mr. Montgomery's hospitality. This is the first general gathering of the club since our president and founder lost his life during what was but the last of a series of heroic acts on behalf of the miner. To those of you who know that the same unflinching regard for duty controlled Mr. Pickering's actions in small as well as in great things, the cold official comment on the Cadeby disaster recently issued by the Chief Inspector of Mines must seem like sacrilege. Allowing for Mr. Redmayne's apparent difficulty in conveying his thoughts in simple English, I have no hesitation in saying that the sentiment conveyed in the last paragraphs of his recent report will be condemned by every healthy-minded miner as unworthy of the traditions of our race.
>
> Putting aside for a moment the moral question as to whether it is right to lead a body of men into an unknown danger to save a probably much smaller number of their fellow-workers, there is good reason for assuming that Mr. Pickering was justified by the facts before him at the time in leading a rescue party. He had with him other men of known experience and good judgment, his official colleagues and the manager of the mine; he was closely followed by another party led by an inspector as experienced as J. R. R. Wilson, who, but for an accidental delay, would, as we now know, have been killed also.
>
> It is easy to be wise after the event; it is easy apparently in the comfort of an office chair to criticise the wisdom of more experienced men; but this report fails most lamentably to distinguish between the conclusions which were justified by the facts before Mr. Pickering and his colleagues at the time, and those which have since been obtained. Even as a cold official judgment, therefore, on the purely professional question of whether it was or was not discreet to go underground, the inferences drawn in this report seem to me to be unscientific and unsound. But the sentiment that it displays is even more to be deplored.
>
> Fancy this country admiring the professional wisdom of Captain Scott if he returned safely rather than expose his men to the dangers of the Antarctic! Fancy Pickering sitting at the surface estimating the distant risks of another explosion while his fellows were dying below! Doubtless if the rescue party had been restrained long enough, in this case as in similar cases, they could have proved the futility of an attempt, as the men would then have been dead. [But, the deeds of men like Pickering and Scott are worth more than lives; through their deaths the spirit of the race lives, for to this world a brave man dying in the face of danger is worth more than ten cowards living and carefully counting the costs.] After reading this report, I see the real wisdom of the Archbishop of York, who said truly of Pickering: "His was not a life cut short, but one abundantly completed and fulfilled." It is our duty to see that the memory of such a man is preserved, for the benefit of our race.

In order to enable the reader to arrive at a fair judgment of this severe arraignment of the chief mine inspector of Great Britain, made recently in an official report to the home office, which has since been issued as a blue book (Cd. 6716), we abstract the following paragraph to which reference has been made:

> THE RESCUE OPERATIONS
>
> I have formed a decided opinion in respect of the rescue operations. While there was provided at the colliery as fine a body of men trained in rescue work as one could wish to see, the organization at the mine on the occasion of these explosions was most defective. When Mr. Witty made his arrangements at the surface, he should have issued instructions prohibiting the descent into the mine of all persons unprovided with a written authorization to do so. He should also have placed a guard at the outby end of the south plane to prevent the entry into that district of unauthorized persons from other parts of the mine. Had this been done the loss of life occasioned by the second explosion would, I am sure, have been much less heavy.
>
> The further questions as to whether the work of recovering and bringing out the bodies should have been undertaken at this stage is one in respect of which there will doubtless be differences of opinion. I have no doubt on the point I know that sentiment weighs heavily in the consideration of a problem of this nature, and that there is an intense desire on the part of relatives of the dead to see and bury the bodies I do not think, however, that the management of a colliery is justified in allowing persons to risk their lives in order to recover and bring out dead bodies, for that such a procedure is always attended by the great risk of a second explosion when a fire is known to exist underground after an explosion, is evidenced by case after case. Instances may be cited in which the bodies have been recovered after an explosion of this nature (e.g., Jamage Colliery). I agree, but it is a race with death. It is hard, however, to make people realize this, and so strong may feeling run on these occasions that it sometimes requires a higher moral courage to resist a natural impulse and prohibit persons from undertaking (and undertaking oneself) a risk of this nature, than to allow the risk to be undertaken.
>
> I should also remark that great difficulty was experienced in obtaining a correct number of the casualties; this was not definitely ascertained for three days after the disaster owing to the indiscriminate issue of lamps after the first explosion. This was a regrettable incident, and one which emphasizes the necessity of strict discipline at such times.
>
> I cannot conclude this report without recording my sense of the magnitude of the loss which the Mines Department has sustained in the death of three of its inspectors. Mr. Tickle was a most promising junior inspector, and was, I know, held in high esteem by Mr. Pickering. Mr. Hewitt was a careful and experienced inspector. By Mr. Pickerings's death the country is deprived of one of its most capable and devoted public servants, and I personally have to mourn the loss of a most able colleague and a loyal and valued friend.

We believe it is wise to refrain from further comment on this sad incident. It seems to us both unseemly and unjust to assume, in the light of later developments, to call in question the acts of one who, with a limited knowledge of conditions, was forced to decide, for himself and others, the question of the advisability of taking a risk that meant possible life to others or death to themselves. It was truly, as Mr. Redmayne has expressed it, "a race with death." Who is so wise as to say, with the limited knowledge of conditions available, that a risk taken to save lives is justifiable or otherwise. It is true, sentiment is strong in the human heart, but that sentiment reasons just as strongly for the living as for the dead.

The words of Sir Thomas that, for sake of emphasis, we have placed in brackets appeal to us, as they must to all, very strongly.

Mr. Pickering is no exception among mine inspectors. Many instances have occurred, both in this country and abroad, where these men have sacrificed their lives in the endeavor, as they hoped, to save the lives of others. Two instances that we recall, at this time, are the death of Mine Inspector William Atkinson, who was killed by afterdamp while attempting to rescue victims of the explosion at Zeigler, Ill., Apr. 3, 1905; and the death of David N. Elias, who was killed in the second explosion, which occurred a few hours after the first and which resulted in the sacrifice of 41 lives in addition to the 18 lives lost in the first explosion at Hanna, Wyo., Mar. 28, 1908. Both of these men were experienced miners and men of mature judgment; and we would not say that this was in error. Judgment may differ in individuals, but can only be declared in error when shown to be so, in the light of facts available at the time.

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The Passing of the Braggart

We like to think we do not miss the braggart who hauled more cars in the barroom than mule flesh and human endurance could withstand. But we do miss those men, and others like them who, in the past, measured their importance by their ability to produce and who cared less about pay than product.

We hardly realize how we are drifting from the old conditions. The difference between the man who tells how he evades his duties and the man who brags how well he performs them is the difference between unproductiveness and efficiency, between national poverty and national wealth. One-half the prosperity of America is the outcome not of great natural resources but of the large output per man employed. That productivity of labor found its origin in the belief on the part of every man that he was an important part in the community and that his success or failure in his work was a matter of general importance and concern.

The workingman of the past gloried in the fact that he was the man who could be called to do anything "in a pinch," that he was able to fill in almost any gap and always "stayed put." The contest to do better each than the other made the product larger per man employed and the national rewards have been proportional.

If we are going to drift into an existence without enthusiasm, each man striving to do his least and worst, if the coal getter is going to believe that a fortune will accrue to him and his family if he can shoot his market coal to pieces and load worthless coal, slate and pyrite, nothing but the greatness of our unused resources will save the nation from penury and these safeguards will not provide for our present standard of living.

The boaster is a living, laboring workman. We recall a superintendent who said: "I used to think that I could dig coal with any man along the Monongahela River and there were good men in the mines in those days." He admitted he found there were those who could beat him but the sense of his superiority to some and his desire to equal others increased his usefulness.

Today there are too many content to whine that the world owes them a living and we would fain see those fellows return who boasted of their work, who tried to excel and looked at the plant in which they worked as partly their own and not as a revolving wheel of which they were wearied spokes ever hurrying on to perform a work in which they had neither interest nor hope.

In the history of a nation, the era most pregnant with possibilities is that in which it boasts most loudly, and in the career of man, the least reputable period is when he doubts his mission and feels there are others who could and would fill his job to equal advantage.

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The Slaughter of the Innocents

With this cheerful reference to the Herodic times, the conservationists would stigmatize child labor. We have already called attention to the fact that to forbear to work is, in most cases to weaken the physical frame, to stunt the mind and to debase the spirit of the race.

But today, we would rather confine ourselves to the question "Is the callow youth, as employed in the mining industry, subject to exceptional risks?" As usual we must look to Great Britain for a statistical answer, for while the public of the United States stresses the memory with the count of the dead few, it keeps no record of the living many. Moreover in many instances those opposed to labor ignore statistics altogether and rely on their intuitions for guidance in their advocacy of laws.

We presume that in Great Britain, the "conservationists of infancy" point with condemnation to the record of the industrially slain—50 children under 15 years of age in 1909 and 55 in 1910—and we venture to think that they suppose as do our "antis" that these might all have been saved had they been kept safely in school. Yet the figures show that per thousand employed only 1.02 were killed in 1909 and 1.07 in 1910. This compares favorably with the death rate of all ages, which for Great Britain was 1.43 in 1909 and 1.70 per thousand in 1910.

The deaths and ratios for all ages are as follows:

DEATH RATES OF BRITISH MINE WORKERS BY AGES

Ages	Deaths 1909	Deaths 1910	Per thousand 1909	Per thousand 1910
12 and under 14	10	12	0.49	0.57
14 and under 15	40	43	1.38	1.44
15 and under 20	257	277	1.60	1.66
20 and under 25	169	245	1.06	1.51
25 and under 35	308	418	1.16	1.53
35 and under 45	302	330	1.69	1.78
45 and under 55	195	249	1.68	2.07
55 and under 65	110	143	1.98	2.49
65 and upwards	27	25	1.74	1.56
Age unstated	6	12	....	....
All ages	1424	1754	1.70	1.43

It is clear that the most risky early period is that between 15 and 20 years, the very time at which our conservationists would have boys enter the mines. Yet even the death rate in this period is not as high as that which rules for men above 35 years of age.

We think that apart from the necessity for keeping the boys at school, there is no reason for holding youths under 16 years of age from the safe occupations usually accorded to such immature mine workers. But if youths are allowed by law to leave the classroom at 14, they may well enter the breaker of the mine at that age and if, perchance, they are compelled by legislative enactment to continue in school, at which we would not cavil, they should be compelled to do some manual work which would prevent them from becoming at once both too weak and too proud to labor.

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Particular attention is called to the series of articles, "Coal Shipping on the Great Lakes," the first installment of which appears on p. 186 in this issue.

Renewed Peace on Cabin and Paint Creeks

*SYNOPSIS—**Another** settlement in the Cabin and Paint Creek districts gives some hope of enduring peace. The following statement sent out by the operators gives their point of view of the struggle now thought to be happily terminated.*

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By the terms of an agreement signed July 29 by the Cabin Creek Consolidated Coal Co., Carbon Coal Co., Republic Coal Co., West Virginia Colliery Co. and Wake Forest Coal Co. and representatives of their employees and ratified on the night of July 31 at mass meetings of the latter, the so called strike on Cabin and Paint Creeks which has kept the state in a turmoil for sixteen months was brought to an end. An attempt was made to have the agreement ratified at an open-air meeting at Decota, on Cabin Creek, Thursday afternoon, July 31. So little interest was taken in the matter that not more than 450 miners attended the meeting. The men at one mine refused to leave their work to attend. A few Industrial Workers of the World and other disturbers prevented action, so it was necessary to hold a number of similar meetings in the evening. Under normal conditions 3000 men are employed at the mines affected by the agreement.

The Union Is Not Recognized

The principal point scored by the operators is the maintenance of the open shop. Ever since the union declined to arbitrate a disagreement in 1904, the Cabin Creek operators have refused to recognize it and it is not recognized under the newly made agreement. The check-off, the concession most vital to the union, is not granted. The mine committee, which is the union means of adjusting grievances, is also not acknowledged. In its stead a system of appeal from the mine boss to the superintendent and then to three arbitrators, one of whom is to be the president of the local union, is established. It is also stipulated that "under the terms of this contract nothing shall be done or enacted that shall increase the cost of producing coal to the operator."

The price per ton is changed but little, being in some instances reduced and in others advanced. On the whole, the change amounts to an increase of about 1 per cent., but as the short ton replaces the long, which in itself constitutes an increase of 11 per cent., the average rise in the price of mining is increased 12 per cent.

Other concessions gained are the 9-hr. day and the semi-monthly pay day. Still other nominal, but not actual concessions are the right to employ check-weighmen at the miners' expense, a right guaranteed by law and never denied by the operators, and the right of the miner to trade where he pleases, a right which they have freely exercised. Other clauses in the agreement, which terminates April 1, 1915, define in detail ordinary practices to be observed in mining.

An Insurrection Not a Strike

The so called strike on Cabin and Paint Creeks was in reality an armed insurrection, organized, financed and directed by the United Mine Workers of America for the sole purpose of compelling the miners of West Virginia to join the union. It began sixteen months ago. It was fomented by agitators hired by the union, afterwards reinforced by the socialists, and directed exclusively by men from outside the state. Within a few days after Duncan McDonald, secretary-treasurer of the United Mine Workers of Illinois announced at the joint conference of operators and miners of Illinois, Indiana, Ohio and western Pennsylvania that the union was about to "get busy" in West Virginia, the union miners on the opposite side of the Kanawha River from Cabin and Paint Creeks began buying rifles. Not until about a thousand union men had been armed was the strike called at the few union mines on Paint Creek.

A guerrilla warfare was then begun. At one time the union had five thousand men armed with modern high-power rifles, in the field. These were opposed at one time by 145 private guards on the two creeks, and later by the entire military force of the state, amounting to 1200 men.

The Cost of Industrial War

Thirteen lives were lost in the insurrection. The cost in money was as follows: operators' loss in business, $2,000,000; loss to the miners in wages, $1,500,000; cost to the taxpayers of the state, $400,000; additional cost to the taxpayers of Kanawha County, $100,000; cost to the United Mine Workers, collected by the check-off, a forced levy on the miners of Illinois, Indiana, Ohio and western Pennsylvania, $602,000; property destroyed, $10,000; total, $4,612,000. According to the latest available statement in the United Mine Workers *Journal,* the official organ, the union's total membership in the state was increased by this insurrection from 1136 in a total of 69,611 mine workers in the state to 3074. Thus it seems that the cost of union proselytes in West Virginia figures out at $2379 a head.

It is worthy of note that a large proportion of the mine workers on Cabin Creek were so strongly opposed to this method of convincing them of the benefits of unionism that they have remained at work throughout all the series of shootings and other disturbances, so that the mines have never been closed entirely but have been in continuous operation, most of the time at one-half to two-thirds normal capacity. The Cabin Creek operators have not failed to fulfill any contracts and have not canceled any orders for coal. This explains why the loss of business was so light in comparison with the loss in wages.

OUTCROPPINGS

He who abuses others must not be particular about the answers he gets.

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If the young knew, if the old man could, there is nothing but would be done.

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Judging from the new state tax on anthracite we presume Pennsylvania is preparing to erect another capitol building.

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Some operators no doubt think of a "good striker" in the same terms that the Western pioneer thought of a "good" Indian.

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The statement that Standard Oil recently paid a fine of half a million dollars in Texas, was a mistake. It simply advanced the money pending collections from the public.

The Value of a Safety Inspector and Instructor for Each Coal Mine

By C. H. Nesbitt*

It is probable that no subject, throughout the industrial world, has received more consideration than that of reducing mine accidents. On this occasion, we come, face to face, to discuss the problem, as it concerns the coal mines of Alabama. Great progress has been made, from time to time, in the mines; and each year we are adding new features and taking new steps, in the direction indicated.

The inauguration of safety inspectors and instructors, in coal mines, is of such importance as to immediately commend itself to all of our coal operators. We all, doubtless, agree that education and supervision are indispensable, in all classes of trade where the best results are to be obtained. All industries that employ labor realize that it is important to have adequate supervision over the entire force, even though life and limb are not at stake. In coal mining, supervision and discipline are difficult because the workmen are segregated, singly or in pairs, in their respective working places; and, unlike in mills, factories and quarries, the foreman or superintendent cannot keep an appreciable number of men under his eye and direction, at the same time, but successive and frequent visits to each working place in the mine are imperative.

A Department of Safety and Instruction

In coal mining, where the hazard is great, the cost of such supervision is many times offset by increased efficiency, which invariably accomplishes a reduction of accidents. I would, therefore, earnestly advocate that the operators of Alabama, each, establish a Department of Safety and Instruction; and that, in addition to the work of the mine foreman and fireboss, daily inspections be made of every working place, by an experienced person, qualified to teach and authorized to enforce provisions for safety.

In this state, in 1912, we recorded 62 fatal accidents at the working face. These accidents were attributable to the following causes, namely: Fall of rock, fall of rock and coal, fall of coal and shotfiring. This constituted over 50 per cent. of the total number of fatalities for that year. Upon investigation it was found that a majority of these fatalities could have been avoided if proper instruction had been given and supervision exercised. Probably, in all cases, the victims of these accidents followed their best judgment, which obviously was bad. It is, therefore, necessary that the advantage of experienced direction and supervision of the work should be given to all operations. No better evidence of the value of such a system could be cited than the results that have been attained by those Alabama operators who have inaugurated the system.

A striking example of the value of safety inspectors and instructors is the accident record of the Frick Coke Co. At all of the numerous mines, a sufficient number of qualified inspectors and instructors are constantly employed. Following is the coal-mine-accident record of the company, for the past three years, as compared with that of the British Isles:

	1910	1911	1912
DEATHS PER MILLION TONS PRODUCED			
Scotland	5.06	4.12	3.50
South Wales	5.60	5.67	6.53
All Britain	6.54	4.47	4.52
H. C. Frick Coke Co.	1.99	1.72	1.88
TONS OF COAL PRODUCED PER DEATH			
Scotland	197,600	242,000	285,500
South Wales	150,700	176,100	153,000
All Britain	137,100	243,500	248,000
H. C. Frick Coke Co.	502,049	578,151	531,328
DEATHS BY FALLS PER MILLION TONS MINED			
Scotland	2.10	1.76	1.86
South Wales	3.18	3.20	2.79
All Britain	2.36	2.33	2.03
H. C. Frick Coke Co.	0.97	0.90	0.70
DEATHS BY CARS PER MILLION TONS MINED			
Scotland	0.68	0.84	....
South Wales	1.68	1.47	....
All Britain	1.02	0.98	0.87
H. C. Frick Coke Co.	0.79	0.41	0.91

As long as human muscle and brains are essential to coal mining, just so long will the human element, in the causation of accidents, exist; and the percentage of avoidable accidents will remain directly proportionate to the extent that ignorance, carelessness, indolence, disobedience to rules and instructions, and poor judgment prevail.

Responsibility for Accident

We have tried placing the responsibility for accident upon the individual and have found that it did not accomplish the desired end. As we know, it is a difficult matter to convince the man of poor judgment that he is not as well equipped for his duties as another man of superior judgment; therefore, the man of poor judgment needs and will benefit by the close and constant supervision and instruction which would be obtained by the system I have advocated. It must be hammered into him. While there must of necessity be joint instead of individual responsibility; at the same time, there must always be, as in an effective military organization, some directing head or commander, immediately overlooking the work as it progresses, and intelligently managing the details, along the line of safety.

Doubtless, some operators will object to the inauguration of such a system, because of the expense entailed by the increased organization. But, if they will compare the cost of this increased organization with the losses they sustain in the absence of it, by damage suits, court attendance, and the existing high insurance rates, I believe it will at once appear to them that, ultimately, the suggested system is truly more economical, to say nothing of the protection to human life.

Accidents Increase Cost of Operation

In addition, it is well to remember the increased operating cost an accident incurs. There is a certain overhead burden, or fixed cost, that accrues at night, Sundays and holidays, as rapidly as on working days. There are the equipment, tophouse force, cars, mules and motors, drivers, etc., required to assemble and raise a certain amount of coal. There are entries and narrow-work to be driven, track to be laid, and a certain number of rooms to be turned and worked in order to yield the desired output, at a reasonable operating cost. The working force must be organized and systematized for stability, economy, efficiency and uniformity of output. The accepted orders for coal are in the books; the railroad cars are placed and everything in readiness for a good run, when the engineer is signaled to hoist slowly. Eventually, the trip emerges from the pit mouth with the crushed or maimed bodies of a miner and his helper and some six or eight rescuers and attendants. What is the result? Two men, either dead, dying, or crippled for life, together with the attendant burial or hospital expenses, lost time of attendants at the funeral or bedside; the working organization of the mine disrupted; lost time of mules and drivers; several rooms out of commission for a day or more; the necessity of cleaning and retimbering the place where the accident occurred and the enforced idleness of the place till another miner comes. But, greater than all is the fact that the productive capacity of one or two men, is, for all time, lost to the company, to their dependents and to society. All for what? *Because he did not know or failed to heed.* In addition to greater safety, greater efficiency and production may be obtained.

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*Chief mine inspector, Birmingham, Ala.

Causes of Mine Accidents

On account of the fact that the demand for coal is so much greater than the supply of mine labor, there is a tendency to give men a check number before they are qualified to run a room; and, in many instances, miners who have worked in the mines for years are incompetent because they have never had the proper instruction and supervision, and others are naturally careless and reckless. Practices are constantly engaged in that are incredibly hazardous and which may not come to the knowledge of the mine foreman or fireboss until the damage is done. It is our duty to humanity to prevent, as far as possible, the loss of life and limb occurring through the ignorance of employees. Never let them say, "We did not know." If a man insists upon committing suicide, do not let him do it on your premises; fire him first.

The records show that the cause to which the most frequent fatalities are attributable is falls of roof. The effective way to remove the cause or, at least, to diminish the toll, is to employ constant vigilance and an efficiency of higher standard than is possessed by the average mine employer. To maintain an eternal watch on the men in close proximity to the working faces will always accomplish much. There is no real reason why we should not produce, at least, from three to four hundred thousand tons of coal each year for each life lost, which would place our operations on a parity with other important producing states.

It cannot be truthfully said that natural conditions and hazards are worse here than those in other coal fields. The natural advantages here are equal to those elsewhere. Therefore, as the record stands, it would seem that we are not employing the proper safeguards. I trust that all will indorse the statement that it is incumbent, primarily, upon operators to protect their employees. Mine officials are on duty, in the mine, every working day and should be in better position than the state mine inspectors to keep constant surveillance over the operations of their mines. The inspection department will, of course, continue earnestly to do all that lies in their power, in that direction.

Supervision and inspection, education and instruction, discipline and vigilance are the only antidotes for the causes of avoidable accidents in coal mines. Try the safety instructor and inspector system at your mines and help put Alabama at the head of the list for low coal-mine-accident records.

The Explosions at the East Brookside Mine

The Brookside Colliery of the Philadelphia & Reading Coal and Iron Co. is located at Tower Hill, 19½ miles in a straight line to the WSW of Pottsville on the line of the Philadelphia & Reading Ry. leading from Schuylkill Haven to Lykens. The mine is quite deep and generates gas, several firebosses being employed.

On Saturday, Aug. 2, seven men were working for Charles Portland driving a tunnel through rock. The gang included six muckers and a boss. Apparently as much as 175 lb. of dynamite were taken into the mine that morning for use in the tunnel. By some means this was caused to explode, killing all the men employed.

From all accounts, the explosion disturbed the ventilation, there being some evidence of a reversal of the air current at one of the shafts. However, when twenty minutes after, nine men, two of them firebosses, went down to rescue the victims, they set fire to a body of gas of some sort and an explosion occurred, killing eight of these men. It has been suggested that the gas found was formed by the incomplete combustion of the explosive. Seeing that the slow combustion of 50 per cent. dynamite produces gases containing 24.4 per cent. of carbon dioxide, 31.2 per cent. of carbon monoxide, 20.7 per cent. of hydrogen, 0.7 per cent. of methane and 23.0 per cent. of nitrogen (see Bureau of Mines Bull. 48), it is evident that explosive gases may well remain after a combustion of dynamite. However, the first explosion was sufficiently violent that it is hard to believe the dynamite produced any large percentage of explosive gas.

It is certain that the effect of a violent shock, such as an explosion of equal force to that described, would result in destroying the ventilating brattices, in forcing gas from places where it might have collected and in opening the crevices of the coal so as to permit the escape of occluded gas. Thus concurrently the cleansing draft of air would be removed and the emission of methane increased.

The nine rescuers in the first party were H. Shoffstall, night boss, H. Murphy, fireboss, D. McGinley, fireboss, T. Behny, miner, J. Kopenhaver, shaftman, Howard Hand, laborer, Harry Hand, miner, V. Zanoni, blacksmith, and E. Luchi, a blacksmith's helper. All these men were killed by the second explosion except the first man mentioned.

Another party descended the shaft and found the superintendent, John Lorenz, and Harry Shoffstall. Lorenz had been making an investigation of the mine with John Farrell, the mine foreman, and the two were involved in both the explosions. Lorenz was found crawling toward safety. When the rescuers volunteered to help him to the shaft, he told them: "Never mind me, go and help Jack Farrell; he needs your assistance. Leave me alone and take care of those that need the help more than I do." However, Lorenz later succumbed to his injuries in a Pottsville hospital. He appears to have inhaled the flames of one of the explosions. Hillary Zimmerman was the only man of those in the mine when the first explosion occurred who escaped with his life.

Harry Shoffstall is likely to recover. In all, 19 men were killed; the loss of life would have been far greater, had the mine been in operation, as 500 men are usually employed at the East Brookside colliery.

DISCUSSION BY READERS

The Mine-Air Current and Explosions

The articles bearing on this subject, by John Verner, Coal Age, Vol. 3, p. 855; and Robert McCune, July 5, p. 25, have raised a very important question in reference to what has always been considered and is still regarded as one of the requirements of safe mining. In my opinion, it is an unwarranted conclusion to regard a ventilating current in a mine as being a source of danger, except only in a limited sense, under certain special conditions. No principle of modern mining contributes more to the health and safety of the miner than that of effective ventilation.

It is wrong to consider a ventilating current in reference to preventing or diminishing the outflow of gas from the strata. That it does this, to a limited extent, is incidental; and to condemn any system of ventilation for not doing what it was not intended to accomplish is unjust.

That a pure, fresh current of air will produce an explosion of firedamp more quickly and cause it to extend farther in the mine than a vitiated atmosphere may be true; but it is equally true that such a current of air properly directed is more effective in diluting and sweeping away an accumulation of dangerous or noxious gases, than is a depleted air current.

The early methods of coal mining were characterized by many unsanitary as well as hazardous conditions, caused mainly by imperfect ventilation or, in many cases, no ventilation at all. The miner readily became a victim of blood and pulmonary diseases. It was no uncommon sight for me, as a boy, to see men, in the prime of manhood, practically incapacitated for mining work, owing to these insidious diseases. Many of these men have struggled on for years, under the spur of necessity, drawing upon their reserved vitality—nature's legacy for old age—to meet the demands of life. No one but those who have lived in such an experience can realize the horrors attending these diseases. Years of untold suffering are followed by the untimely death of a man who was otherwise muscular and vigorous.

If modern methods of mining coal have been increasingly productive of danger, they have at least the redeeming feature that, like Sir Walter Raleigh's ax, they kill quickly; but, it may be said that primitive methods of mining, though slower in action, were none the less certain. We realize that the present demand for coal could not be supplied by primitive methods of mining. It is this increasing demand that has necessitated the introduction of mechanical devices that make possible a larger production of coal. Even with these increased facilities for extraction, the demand for coal still calls for an increase in the number of workers; and these requirements necessitate increased ventilation. It is clear therefore that modern methods of mining are the products of necessity.

A comparison of primitive methods of mining with those now in use seems to point clearly to the fact that the additional dangers in mining arise chiefly from the increased production of coal dust and the distribution of this fine dust throughout the workings. The increased production of fine coal dust can be attributed directly to two causes; namely, the use of machines for undercutting the coal, and the excessive use of blasting powder. In the use of permissible powders, attention has often been called to the fact that the strength of these powders is such as to require a far less quantity of the powder for the performance of the same work.

Modern methods of mine haulage are responsible largely for the distribution of fine coal along the haulage roads. Also, the increased demand for ventilation, necessitating a higher velocity of the air current, has increased the amount of dust carried in the air, which is deposited at points where the velocity of the air is reduced by reason of an increased area of the air passages. The evils arising from new conditions must be met by, first, ascertaining the nature of the trouble and, second, devising and applying the best possible means for overcoming the danger.

Since by far the largest proportion of dust is produced at the working face, it is here that suitable means must be adopted to prevent, as far as possible, its projection into the mine air. The means thus far adopted to accomplish this are not as effective as could be desired. Again, to prevent the distribution of dust along the haulage roads, mine cars should be made dust-proof, and these should not be overloaded. This will not only add to the safety of the mine, but will increase the economy of operation, as it will reduce the cost of keeping the roads clean, which is an item of no small importance in large mines. When proper precautions are taken, in respect to these two conditions, the danger that might arise from ample ventilation is practically removed.

In my opinion, there should be a sufficient quantity of air circulated in every mine to supply ample ventilation to all working places and allow a sufficient scale of air to be taken from each split to properly ventilate the worked-out and abandoned portions of the mine, which, under the old system of ventilation, often accumulated dangerous quantities of gas. An ample and efficient air current is one that sweeps every portion of the mine with sufficient volume and velocity to insure the dilution and removal of the gases generated.

Referring to the remark that is often made, that it is frequently the model and uptodate mine that meets with disaster, I would like to ask: Is this a just criticism or a logical argument against the introduction of approved and tested methods? Cannot the same argument be used to demonstrate the fact that any disaster occurring in such a model and uptodate mine must have resulted from carelessness or reckless indifference to safety and disregard of mine regulations? It must be remembered that a good tool will not compensate for a lack of skill, or for carelessness on the part of the worker.

I. C. Parfitt.

Jerome, Penn.

Mixed Lights in Mining

Observing the great difference in the opinions expressed in reference to the use of mixed lights in mining, in recent letters on this subject, published in Coal Age, I am led to express my views on this important question, in coal mining.

I believe that conditions can exist, in many mines where gas is given off in dangerous quantities, that will render the use of mixed lights in the mines safe. Suppose, for example, that we were about to open and develop a large coal mine covering a great acreage. The main entries are to be driven due north, for a distance of, say two miles. The mine is found to be gaseous; and, in accordance with Art. 6, Sec. 4, of the bituminous mine law of Pennsylvania (1911), the mine is opened by driving five main entries, two leading from the main opening, and two from the second opening, while the fifth entry is to be used solely as a traveling way.

Now, suppose gas is given off on the west side of the mine only, there being no gas found on the east side; and the circulation of the mine is so arranged that each side has its own separate ventilating current. Under these conditions, I would consider it safe to work with open lights on the east side, while safety lamps are used exclusively on the west side of the mine; but would suggest that all precautions required by law for a gaseous mine should apply also to a mixed-light mine. The fireboss should examine every working place on the open-light side of the mine the same as he does on the gaseous side.

To attempt to enforce a rule that safety lamps be used exclusively in every section of a mine, simply because gas has been detected by an approved safety lamp in some certain portion of the mine, would be to impose a burden on the miner and operator alike, especially in a mine such as I have described. Where mixed lights are used, under the conditions described, the following regulations should be made and strictly enforced: 1. No man should be permitted to enter the safety-lamp section with an open light. 2. A safety-lamp station should be provided at a convenient point in the mine, and an attendant be on duty at all times during working hours, day and night, to see that no one enters the gaseous section without exchanging his open light for a safety lamp, in accordance with Art. 10, Sec. 4, of the mine law.

If the ventilating system is properly planned, and the overcast and stoppings are substantially built, I believe it is entirely consistent with safety to use open lights on one side and require safety lamps to be used exclusively on the other side of such a mine.

Jos. Northover, Assistant Mine Foreman,
Berwind-White Coal Mining Co.

Seanor, Penn.

Study Course in Coal Mining

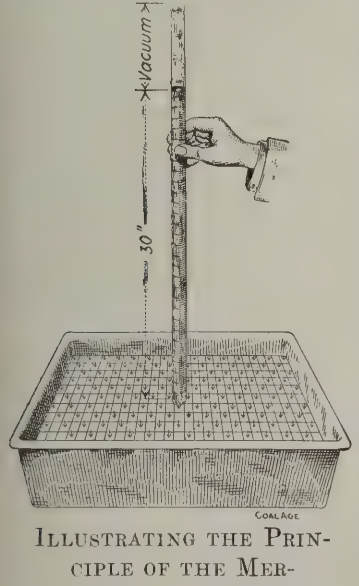
By J. T. Beard

The Coal Age Pocket Book

THE PRINCIPLE OF THE BAROMETER

The principle of the mercurial barometer is the balance of pressure between the atmosphere and the column of mercury in the tube. The weight of the atmosphere counterbalances the weight of the mercury column, which rises as the atmospheric pressure increases and falls as it decreases. The height of the mercury column is therefore a true index of the pressure of the atmosphere at the surface of the earth, at the moment of taking the observation.

The principle of the balance of pressure between the air and the mercury is clearly illustrated in the accompanying figure where a glass tube, closed at one end, is shown supported in a basin of mercury. The surface of the liquid in the basin is divided into imaginary squares, by lines one inch apart; and the small arrow-heads represent the pressure of the atmosphere exerted on each square inch of surface.



Illustrating the Principle of the Mercurial Barometer

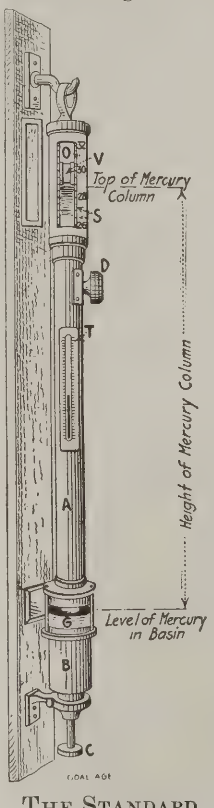
Suppose for a moment, that the column of mercury in the tube is exactly one square inch in cross-section; it is evident, in that case, that the mercury column takes the place of the atmospheric pressure on one square inch of surface; and, since there is perfect equilibrium, its weight is equal to the pressure of the atmosphere per square inch.

Furthermore, whatever the sectional area of the mercury column, it is clear that its weight will always equal the atmospheric pressure for the same area of surface. Hence, the area of the mercury column is not important, but its height only.

If the weight of one cubic inch of mercury (0.4911 lb.) be multiplied by the height of the column of mercury, as measured in inches, the product will be the pressure of the atmosphere, in pounds per square inch, at the place where the observation was taken. This assumes, that the barometric reading has been reduced to a standard reading, at a temperature of 32 deg. Fahrenheit, which is common practice.

The Coal Age Pocket Book

Description of the Instrument—In the accompanying figure is shown the common form of the standard mercurial barometer. The glass tube that contains the mercury column is here inclosed in the metal case A, to the bottom of which is attached a somewhat larger casing B. The latter holds a glass cylinder G terminated at the bottom with a chamois-skin bag, the whole forming the basin that holds the mercury.



The Standard Mercurial Barometer

The entire case AB is hung in a truly vertical position, supported on a substantial base, as shown in the figure. The top of the mercury column is observed through the opening O, in the upper end of the case. In this opening, is arranged a sliding vernier V, which can be adjusted, by means of the thumbscrew D, so that its lower edge exactly corresponds with the top of the mercury column. The position of the vernier is then read on the scale S marked on the sides of the opening in the case. This scale is graduated in inches, but only extends an inch or two above and an equal distance below the normal barometric reading. The normal reading at sea level is about 30 in., and the scale extends from 26 to 32 inches.

Before setting the vernier, however, it is necessary to adjust the level of the mercury in the basin so that it corresponds exactly with what would be the zero of the extended scale. To enable this to be done with precision, there is attached to the scale a long rod that extends downward inside the casing. The lower end of the rod is drawn to a fine point that marks the zero of the scale.

To adjust the level of the mercury in the basin, the thumbscrew C is turned. This screw bears against the bottom of the chamois-skin bag and operates to raise or lower the level of the surface of the mercury in the glass cylinder. The adjustment is complete when the fine pointed end of the rod is seen to just prick the surface of the mercury. The point of the rod is observed through the glass cylinder above the surface of the mercury.

A thermometer T is shown attached to the metal case. In making accurate observations it is necessary to reduce all readings to standard readings.

INQUIRIES OF GENERAL INTEREST

The Air Chamber of a Pump

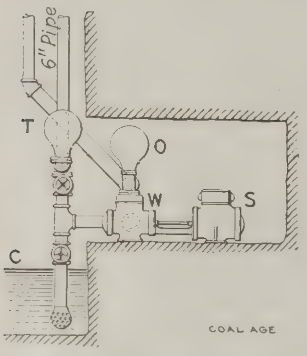
Please explain the principle of the air vessel (chamber), as used on mine pumps? Show by sketch how the air vessel should be fitted to a pump.

PUMPMAN.

West Elizabeth, Penn.

The purpose of the air chamber is to maintain a continuous flow of water in the discharge pipe of a reciprocating pump. In this type of pump, the water in the discharge pipe would come to rest between each stroke of the pump, as the action is intermittent.

In the accompanying figure the air chamber *O* is fitted, by a T, to the discharge pipe, immediately above the valve chest of the water cylinder W of the pump; *S* is the steam cylinder. The air chamber is simply a closed chamber of spherical shape. The air in this chamber is compressed by the weight of the water in the column pipe. When the pump ceases to act between each stroke the pressure of the air acting on the water maintains the flow in the discharge pipe the same as though the pump was in action, because the pressure of the air in the chamber is equal to the pressure against which the pump operates. It is important that the air chamber be located in direct connection with the discharge pipe and as close to the water cylinder of the pump as possible.



A MINE PUMP ARRANGED TO DRAIN TWO BASINS

The pump shewn in the figure is arranged either to draw its water from the sump *C* below the pump, or to be fed from another water basin a short distance up the shaft. In this arrangement, however, a second air chamber *T* is required to be attached to the pipe leading from the upper basin.

⁂

Effect of Sulphur on Mine Fire

If, just before sealing off a mine fire, a large quantity of sulphur is ignited, what effect would this have on the fire after it was sealed off?

J. C. HAYSLETT.

Arjay, Ky.

We suppose this question refers to the burning of a considerable quantity of pyrite, in the coal seam. Pyrite (sulphide of iron, FeS_2), as found in coal seams, is commonly called "sulphur," by the miner. A considerable quantity of this pyrite disseminated in the coal would give off, under the action of the fire, sulphurous fumes (SO_2), which are suffocating and extremely poisonous. In the presence of moisture, there would be the possibility of the formation, besides, of hydrogen sulphide (H_2S), which, next to carbon monoxide (CO), is the most dangerous gas known to mining.

The only effect the sulphurous fumes would have on the fire itself would arise from the dilution of the air with an extinctive gas and the consequent depletion of the available oxygen, which would reduce combustion and tend to extinguish the fire.

⁂

Effect of Washing Coal

We are preparing to put in a coal washer and would like to ask for a little information as to what results may be expected.

An analysis of the coal, before washing, is as follows:

Fixed carbon	65.80 per cent.
Volatile matter	29.71 "
Moisture	1.21 "
Ash	2.28 "
Sulphur	1.00 "
Total	100.00 per cent.

The tests we have made show that 93.5 per cent. of the washed coal passing through a ¾-in. revolving screen will pass over a $\frac{1}{32}$-in. mesh, the remaining 6.5 per cent. passing through that mesh. Analysis shows that the larger of these two sizes of screenings contains 2.06 per cent. ash and 0.95 per cent. sulphur. The smaller size contains 13.45 per cent. ash and 1.59 per cent. sulphur.

We wish to know what percentage will be added to the value of what remains after washing, by taking out the screenings that pass through the $\frac{1}{32}$-in. screen.

We also desire to ask what value the part taken out would have as a fuel; and what arrangement of furnace or appliances would be required to burn it successfully, either in stationary or locomotive boilers. We could possibly use this portion of the screenings ourselves, as we have both kinds of boilers.

L. K. MOSS,
Supt., Mabel Mining Co.

Warrior, Ala.

The above inquiry, submitted to A. J. Sayers, engineer for the Link-Belt Co., Chicago, Ill., elicited the following reply:

The question of your correspondent cannot be answered satisfactorily without making quite extensive tests on samples of the coal in question. Without doubt, the value of the coal for blacksmithing purposes would be increased by screening out the $\frac{1}{32}$-in. screenings. This is clearly shown from the analysis given of these screenings.

As there is only 6.5 per cent. under $\frac{1}{32}$ in., it does not affect the general sample to any great degree, in spite of the fact that this small percentage runs very high in ash and sulphur. The only suggestion we would have to make would be for Mr. Moss to screen out and re-treat the coal from $\frac{3}{16}$ in. or ⅛ in. down, mixing it with the other size for his market. This could be done successfully by the ordinary Foust or Feldspar Luhrig Jig.

We are not in position to tell Mr. Moss the exact commercial value this would be to him, or to answer his question in regard to the analyses of the screenings. We do not believe, however, that it would pay him to screen out this fine product and try to consume it in his own boilers. It would be a very uneconomical coal to burn, under ordinary conditions, and the treating of a small percentage would not be an inexpensive proposition for him.

EXAMINATION QUESTIONS

Mine Development

(West Virginia Examination)

Ques.—Locate on the accompanying plan, the position of the fan and show the method of ventilation, by marking thereon the different overcasts, doors, stoppings or brattices, regulators, curtains or check doors, and the direction of the air currents, by means of the indicated symbols. Note any violation of the mine law by the letter *V*.

Ans.—In reply to this question, we have marked on the mine plan, the position of the several overcasts, doors, stoppings, etc., and indicated by arrows the direction of the air currents. The triple-entry system shown on the plan suggests the possibility of this being a gaseous mine; and we have adopted an exhaust fan, placed at the mouth of one of the side entries, flanking the main haulage road, which is thus made the main intake for the mine.

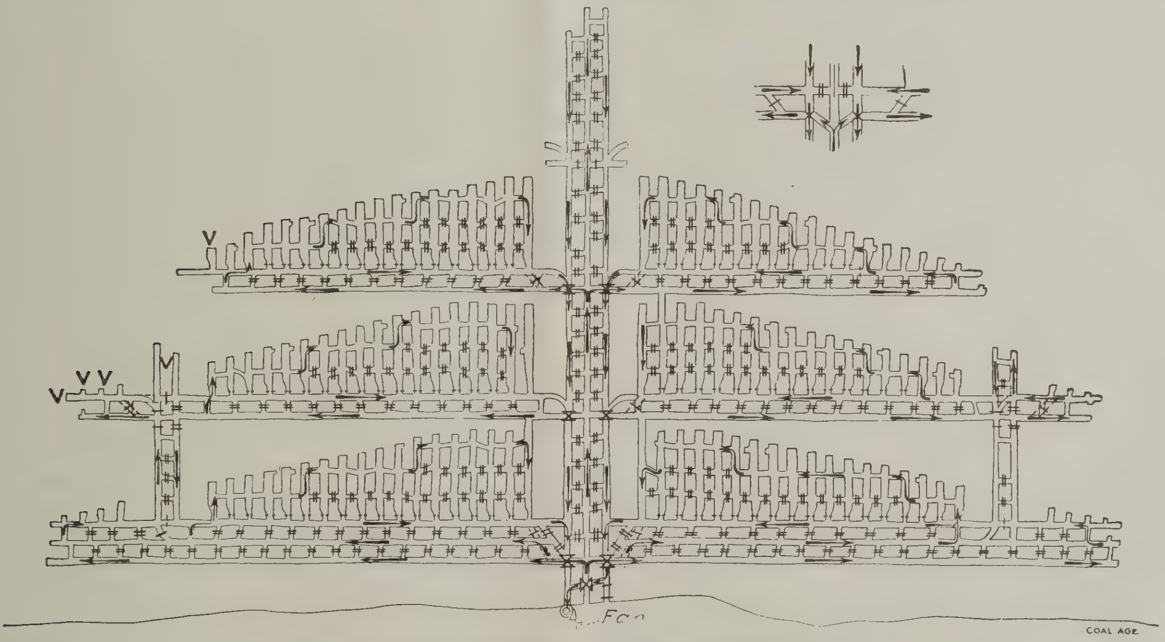
Ques.—State your opinion as to whether or not this mine is being properly developed.

Ans.—This mine is evidently planned for an output of, say 1000 tons per day. It is divided, by the cross-headings, into sections capable of producing, in 6-ft. coal, under fair conditions of roof and floor, say 150 tons per day, per section. If, however, the total output of the mine should exceed 1000 or 1200 tons per day, it would be preferable to use a four-entry system for the main roads and airways. This would provide separate roads for the loads and empties on the main-intake airways and separate return airways for the two sides of the mine, assuming a gaseous mine.

The proposed plan of dividing the mine into separate sections is good, providing each section is worked out regularly and closed promptly when the same is abandoned. The method of holing through the first or second room on each pair of entries provides good ventilation until such time as the overcast on the main return is built at the mouth of the cross-entry, which should be done as soon as the development of that pair of entries will warrant the expense of the overcast. A substantial stopping should then be built where the room holed through into the entry.

Ques.—Would you change this method of mining? Give reasons.

Ans.—We have indicated in the small detailed sketch an improved arrangement at the mouth of each pair of cross-entries. An oblique crosscut should be provided between the two cross-entries of each pair, at the mouth of the first room on each entry, to allow the coal in that section to be hauled out on the intake air. An overcast is built on the main-return airway, at the mouth of each pair of cross-headings.



Showing Development of a West Virginia Mine

Ques.—How would you begin to draw pillars in this mine?

Ans.—This will depend on the nature of the roof and floor. Under fair conditions, the rooms can be held open until the last room is driven on each section; and many would prefer to begin drawing the pillars, in each section, as soon as the last room had reached the limit. Under certain conditions, however, it will be impracticable to hold the rooms open this length of time, and the drawing of pillars should then be commenced as quickly as each room reaches the limit. In every case, the line of pillar work should be kept as uniform as possible.

[The two remaining questions on this map will follow next week.—Ed.]

COAL AND COKE NEWS

Washington, D. C.

Representative Murray, of Massachusetts, has taken action which is calculated to hasten the rendering of the decisions in the anthracite coal cases, which are being held back to an unexpected degree by the Interstate Commerce Commission. Mr. Murray has introduced a resolution (Aug. 1) calling for an investigation by the Government that will bring out the fact on the following points:

1. Capitalization, ownership and control of the Pennsylvania anthracite mines.
2. Intercorporate relationships of the coal-mining, coal-handling, and coal-selling companies, and in the companies transporting coal by water and rail.
3. The total revenues, expenses and profits of the anthracite-mining companies for a period of years.
4. The total revenues, expenses and profits of the anthracite-carrying railroads for a period of years.
5. Wholesale prices of anthracite coal at the mines and at the principal distributing points, and retail prices of coal in the principal cities.

Much of this ground was covered in the anthracite coal inquiry of last year and part of it has been published in a government report. Mr. Murray in fact admits this, saying:

> I have reason to believe that there is now on hand in the executive departments enough data to show that 90 per cent. of the available anthracite coal, and between 85 and 90 per cent. of the anthracite shipped each year is in control of the seven railroad systems which form the only means of transporting the coal to the markets. These roads are bound together by their common interests, by interlocking directorates, and by agreements of various kinds so that they act as a unit in controlling the price of anthracite coal. For example, the net earnings of the Philadelphia & Reading Coal & Iron Co. for the last half of 1912 were $2,921,139 or nearly ten times as great as they were for the last half of 1911.

Mr. Murray's action is understood to be due to widespread complaints in New England regarding both price and supply of anthracite, and it is believed that there will have to be a renewal of the subject notwithstanding that rather elaborate inquiry was devoted to it only about a year ago while a report was filed less than six months ago.

Reasonable Time Defined

The Interstate Commerce Commission has handed down opinion No. 2405 in which it refuses to award reparation to a retail coal dealer for excessive rates inasmuch as he had been advised by the Commission that his claim informally presented would be considered only on the formal docket, yet took no action for five years and then filed a complaint. This amounts to a definition of the meaning of "reasonable time" for the presentation of complaints and is equivalent to the statement that all such demands lose their basis if they are withheld beyond the time when they might by the exercise of "due diligence" have been presented.

The Earnings of West Virginia Miners

Statements made public here show that according to the West Virginia Department of Mines, the average earnings of miners for the year ending June 30, 1912, were $618.52, the highest average earned by soft-coal miners anywhere. West Virginia is a nonunion state. In the unionized state of Illinois the average earnings of miners in the same year, according to the State Department of Mines, were only $556.33, or $62.19 less than the nonunion miners of West Virginia averaged.

Men who belong to the union must pay dues and assessments, which according to statements published in the United Mine Workers "Journal," amount at present to 25c. with strike assessments of 50c. each semi-monthly payday or $18 a year. The 400,000 members of the United Mine Workers, at present rates of collection appear to be yielding a fund of $7,200,000 annually. It is estimated that if the 69,611 miners of West Virginia can be added to the union rolls, they will increase this sum at the present rate by $1,252,998 a year.

So eager are the union officers to increase the receipts of the general treasury that in the so called "Paint Creek Settlement," which really was a settlement with only two companies, the officers actually signed a contract binding their members to return to work for less money than the companies had offered to pay before the strike began.

HARRISBURG, PENN.

The officials of the United Mine Workers hold out little hope that the coal operators will accept the proposition of the miners to establish a "check-off" in the anthracite region as a remedy for the frequent petty "button strikes," which have prevailed ever since the ratification of the 1912 agreement, due mainly to the refusal of the men to join the union or pay dues toward the support of the organization. The plan was proposed at the convention recently held in Wilkes-Barre. The proposition has not yet been presented to the operators, but preliminary arrangements are now being made to do so at an early date.

The argument of the men in the union is that this is the only way to stop the trouble, and they point out that it is as much to the advantage of the companies to adopt this method as it will be to the union.

John P. White, national president of the mine workers, is expected to be in the anthracite region in the course of a few weeks. The principal purpose of his visit is to urge the men to refrain from these petty strikes. His argument will be that the operators will use these strikes as a reason for not entering into a new agreement with the miners' organization upon the expiration of the present contract.

In the Schuylkill region last week about 200 rock men employed by contractors went on strike for an increase in wages, and all rock work in tunnels being done by the Lehigh Valley and Reading companies between Centralia and Mahanoy City came to a standstill. The 1100 employees of the William Penn Colliery of the Susquehanna Coal Co. went out on strike on account of the dockage question, but the men agreed to return to work and then adjust their troubles. At the Midvalley Colliery of the Midvalley Coal Co. and the Cameron Colliery of the Mineral Railroad & Mining Co., "button strikes" are in order. The Beaver Brook Colliery of the Dodson Coal Co. is about the only one that has not had a case before the Conciliation Board this year.

Following a conference held last week between Governor Tener, representatives of the Attorney General's department, Auditor General Powell and State Treasurer Young, Auditor General Powell decided to pay state funds to virtually all state departments.

These payments will start as soon as vouchers are presented from the various departments which the Auditor General believes are not legally created because not contemplated in the Constitution.

Governor Tener has re-named the State Industrial Accident Commission. To this body he will intrust the important duty of framing a workman's compensation and employers' liability act for submission to the next session of the Legislature.

The Commission will be instructed to get the views of all interests on the subject and to frame a bill that, if possible, will meet with less opposition than that which failed during the last session because neither labor nor capital could come to an agreement as to its provisions.

Morris Williams, president of the Pennsylvania Coal Co., and Francis Feehan, a former district president of the United Mine Workers, are among those appointed on this commission.

PENNSYLVANIA

Anthracite

Scranton—Workmen in the Greenwood mine of the Delaware & Hudson Co. had a narrow escape from death on July 29, when lightning entered a chamber by means of an electric feed wire and fired three sticks of dynamite that had been placed preparatory to a blast. Three men had just left the chamber when the charges went off. The battery wires were burned out and the trail of the bolt could be followed from the surface through a slope to its entrance into the chamber. The accident is the first of its kind in this end of the anthracite coal fields.

Wilkes-Barre—A suit in trespass against the Wilkes-Barre Anthracite Coal Co. has been filed, asking $25,000 damages. The suit grows out of a case where a pumprunner had his clothing caught in the gears of a machine in the company's mine.

The Kingston Coal Co., on Aug. 1, filed a cross bill in equity against the Delaware, Lackawanna & Western R.R. Co. over the ownership of coal lands, in which over $1,000,000 is involved. The case grows out of an agreement made in 1862 when the Lackawanna Co. leased certain coal lands, and then entered into an agreement with the Kingston Coal Co., whereby the latter company was to mine the coal, it being cheaper for the railroad company to have the coal mined by the Kingston people than erect its own collieries.

Pittston—The Pennsylvania Coal Co. has just completed a modern electric plant at the old Schooley shaft, and expect to supply the various collieries in the south district with electricity in the near future. The culm bank at the old Schooley plant will be utilized for fuel. Electricity will be furnished in the beginning to old No. 2 shaft and to No. 9.

Shenandoah—Six miners and laborers were entombed for some hours on July 29 at the William Penn colliery near here shortly after they had started work in No. 2 Lift. After the fall of rock occurred shutting them off from the rest of the mine, other employees lost no time in starting a rescue party, and by 2 o'clock in the afternoon all of the men were brought out alive and apparently little the worse for their experience.

Tamaqua—Sparks from an electric motor in the No. 4 mine of the Lehigh Coal & Navigation Co. set fire to a body of gas on July 29, as a result of which three men were badly burned. The men were employed on the gangway when the explosion occurred and were hurled a considerable distance by its force.

An explosion of gas at the Buck Ridge Colliery of the Philadelphia & Reading Coal & Iron Co. at Shamokin on the same day seriously if not fatally burned two miners.

Bituminous

Beaverdale—The Beaver Run Coal Co., on July 1, formally opened a new stone club house for its employees. This is equipped with gymnasium apparatus and is generally similar to a Y. M. C. A. F. B. Cortright, secretary of the company, of Philadelphia, presided at the opening of the new building.

Johnstown—Judge M. B. Stephens has granted an injunction to the Morrellville Coal & Coke Co. against the Morrellville Coal Mining Co., restraining the latter from mining further coal. The case is an unusual one, involving the designation of the amount that is to be allowed the operating company for faults in the coal. The holding company maintains that the operating firm is in arrears with the royalty, while the operating company maintains that it has paid excess royalty amounting to $50,000. Another injunction was applied for some time ago in the Blair County Courts and Judge Stephens will hold a hearing in that case soon to receive testimony growing out of the dispute.

Kaylor—The mines at Kaylor, formerly operated by the Great Lakes Coal Co., but now owned by the North Penn Coal Co., recently resumed operations under new management. Two of the mines are now working and as rapidly as men can be secured the others will be again opened. It is the intention to again operate this group of mines to their full capacity.

Pittsburgh—Three separate answers of the Monongahela River Consolidated Coal & Coke Co., the Pittsburgh Coal Co. and the Union Trust Co., of Pittsburgh, trustees, defendants in a bill in equity, filed by Alexander Dempster, were filed in the local court at Pittsburgh on July 31. All three answers declare that Dempster has no standing in a court at law under the equity proceedings and ask that the bill be dismissed.

The answer of the Pittsburgh Coal Co. declares that Dempster, a minority stockholder of the Monongahela Co., without averments of fraud or danger of insolvency and sufficient facts in support thereof, seeks by a decree of court to control the corporate property of the company and personally dictate its management. By comparison of the defendants' holdings of stock in the company and the stock held by the plaintiff it is alleged that the acts complained of do not warrant or justify a decree in his favor.

A statement of the affairs of the company shows that in 1909 they lost $376,155.43 through the loss of coal fleets sunk in the Mississippi River by storms. In 1910, the profits are given as $231,222; in 1911, $355,789; and in 1912, $708,539; and it is asserted the profits of the present year will exceed those of last year.

WEST VIRGINIA

Charleston—With but one exception every local miners' union on Cabin Creek reported Aug. 1 that they had ratified the terms of an agreement by which the long coal strike will be officially ended.

Fayetteville—A strike was recently declared at the Cranberry mines in Raleigh County at a property of the New River Co. The cause of the disturbance was a controversy between a union and non-union employee, the non-union man refusing to join the miners' organization, and when urged too strongly by the union man, defending his stand with his fists. The matter is to be submitted to arbitration and the striking men have gone back to work.

Morgantown—The mine rescue course given in connection with the department of mines of the college of engineering at the State University of W. Va. is an accredited training course of the Federal Bureau of Mines. Summer school students in mining engineering have received certificates from the Federal Bureau for their mine rescue studies.

KENTUCKY

Fleming—The Elkhorn Fuel Co.'s new town of Fleming has filed application in due form before the Circuit Court of Letcher County for incorporation under the laws of the state. The court is asked to appoint five trustees, a marshall and an assessor, the petition being signed by the due two-thirds of the qualified voters of the town.

Harlan—The Harlan Coal Mining Co. is one of the eastern Kentucky operators which has been so crowded with orders from the territory north of the Ohio that it has had difficulty in keeping up with its regular business. On this account it has been forced to decline all orders or offers from others than its established customers, and to limit the amount of coal that even these favored customers may take at this time. The company has in several cases had to buy outside coal to take care of orders, nearly always at prices as high as it received, and in some cases higher.

TENNESSEE

Knoxville—Considerable interest is already being manifested by Kentucky mine operators and their employees in the great miners' field day, to be held at Knoxville, Sept. 20. Between 30 and 40 teams have been entered, and are receiving minute instructions and hard training to fit them for their contest for the rich prizes to be awarded. An unusual feature of the meeting will be a demonstration of the manner in which coal-dust explosions occur, and their danger. A big steel tube made for that purpose will be used by the Bureau of Mines in this demonstration. Twenty-five thousand miners are expected to be present. The exercises on Miners' Day will be held under the auspices of the Tennessee Mine Foremen's Association, the American Mine Safety Association and the American Red Cross.

OHIO

Martin's Ferry—The mine of the Powhattan Coal Co., which was to have been opened shortly, will not be started until about the first of the year. The principal reason for this postponement of operations seems to be that all bids received for building tracks, tipples, power house, etc., were considered too high on account of the scarcity of labor. It is believed that labor conditions will be easier in a few months.

New Lexington—Referee in Bankruptcy E. R. Mayer has made public his finding in the bankruptcy case of the Saltillo Coal Co., showing that the company is insolvent. The finding shows the company's indebtedness to be about $33,050 and the assets $23,500.

Columbus—Senator William Green, author of the bill to require the weighing of coal to determine the wage of miners, before screening, addressed the state commission appointed by the governor to investigate the subject recently in the senate chamber at Columbus, Ohio, giving his reasons for introducing the bill.

The introduction of the bill, he said, naturally followed the adoption of the amendment to the constitution making such a statute proper, and valid, and the vote on the amendment showed that the people were in sympathy with the proposition. In 1898 such a law was enacted, but the supreme court set it aside. If the organic laws of the state had been in 1898 as they are now, this dispute would not be in progcess. It would have been settled long ago.

INDIANA

Boonville—Several convictions have been secured recently at Boonville, Ind., by John C. Wright, a deputy state mine inspector, under the mining law of Indiana. The charges were various, including failure to provide ventilators, make break-throughs and furnish timbers.

Hymera—Five men were probably fatally burned, and 18 others severely injured in a dust explosion at Jackson Hill mine No. 2, three miles east of here on Aug. 1. Rescuers succeeded in bringing out all of the injured miners alive, but the mine property was heavily damaged. It is believed the dust was fired by a windy shot.

ILLINOIS

Watson—Leases are sought on 10,000 acres of coal land in a contiguous body near Watson on either side of the Illinois Central R.R. These leases are drawn for two years and represent the Consolidated Coal Co., of St. Louis and Chicago. It is believed from oil-well drillings that coal in paying quantities underlies Watson and the surrounding country.

Clinton—An inspection was recently made of mine No. 4 of the Big Creek Coal Co. looking toward the installation of electric machinery therein. Many of the larger mines in Fulton County have adopted electric power systems and those who have not done so are making preparations therefor.

Hillsboro—The Peabody coal mine after being shut down to make extensive improvements for several months has recently resumed operations. Inside of a month it is expected that this mine will employ about 350 men. This number will be increased constantly for several months.

OKLAHOMA

McAlester—As the result of injuries received in a gas explosion in mine No. 4 of the Union Coal Co., at Adamson, on July 25, Jake Blevins, a coal miner, died in the local hospital here on July 28.

FOREIGN NEWS

Juneau, Alaska—The commissioner of the general land office has canceled the Alaska coal claim of James Wardell, of Juneau, on land adjoining the Cunningham group in the Bering River region. This is the first Alaska coal cancellation since the voiding of the Cunningham claim in 1911. Forfeiture was on account of failure to open and improve the land.

Antofagasta, Chile—J. Bartman Coleman and J. Yeams, of the Caledonian Collieries Co., Ltd., of Australia, have left on an extensive inspection trip in the interior. They expect to look at a number of coal prospects before returning. They also will study the fuel question at various nitrate concessions, where the increasing use of fuel oil is making considerable inroads in the coal tonnage consumed.

Glasgow, Scotland—Twenty-two coal miners perished in the fire which broke out Aug. 3 in the Mavis Valley pit of the Cadder Colliery near here. Their bodies have been recovered. Only one man escaped alive of the shift of miners in the pit at the time of the fire. A widow lost three of her sons. The rescuing parties passed through a severe ordeal, owing to the intense heat and poisonous gases, and many of them were brought to the surface unconscious.

COAL AND COKE PATENTS

Improvements in Collapsible Wooden Mining Props, H. Heidkamp, 117 Blüthenstrasse, Hamborn-Neumühle, Rheinland, Germany, 17,557 of 1912.

Apparatus for Discharging Substantially Vertical Retorts for the Destructive Distillation of Coal, H. W. Woodall and A. McD. Buckham, assignors to Isbell-Porter Co., Newark, N. J., 1,065,572, June 24, 1913, filed Feb. 1, 1913, serial No. 475,474.

Steam Boiler Furnace, J. McMillan, Chicago, Ill., 1,065,702, June 24, 1913, filed Mar. 23, 1912, serial No. 685,745.

Means for Securing Combustion of Coal, J. H. Parsons, assignor to Parsons Engineering Co., Wilmington, Del., 1,066,044, July 1, 1913, filed Apr. 15, 1908, serial No. 427,119.

Method of Securing Combustion of Coal, J. H. Parsons, assignor to Parsons Engineering Co., Wilmington, Del., 1,066,043, July 1, 1913, filed Nov. 1, 1907, serial No. 400,169.

Mechanical Stoker, E. C. Cramp, Harrisburg, Penn., 1,066,254, July 1, 1913, filed May 2, 1912, serial No. 694,656.

Method of Regulating Generation in Gas Producers, L. R. C Chowning, Corning, N. Y., 1,066,252, July 1, 1913, filed Jan. 25, 1913, serial No. 744,256.

Miners' Emergency Case, E. M. Johnson, Bishop, Penn., 1,066,449, July 1, 1913, filed Aug. 12, 1912, serial No. 714,568.

Soot Boiler Cleaner, L. J. Bayer, assignor to Bayer Steam Soot Blower Co., St. Louis, Mo., 1,066,244, July 1, 1913, filed Oct. 9, 1912, serial No. 724,757.

Mine Car Wheel, W. J. McDonald, assignor to American Car & Foundry Co., St. Louis, Mo., 1,066,638, July 8, 1913, filed Dec. 21, 1912, serial No. 737,034.

Coal Leveling Machine for Bee-Hive Ovens, W. Sangster, J. S. Ham, assignors to Covington Machine Co., a corporation of Virginia, 1,067,221, July 8, 1913, filed Aug. 24, 1908, serial No. 450,115.

Gas Producers, H. L. Douherty, New York, N. Y., 1,066,717, July 8, 1913, filed Dec. 27, 1909, serial No. 535,037.

Coal Leveling Machine for Bee-Hive Ovens, W. Sangster, assignor to Covington Machine Co., a corporation of Virginia, 1,067,199, July 8, 1913, filed July 7, 1908, serial No. 442,305.

Smoke Preventer, G. H. Maynard, New York, N. Y., 1,067,826, July 22, 1913, filed July 25, 1912, serial No. 711,607.

Self-Coupling Mine-Car Bumper, E. Stark, Munger, Mich., 1,067,384, July 15, 1913, filed Sept. 12, 1912, serial No. 720,035.

Coal Leveling Machine, P. H. Douglas, assignor to Wellman-Seaver-Morgan Co., Cleveland, Ohio, 1,067,240, July 15, 1913, filed Dec. 20, 1911, serial No. 666,948.

Coal Transferring Apparatus, Charles Marcello, Pickayune, Miss., 1,067,615, July 15, 1913, filed May 8, 1912, serial No. 695,921.

Smoke Purifier, J. Delaney, Milwaukee, Wis., 1,067,321, July 15, 1913, filed Sept. 8, 1911, serial No. 648,271.

PERSONALS

James Bagley has been appointed state inspector of coal mines at Seattle, Wash., taking the place of D. C. Botting, resigned.

John Reynolds, of Eagan, Tenn., has resigned the position of superintendent of the Eagan mine of the Campbell Coal Mining Co. of that place.

J. J. Rutledge and J. M. Jones, of the Federal Bureau of Mines, have been making an inspection of the Birmingham district with the purpose, it is believed, of preparing a report upon the explosibility of coal dust for the Bureau of Mines.

Hugh McDonald and W. W. Smith, of Minot, N. D., have been inspecting various coke plants in the Connellsville region, with the idea that they will shortly construct a coking plant at their mining property near Minot and produce a domestic coke from North Dakota lignite.

The Chief of the Department of Mines, of Philadelphia, Hon. James E. Roderick, has appointed Harry Phythyon, of West Middlesex, and Thomas H. Thompson, of Finleyville, to be inspectors of mines in the bituminous region. Mr. Phythyon will have headquarters at Belle Vernon, Fayette County. Mr. Thompson will have headquarters at Punxsutawney, Jefferson County.

Governor Tener announced on Friday, Aug. 2, that he had named the following men to constitute the new Public Service Commission of Pennsylvania: Nathaniel Ewing, Fayette County, head of the State Railroad Commission, which is supplanted by the new commission, chairman; ten-year term. S. Larue Tone, Allegheny County, general manager and chief engineer of the Pittsburgh Railways Co.; nine-year term. Samuel W. Pennypacker, Montgomery County, ex-governor and member of the old Railroad Commission; eight-year term. Emory R. Johnson, Philadelphia, professor of transportation and commerce expert, University of Pennsylvania; eight-year term. Milton J. Brecht, Lancaster County, member of old Railroad Commission; six-year term. Charles F. Wright, Susquehanna County, ex-state treasurer; five-year term. Frank M. Wallace, Erie, treasurer of the Pittsburgh Coal Co.; four-year term.

TRADE CATALOGS

The Electric Controller & Mfg. Co., Cleveland, Ohio. More Chips. Booklet, describing the automatic control of machine tools; 31 pp., 8x10½ in., profusely illustrated.

CONSTRUCTION NEWS

Whitesburg, Ky.—The Elkhorn Mining Corporation organized for the purpose of developing land in the Boone's Fork and Beaver Creek field has made the announcement that actual development work is to be started immediately.

Peoria, Ill.—The Chicago and Northwestern Ry. has started the laying of rails upon its new coal road now being built from Peoria south, to tap the coal field in Macoupin County. Winston Bros., of Minneapolis, have the contract for the work. For several years the Northwestern has had this project in mind, but because of adverse conditions in the Northwest it was not deemed feasible until the present year to begin actual operation.

Punxsutawney, Penn.—With 11 new openings supplementing the six old ones, a new tipple under construction, a power plant and a two-mile extension of railroad being built to a 17,000-acre tract of coal land, the Madeira-Hill Coal Mining Co. has improvements under way which promise to revive in a large extent the mining industry of Clover Run. This operation is located in Clearfield County on the road from Mahaffey to DuBois, about six miles from Hillman.

Fairmont, W. Va.—It has been announced that the Elkhorn Fuel Co. is about to begin the extensive construction necessary in connection with its plant for developing 300,000 acres of coal land in Kentucky and West Virginia. This corporation has awarded a contract to the Nicola Building Co., of Pittsburgh, for the construction of 1000 buildings in connection with the plan for a modern mining town in Letcher Co., Ky., where developments will begin.

Birmingham, Ala.—The Tennessee Coal, Iron & R.R. Co. have recently announced five distinct improvement projects, which involve the expenditure of a considerable appropriation. These improvements embrace: One school house at Edgewater, and 100 dwelling houses at the same place. A domestic water supply at Iskooda Mine. Sanitation at Muscado, Fossil, Iskooda and Patten. Electric pumping improvements at Pratt No. 1 division. Opening No. 9 slope at Blocton to take the place of the old slope being exhausted or worked out.

NEW INCORPORATIONS

Indianapolis, Ind.—The Sedalia Lumber & Coal Co., of Clinton County, has dissolved.

Chicago, Ill.—The Benton District Coal Co. has increased its capital stock from $20,000 to $30,000.

Stephens, Tenn.—The Stephens Land & Coal Co. has been incorporated with a capital stock of $20,000 to develop coal deposits.

Connellsville, Penn.—The Margaret Smokeless Coal Co. has been chartered by Henry C. Mills, Patton, Penn., Geo. S. Good, Lockhaven, Penn., and F. J. Dixon, of Blairsville, Penn. The capital stock is $10,000.

Indianapolis, Ind.—The Ayrdale Coal Co., of Terre Haute, has been incorporated with a capital stock of $5000 to operate a mining company. The directors are: W. J. Freeman, C. J. Freeman, Jasper Schloat, W. A. Craig and Walter Bledsoe.

Columbus, Ohio—The Bell Block Coal Co., of Columbus, Ohio, has been incorporated with a capital stock of $10,000 to mine and deal in coal. The incorporators are: P. W. Barricklow, W. H. Barricklow, W. O. Copeland, Ethel E. Plant and W. H. Plant.

Madison, Wis.—The Elkhorn Gas Coal Mining Co. has been organized in West Virginia and incorporated by Milwaukee men. The capital stock is $2,000,000, of which $1000 represents the property owned in Wisconsin. Ferdinand Schlesinger is president; Henry J. Schlesinger, vice-president; Armin J. Schlesinger, treasurer, and Edward G. Wilmer, secretary.

INDUSTRIAL NEWS

Birmingham, Ala.—The operations of the Dayton Coal & Iron Co., at Dayton, Tenn., have all closed down recently for an indefinite period.

Pittsburgh, Penn.—The Hirsch Electric Mine Lamp Co. has moved its factory to the corner of 12th and Wood Sts., where its manufacturing facilities are greatly increased.

Connellsville, Penn.—The H. C. Frick Coke Co. has shut down three Leisenring plants indefinitely, throwing 1500 men out of employment, and blowing out 2000 ovens. Some other operators are also putting ovens out of blast.

Fairpoint, Ohio—It is reported that a new coal mine will be opened at Fairpoint in the near future. It is rumored that the mine will be opened by the owners of the Edghill mine north of Bellaire. No definite information can as yet be had upon this point.

Peoria, Ill.—Walter Ohlander and John Kietzler, of Pekin, have leased the Lake Erie coal mine between Wesley City and East Peoria. At present they are getting the mine into shape and are giving work to 25 men. They expect to employ a force of from 75 to 100 men during the winter.

Battle Creek, Mich.—Intending to take no chances of a possible strike the Grand Trunk R.R. is stocking 66,000 tons of coal on the flat below the Verona road crossing. The railroad has already 22,000 tons of coal in its regular storage yard near the locomotive shop, but this is only a small part of what may be needed.

Parkersburg, W. Va.—The United States Lumber Co. and the Tri-State Investment Co. have just closed a deal with Philadelphia and Scranton capitalists whereby they disposed of their combined interest in the coalfields of Highland, Bath and Augusta Counties in Virginia, and Pendleton County, in West Virginia, for a sum aggregating $320,000.

Six Mile Run, Penn.—Schipper Bros. Coal Mining Co. announces that it has just completed a tipple at its Broadtop Mine, on Six Mile Run, containing screens and picking belts for coal preparation. This company has also begun shipment from its new Crescent No. 7 Mine, on the Barnett seam, and has installed at its Ladysmith No. 5 Mine a new 10-ft. Brazil fan.

Columbus, Ohio—The Hocking Valley Ry. Co. was recently granted permission by the Ohio Public Service Commission to issue $1,000,000 of equipment trust notes for the purpose of buying new rolling stock and immediately upon the request being granted the company placed an order with the Ralston Steel Car Co. for 1000 steel battleship coal cars, which will be delivered about Oct. 1.

Washington, D. C.—One of the largest petitions ever presented to Congress from a single congressional district has been submitted to the House by Representative W. N. Carr, of Uniontown, Penn., in behalf of 13,500 employees of the H. C. Frick Coke Co. These men ask Congress to prevent a proposed dissolution of the U. S. Steel Corporation, of which the H. C. Frick Coke Co. is a subsidiary.

Columbus, Ohio—It is reported in railway circles that the Baltimore & Ohio, owner of the Cincinnati, Hamilton & Dayton Ry. system is planning to take up the southern end of the Detroit, Toledo & Ironton Ry. between Jackson and Ironton. The Baltimore & Ohio has been seeking an outlet through that locality for some time and has already had such a route surveyed. The purchase of the southern division of the Detroit, Toledo & Ironton will eliminate the building of a new road.

Philadelphia, Penn.—The Manor Real Estate & Trust Co., of Philadelphia, representing purchasing and holding companies of the Pennsylvania R.R. have concluded the purchase of seven tracts of coal land in Greene and Cherryhill Townships, Indiana County, the average price paid per acre being $70. The coal here purchased adjoins a large tract of nearly 15,000 acres recently taken over by the Manor Co. from the Greenridge Coal Co. Total payments in Indiana Co. aggregated $45,000.

Mobile, Ala.—The collier "Blossburg," owned by the Pratt Consolidated Coal Co., which was constructed at Pascagoula and Mobile has been put into service. This vessel is the only collier of its kind and is 150 ft. long, 36 ft. beam and 11 ft. deep. It has a carrying capacity of 1600 tons of coal and can bunker a steamer at the rate of 200 tons per hour. Furthermore, all classes of vessels from the smallest tug to the largest steamer can be more economically bunkered than from coal barges of the old type.

Pittsburgh, Penn.—It has been announced that the J. H. Hillman & Sons Co. has bought a controlling interest in the Bessemer Coal & Coke Co., which owns approximately 3300 acres of coking coal in the Connellsville and Klondyke region. By acquiring the controlling interest in the Bessemer Coke Co., the J. H. Hillman & Sons Co. now becomes the largest shipper of coke in the country. This firm now has an annual shipment of 3,500,000 tons of coke, and a large quantity of bituminous coal to all parts of the United States and Mexico.

COAL TRADE REVIEWS

GENERAL REVIEW

Heavy demand for bituminous continues unabated. Consumers, however, are becoming more cautious about future commitments. Buying more scattered. Anthracite moderately dull, but normal under the curtailed production.

With the August anthracite circular now in effect, there is little interest shown in getting coal forward, although there is a large tonnage moving at the full circular, and any further curtailment in production is unlikely. The companies appear to be disposing of the restricted production without any serious trouble, although there is considerable individual coal being sold down to the regular April circular, or less. The steam grades are showing some indication of improvement.

The broad heavy consumption of bituminous continues unabated, and the trade is now beginning to contemplate what the situation will be in the fall. Indications are that the current month will be the best August in the history of the soft-coal market, but the situation will turn entirely on the production. While the outlook for increased shipments is not encouraging at the moment, the possibility of a heavier movement is tending to give an easier tone to the market. Spot tonnages have not been particularly strong, especially where accumulations have occurred; buying is also more scattered and of an emergency kind, but prices continue firm. Consumers are becoming more cautious about orders into the future, and there is a feeling developing at some points that there is a possibility of a temporary slump.

Railroads in the Pittsburgh district are moving coal better than was expected, but there is sufficient congestion to cause some anxiety over the future. There is little new demand, but it is also doubtful if any important tonnage could be contracted for at the circular; production is up to full capacity. Outlying districts appear to be only waiting for Pittsburgh to take the initiative in the matter of advancing quotations. The only uncertainty in the situation at the present moment appears to be the contradictory conditions of the iron and coal markets. Ordinarily, these act in perfect sympathy with each other, but the reverse obtains now and the situation is highly puzzling to those effected.

The increased circular, effective the first of the current month in Ohio, is being strongly held, and the demand remains insistent. Production has been curtailed during the week by the restricted car supply which is now becoming a feature of the situation. There is no further doubt that the Lake shipping for the year will exceed all previous records. The companies at Hampton Roads are catching up on the contracts, because of heavier shipments from the mines, and there is also a larger movement in the coastwise and foreign trade. The tonnages in the West and Northwest, from West Virginia are unusually large.

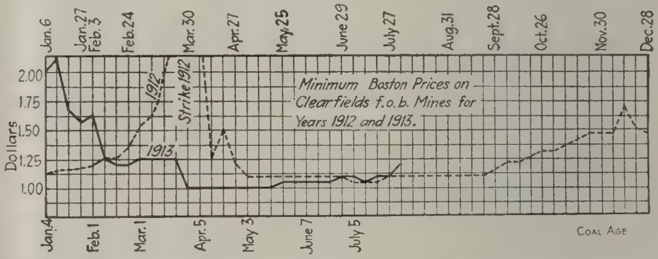
The car shortage in the extreme Southern market is causing a great deal of anxiety over what the situation will be this fall; coke is somewhat weaker because of the closing of a number of the iron furnaces. Prices in the Middlewest are being firmly held with some advances occasionally recorded. It appears to be doubtful if the operator can produce sufficient coal to meet the demand, particularly with the car and labor shortage which is becoming steadily worse.

BOSTON, MASS.

Generally a milder tone to bituminous, but it is considered only temporary. Interest still active in the probable output of West Virginia the next three months and prices continue firm. Difference among companies in charging Pennsylvania state tax.

Bituminous—The situation here continues without marked change, and what interest is shown is apparently confined to conjectures over what are likely to be the developments later. In that respect, there has been no pronounced trend, and the fall market will turn on the size of the output of Pocahontas and New River the next two or three months. Gains so far, since the resumption of mining, July 7, have been slow, but better loading is promised at all the Hampton Roads piers the next fortnight. On the whole, clear weather and the good movement of transportation coastwise help give the situation just now a milder tone, although it is recognized that there are other factors that are almost sure to make the outlook serious before many weeks. Prices are as firm as at any time since July, but buying is scattered and on Pocahontas and New River, only of an emergency character. There is a feeling in some circles, however, that within the month there will be a quiet time when prices will recede for a little, even though still later there is an upward movement that will extend into the winter.

From Pennsylvania shipments have lately been coming more slowly and there are further reports of labor shortage, of a surplus of business, and in some sections even of a limited car supply. Prices are without change, and few shippers are lacking an abundance of August business. A cautious policy is still being observed with regard to deferred deliveries. In Georges Creek the same condition is true, only with more emphasis. Practically no shipments are being made except on contract obligations, and then only in relatively small allowances to each consignment.



Water Freights are still easy, with few vessels offering. Steamer charters have been made for a series of trips on the basis of 70c. Hampton Roads to Boston points. That is about the rate on sailing vessels and barges, but dispatch has been so poor that shippers have hitherto been disinclined to charter beyond what they were obligated to take.

Anthracite—With August prices in force, there is little interest in getting hard coal forward. The advance of 25c. at retail in Boston, Aug. 1, making egg, stove and chestnut respectively $7.50, $7.75 and $8, has stimulated the demand from consumers and this will be reflected later in the month in orders filed with the companies. August will probably show a heavier tonnage movement than July and the fact that some consignees were too late in entering requisitions then, will influence retailers to get started earlier this month. Broken and screenings are notably in short supply.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.50	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.40@2.75	2.60@2.90	2.92@3.02	
New York*	2.70@3.05	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.10
Providence†				3.95@4.10
Boston†				4.05@4.15

*F.o.b. †On cars.

NEW YORK

Bituminous is still in heavy demand, but the trade is inclined to be spasmodic and uncertain. Prepared sizes of hard coal are holding their own and trade is about normal for this period.

Bituminous—The strength in the local soft-coal market continues unchanged, but is more of a spasmodic nature now. Inquiries will be numerous one day, and then followed by possibly several days of no business whatever. However, in a general way there has been no easing off in the situation, and the prices continue as firm as ever. One of the reasons advanced for the unusually strong market is a heavy stocking movement on the part of the railroads. Last year the roads were forced to pay a comparatively good price for their coal requirements during the winter; this is the first time this had occurred for a number of years, and they do not propose to contend with the same condition this winter.

It would be a difficult proposition to place any important contract running to the end of the year now, and almost, if not quite impossible, to contract up to Apr. 1, 1914. The car supply has begun to tighten up on the Baltimore & Ohio, this road now supplying only about 50 per cent. requirement; there is some indication of a tightening in this respect on the Pennsylvania, but less on the New York Central, and both of these roads are handling the situation in excellent shape so far. The New York market is not quotably changed, and we continue prices as follows:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—The hard-coal market continues rather dull and uninteresting, but in probably better condition than normally at this period of the year. The demand is still holding good, and although there is considerable price cutting, there is at the same time a large tonnage moving at the circular figure.

Production is being still further restricted, most of the large operations now probably working on a basis of about four days per week. As a result of this curtailed output, there is little coal going into storage, although some of the smaller steam grades continue to accumulate. Stove coal is still the shortest in supply. The market is quotable as follows:

		Individual	
	Circular	Lehigh	Scranton
Broken	$4.70	$4.45@4.85	$4.50@4.90
Egg	4.95	4.95@5.10	5.05@5.15
Stove	4.95	5.10@5.20	5.15
Chestnut	5.15	5.25@5.35	5.40
Pea	3.50	3.30@3.45	3.35@3.50
Buckwheat	2.75	2.15@2.45	2.55@2.75
Rice	2.25	1.70@1.95	2.25
Barley	1.75	1.30@1.70	1.75

PHILADELPHIA, PENN.

The anthracite trade, under restricted mining, still holding fair. All sizes moving off with possible exception of chestnut. Individuals still cutting prices, with concessions below April circular on some sizes. Bituminous continues on the high wave of prosperity.

The anthracite coal trade during the past week has developed nothing new, although operators claim that, with the restricted mining, they are able to dispose of most, if not all of the production. There is even a little better tone to the market as regards the small sizes. Chestnut seems to be about the only slow grade and broken is far in excess of the supply; this latter size is apparently coming into greater demand, or else there is less being made, for the companies sometimes find themselves hard pressed to cover current requisitions, and in some cases, are compelled to turn down new business.

The retail trade is in about the same condition as reported last week, and is not likely to show any improvement during the present month. There is some talk of a further restriction of mining during August. It is understood that most of the companies are now operating on the four days per week basis, but if the present demand keeps up, it is more than likely that further restriction will not be necessary. The individuals continue quoting exceptionally low prices, in some cases less than the April figures having been made, and there is also a great deal of jockeying with the Pennsylvania State tax. Nevertheless there is a large tonnage moving at the full circular prices.

The bituminous industry is on the end of its second month of prosperity. It is confidently expected, in fact, the condition already actually exists at some points, of quotations at least forty-five to fifty per cent. over those of last year at the corresponding period, and the trade is even looking for better things in the way of prices, although a conservative attitude is maintained by many.

PITTSBURGH, PENN.

Shipments close to actual capacity. Movement good so far but sufficient congestion to make the outlook disturbing. Coke situation uncertain. Furnaces appear less averse to meeting the producers' figures.

Bituminous—Coal shipments continue heavy, mining being very close to actual capacity. There is some congestion on the railroads, not a great deal, but sufficient to make a somewhat threatening situation for the future. On the whole, the railroads are moving the coal more expeditiously than was expected, shippers having seriously contended that the railroads were quite short of motive power. Fresh demand is relatively light but capacity is so well taken up that it would be difficult, if not impossible, to place fresh contracts at the regular circular prices, which we continue to quote as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district. Slack is bringing the full circular price as a rule, though on one or two divisions slight concessions can be obtained on prompt lots, say 10@15c.

Connellsville Coke—Authentic information is relatively meager as to progress being made by the coke operators in closing out August furnace coke. It is understood that the Producers' Coke Co., which handles the output of a number of operators, has made several sales, at the $2.50 price. Independent operators have made at least two sales, aggregating 15,000 tons, at that price, not guaranteed against decline. Furnaces are less averse to paying the operators' price than they were in the case of July coke, chiefly because they find the pig iron market has been picking up, and a break in coke prices at this time would disturb pig iron. We quote: Prompt furnace, $2.50@2.60; contract furnace, $2.50; prompt foundry, $2.85@3; contract foundry, $2.85@3.

Since the beginning of July there has been restriction of production by operators who did not have all their coke sold, for a month or longer periods, in order to avoid possible price cutting in the prompt market which would disturb the contract market. In the past few days the claim has been made by some operators that the men are so averse to working full time that they could not increase their output if they tried. These statements are doubted in many quarters. As reported by the "Courier," shipments in the week ended July 26 aggregated 393,634 tons, a decrease of 6214 tons, the production being given at 393,333 tons, a decrease of 6371 tons.

BALTIMORE, MD.

The best summer trade in years. Little probability of any easing off before the fall demand opens up. Shipments continue heavy and consumers are asking for tonnages in excess of their contracts.

This is the best August in the history of the coal trade for years. The time has now come when the trade feels there will be no break in the good prices for bituminous coals that have held so far the present season. Most of the companies that handle soft coal are pretty well filled with orders, and at figures considerably above those of a year ago.

Inquiries are now coming in also, for business above the contract call, which, by the way, is excellent. Shipments continue heavy over the piers and the local call for fuel is also good. The rush of contract coal continues in the Lake trade and there will probably be no abatement in that direction until navigation closes. While spot tonnages have not been overstrong at some points where there has been an overaccumulation, still the mine prices are showing no signs of weakening. Poorer grades of Pennsylvania coal readily bring $1, and the better qualities are being quickly absorbed at from $1.25 to $1.40. The off quality West Virginia fuels are commanding 90c. to $1 at the mines, with the better grades at $1.15 and $1.20.

The anthracite business here continues rather dull. There will be the usual awakening about the middle of the next month, however. The export trade from this port continues heavy. Egypt is still figuring largely in the amount of coal sent out, the Consolidation Coal Co. handling most of the tonnage to Alexandria.

BUFFALO, N. Y.

Bituminous trade seriously considering an advance in the circular. Strong position of the coal market, as compared with iron, is puzzling business interests. Car supply much improved.

The bituminous trade is so strong that dealers believe they could hold an advance of 15 to 20c. a ton. A few notices have been sent out from certain mines to the effect that an advance of 5c. might be expected on Aug. 1, but as a rule the trade here is waiting for the big companies in Pittsburgh to take the lead. Other branches of business appear to be watching bituminous coal and wondering how it manages to hold so firm when iron is dull. There was never so much iron ore moving on the Lakes as now and yet the tone of the iron trade is as uncertain as ever. Consumption is heavy at least, and users of manufactured iron are complaining that they cannot get anything like prompt deliveries.

Still there are quite a good many furnaces in the vicinity of Buffalo shut down on the complaint that there is no profit in pig iron. Everybody is puzzled over the contradictory condition in business, but the coal interests continue producing at maximum all their full capacity. Coal sells itself, and there would be no salesmen out if it was not expected that old conditions would return. The only drawback to the trade is the scarcity of money. Canada is much more poorly supplied than this country, especially since the government promised to release a large amount for general use. There is no complaint of car scarcity, though they are not plenty; the main difficulty is that the loaded cars move so slowly. Only after a shipper has made serious complaint that the consignee of a stranded car is running out of coal, does it begin to move again. Quotations of bituminous will, therefore, be $2.90 for Pittsburgh select lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack, all very strong. Coke is still weaker than coal and sells on the basis of $4.65 for best Connellsville foundry, f.o.b. cars at Buffalo.

There is no stir in the anthracite trade and none is looked for right away, as consumers are either hard at work in the field or off on vacations. Anthracite is in long supply and there is an excess of lake tonnage; some days more than a dozen big freighters leave this port light. The shipments of hard coal from this port for the week were 158,000 tons; for July, 780,632 tons and for the season, 2,566,206 tons. Last season to August the shipment was only 1,087,385 tons, owing to the late start, due to the mining suspension.

TOLEDO, OHIO

Toledo docks will undoubtedly establish a new high record during the current year. Car supply good so far. Steam and domestic grades in good demand and prices are strong.

The coal trade continues to be a rushing business in Toledo, especially in Lake shipments. This will undoubtedly prove a banner year for the Toledo Lake coal trade, although next year when the new Hocking docks are completed it is expected that a much greater tonnage will diverted to this port. The demand continues good for both domestic and steam coal and also for the fine grades. Thus far there has been no shortage of cars, although some dealers are fearful that there will be a little later on when crops begin to move, as this section has had a record yield. There has been plenty of coal thus far to supply the trade and much of it is now going up the Lakes.

The C. H. & D. docks have loaded 100,000 tons of coal during the past year and there are now four boats loading, each of from eight to ten thousand tons capacity. The Hocking and T. & O. C. docks have been loading to the limit of their capacity.

Prices quoted here are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.50	1.20	2.50	1.50	2.50	....	....
Nut	2.00	1.20	2.25	1.50	2.50	....	....
¾ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.60	1.15	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

LOUISVILLE, KY.

The heavy movement into the West and Northwest continues unabated. Storing of winter coal is strengthening the domestic market. Some producers so rushed they are unable to supply their regular trade.

After an almost imperceptible slackening up, the market has again resumed its former activity and is even stronger than before. The most important feature is the continued heavy movement into the Northwestern market, principally through Chicago, although there are numerous orders from points west of the Mississippi. Eastern Kentucky operators, especially those in the Harlan field, are obtaining the greatest benefit from this heavy demand; many of them are so rushed with orders that they are unable to supply their regular customers. This is the general condition throughout eastern Kentucky, and no relief is in sight until the production is much improved, there being considerable development now under way.

The generally firm condition of the market has naturally had a stiffening effect upon prices. The good grade domestic coals from eastern Kentucky are selling at $1.85 to $2 a ton, f.o.b. mines, for block, with block and lump at 10 to 15c. less, and round 25 to 35c. less. The September selling basis will be $2.10 to $2.25 for block, with the other grades in proportion as indicated. Nut and slack is in fairly good supply at 60 to 75c. for the better grades, the off qualities being from 40 to 50 cents.

COLUMBUS, OHIO

Demand is good for all grades. The feature of the trade is the advance in the circular, effective Aug. 1, which is being well maintained. Production is curtailed by a growing car shortage. The tone of the market is good.

Demand for all grades of coal has been good during the past week. The tone of the market is satisfactory and the advanced circular, effective Aug. 1, is being well maintained. Price cutting is not common and is only done in a few instances. The outlook for the future is considered good in every way.

Car shortage is making its appearance and as a result the output from the various mining districts is being curtailed to a certain extent. In eastern Ohio the car shortage is the worst and consequently the production is estimated at only about 65 per cent. of normal; it has also appeared in the Hocking Valley and the output is about 80 per cent. of the average in that section. In the Pomeroy Bend district some trouble over lack of cars is reported and the same is true of the domestic fields of Jackson.

Domestic business is holding up well despite the extremely hot weather. Dealers' stocks are pretty large and they are not buying for immediate delivery at present. Municipal and school contracts are requiring some attention and there is a good demand for Pocahontas in this territory at prices considerably higher than a year ago. Some of the larger householders have placed their contracts for the coming season. Retail prices are higher, in conformity with the advanced circular.

Lake trade is good although there is a slight falling off in the volume, due to car shortage and scarcity of labor. No congestion of consequence is reported from the docks at the upper lake ports. The movement to the interior has started and there are no indications of a congestion. There is a good demand from plants making iron and steel and also from factories in many other lines. There is no disposition to stock up at this time although it is believed some stocking will be done soon to guard against a possible suspension after Apr. 1, when the present mining scale expires. Railroads are using a fair amount of fuel.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump	$1.70 @ 1.65	....	$1.70 @ 1.65	$1.70 @ 1.65
3-4 inch	1.55 @ 1.50	$1.35 @ 1.30	1.45 @ 1.40	1.50 @ 1.40
Nut	1.30 @ 1.20	....	1.35 @ 1.30	....
Mine-run	1.35 @ 1.25	1.15 @ 1.10	1.30 @ 1.25	1.25 @ 1.20
Nut, pea and slack	0.65 @ 0.60	....	0.60 @ 0.55	0.60 @ 0.55
Coarse slack	0.55 @ 0.50	0.70 @ 0.65	0.50 @ 0.45	0.50 @ 0.45

HAMPTON ROADS, VA.

Shippers well caught up on contracts, although dumpings for the week were light. Movement from the mines was heavy and also the shipments in both the foreign and coastwise trade. Prices firm.

Dumpings over the Hampton Roads piers during the week have fallen below expectation. However, there has been a continued heavy movement in from the mines, and wholesalers have caught up on their contracts, some even having free coal remaining on track in the yards, although this will no doubt find a ready application on contract. The export and coastwise movement still continues heavy with prices firm at $2.95 to $3 for Pocahontas and New River, and $2.60 to $2.75 for Kanawaha for deliveries during the current month and early in September.

The dumping over the Hampton Roads pier for July amounted to 934,672 tons. The Norfolk & Western R.R. led with a tonnage of 513,951 tons, at the Lambert Point pier, the Virginia Ry. being second, with 221,064 tons at Sewalls Point, while the Chesapeake & Ohio Ry. dumped 199,747 tons at Newport News.

BIRMINGHAM, ALA.

Operators complaining vigorously about the inadequate car supply. Indications point to an acute situation when the fall demand opens up. Optimistic outlook for the winter trade.

The most interesting feature in the local market is the vigorous complaints from the operators about the inadequate supply of cars, which they claim is worse than for some months past. The lack of equipment at this time when the shipments are comparatively light is causing considerable apprehension over what the situation will be when the fall demand opens up.

Furnace coke is slightly weaker, due to the closing down of a number of blast furnaces, but foundry coke appears strong with prices being well maintained. Smithing coal is experiencing the customary summer dullness, and the price level has been reduced in order to stimulate buying. Business conditions generally in the South are excellent and the trade is inclined to take an optimistic view over the immediate future of the coal business.

DETROIT, MICH.

Shortage in the car and labor supply is restricting production and causing uneasiness. Pocahontas grades are stiff and becoming more difficult to obtain.

Bituminous—The car supply is becoming steadily worse and operators are seriously handicapped in their efforts to produce sufficient coal to meet the heavy demand. There is also considerable apprehension expressed over the inadequate supply of labor and indications are that high quotations will prevail locally before the end of September, with coal difficult to obtain at that. Prices on contracts are being maintained in every respect, several large tonnages being closed during the week.

Anthracite—All of the big hard coalers, with the exception of the D. L. & W. have announced a uniform advance of 10c. per ton on the circular to cover the new 2½ per cent. Pennsylvania state tax on anthracite.

Coke—Coke is becoming somewhat stronger and will apparently continue to improve from now on. Semet Solvay is quotable at $3.75 with gas house at $3.50 and Connellsville at $3 all f.o.b.

The local market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.50	....	$1.60	....	....	$2.50	$2.25
Egg	1.50	....	1.60	....	....	2.50	2.25
Steam lump	1.30	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	1.10	$1.10	$1.10	....	....
Mine-run	1.10	1.10	1.05	1.05	1.05	1.50	....
Slack	0.90	0.95	0.60	0.70	0.70	....	....

ST. LOUIS, MO.

The anticipated advance in the Carterville and Franklin County coals took place Aug. 1. Standard grades are moving more freely. Anthracite and coke are completely demoralized.

As had been anticipated, Aug. 1 brought a surprise in the way of an advance on Carterville and Franklin County coal, although there are indications that some of these may only be temporary, as the local demand has been caused largely by a lot of speculation on the part of jobbers who figured on having a good demand in the first half of the month. The country demand is fairly good from points in Missouri and the North, but in the South there is nothing as yet.

Standard coal is moving a trifle more freely, but the same old proposition exists where it is being sold for less than cost. Standard screenings are down from 40c. to 45c. and, of course, this means that 2-in. lump is hovering around 90c. to 95c.; 6-in. has advanced to about $1.10, and everything indicates that Standard lump will continue to advance because it is a certainty that screenings will continue to drop.

Very little anthracite moving in, and the market is in a demoralized condition and the same thing applies to coke.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.90
3-in. lump	....	....	$1.25	....
6-in. lump	$1.35 @ 1.50	....	1.35	1.10
Lump and egg	....	$2.10	1.30	....
No. 1 nut	1.15 @ 1.30	....	1.05	0.87½
Screenings	0.65	....	....	0.80
Mine-run	1.10	....	....	0.75
No. 1 washed nut	1.50	....	....	....
No. 2 washed nut	1.30	....	....	....
No. 3 washed nut	1.20	....	....	....
No. 4 washed nut	1.10	....	....	....
No. 5 washed nut	0.80	....	....	....

PORTLAND, ORE.

Trade holding up good for this period of the year. Considerable Utah coal coming in because of the British Columbia strike.

There is nothing of particular significance to report this week from the coal trade in this section, except that business is keeping up quite steady for this time of year. Utah coal is being sold here in considerable quantities, with less Washington fuel owing to the home demand which has been heavy for some time on account of the strike in the British Columbia mines.

While prices increased 25c. per ton at the mines on Aug. 1, dealers here are of the opinion that the increase will not affect retail prices, but will be absorbed by themselves. A fair volume of business is looked for this winter.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for June and the first six months of this year and last year:

	June		Six Months	
	1913	1912	1913	1912
Coal	3,061,929	2,591,318	16,665,968	15,148,448
Coke	396,920	424,009	2,447,888	2,284,892
Total	3,458,849	3,015,327	19,113,856	17,433,340

VIRGINIAN RAILWAY

Total shipments of coal over this road for June of the current year were 304,030 tons as compared with 256,070 tons for the same month last year. For the five months to June 31 of the current year, the shipments were 2,201,033 tons as compared with 1,662,917 tons for the same period last year.

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for May, 1912-13, and for the eleven months ending May, 1911-12-13, in long tons:

	11 Months			May	
Imports from:	1911	1912	1913	1912	1913
United Kingdom	13,186	6,691	8,750	600	200
Canada	1,392,770	963,033	1,255,854	112,682	74,638
Japan	14,481	13,165	78,812	230	12,315
Australia & Tasmania	259,791	182,266	140,825	19,399	10,840
Other countries	4,821	1,992	3,257	48	....
Total	1,685,049	1,167,147	1,487,498	132,959	97,993
Exports:					
Anthracite	2,805,724	2,677,133	4,206,746	18,019	505,305
Bituminous,					
Canada	7,554,140	9,613,219	10,563,330	1,048,155	1,470,590
Panama	470,297	447,412	443,249	57,769	49,800
Mexico	590,976	306,072	406,249	39,536	56,048
Cuba	860,239	1,032,532	1,167,681	113,785	132,571
West Indies	481,534	649,226	550,055	71,681	47,164
Other countries	570,816	1,300,897	1,059,036	155,288	147,737
Total	10,528,002	13,349,358	14,189,600	1,486,214	1,903.910
Bunker coal	5,920,979	6,525,093	6,666,494	693,063	690,228

NORFOLK & WESTERN RY.

The following is a statement of the tonnages shipped over this road during June, 1913, and for the six months ending June 30, as compared with corresponding periods of 1912 in short tons:

	June		Six Months	
Destination	1912	1913	1912	1913
Coal				
Tidewater, foreign	121,972	175,414	834,554	876,320
Tidewater, coastwise	297,636	262,574	1,814,298	1,903,318
Domestic	1,569,697	1,623,923	8,417,511	8,651,814
Coke				
Tidewater, foreign	3,070	......	40,904	22,841
Domestic	97,527	123,941	701,308	817,801
Total	2,089,902	2,185,852	11,808,575	12,272,094

FOREIGN MARKETS

GREAT BRITAIN

July 25—The demand is more active for Admiralty large coals, which are firmly held both for prompt and forward delivery. Prices for other qualities are, however, irregular for immediate shipment.

Quotations are approximately as follows:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$4.08@4.20
Best seconds	4.56@4.68	Seconds	3.96@4.02
Seconds	4.32@4.50	Best Cardiff smalls	2.46@2.52
Best dry coals	4.32@4.56	Seconds	2.34@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

GERMANY

Exports and Imports of fuel in Germany for May and the first five months were as follows:

	Exports			Imports		
	May		5 Mos.	May		5 Mos.
	1912	1913	1913	1912	1913	1913
Coal	2,480,522	2,288,587	13,687,651	882,846	952,624	4,071,183
Lignite	4,172	3,093	26,703	503,825	528,573	2,911,166
Coke	512,026	596,424	2,868,838	48,767	53,036	235,150
Coal briquettes	193,907	202,171	1,023,580	3,372	1,713	9,033
Lignite ditto	37,084	61,034	374,660	7,399	7,620	51,869

Production for May and the first five months of this year and last year was as follows:

	May		5 Mos.	
	1912	1913	1912	1913
Coal	14,734,098	14,268,674	66,938,122	73,414,129
Lignite	6,742,672	6,865,438	27,137,136	28,309,207
Coke	2,378,226	2,673,104	11,376,863	13,266,336
Coal briquettes	438,477	451,087	2,044,311	2,365,154
Lignite ditto	1,389,169	1,710,005	6,407,057	7,146,051

BRITISH WEST INDIES

The "Iron and Coal Trade Journal" (London, England), says in a recent issue:

> The way in which coal from the United States has ousted British coal in the British West Indies is shown by the fact that supplies of bunker coal, representing approximately 40 per cent. of the imports, are drawn entirely from the United States. The last importation of bunker coal from the United Kingdom was in 1909.

FINANCIAL DEPARTMENT

The Elk Horn Fuel Co.

Character and Value of Properties—"The Elkhorn Coking Coal Field," in eastern Kentucky, has long been known to contain fuel of exceptional quality which has been unavailable to the market through lack of railway facilities. The land owned and under option by the Elk Horn Fuel Co. is about 60% of "The Elkhorn Coking Coal Field," and lies principally to the north of the recent development in the same field by the Consolidation Coal Co., and occupies mainly the watersheds between the Kentucky and Big Sandy Rivers and extends north along Beaver Creek and other tributaries of Big Sandy, Kentucky and Licking Rivers. It produces the highest grade of coking, gas-producing, openhearth malleable, and byproduct coal, and has proven to be one of the most valuable and uniform coals ever mined in this country. The lands are underlaid by the Elkhorn seam to the extent of 75% to 80% of the entire area; the barren area being caused by erosion of streams. The region will yield in recovery an average of 5500 net tons per acre, the seams running from 4 to 8 ft. in thickness. This coal is remarkably uniform in quality throughout the entire coking region

Mr. d'Invilliers in his report (which covers only a portion of the coal properties owned or controlled by the Elk Horn Fuel Co.) places a present valuation of $10,000,000 upon 110,133 acres of land and mineral rights owned by the Elk Horn Fuel Co. in "The Elkhorn Coking Coal Field," and 14,750 acres (represented by its stock ownership in the Beaver Creek Consolidated Coal Co.) and 4500 acres (represented by its stock ownership of the Mineral Fuel Co.) each in the same field. Messrs. Haas, Mayo and Fleming in their report place a realizable value at forced sale in excess of $15,000,000 on all of the property of the Elk Horn Fuel Co. (exclusive of the stock of the Consolidation Coal Co. owned by it). It is probable the value of the properties of the company largely exceeds the above figures, the property owned in fee and mineral rights, upon which the mortgage is a direct first lien, alone largely exceeding the value of $10,000,000.

Transportation Facilities—"The Elkhorn Coking Coal Field," hitherto inaccessible for lack of transportation facilities, now enjoys special advantages in this respect as the Louisville & Nashville, Chesapeake & Ohio, Baltimore & Ohio and the Carolina, Clinchfield & Ohio are now recognized factors in the development of this field.

The Louisville & Nashville is now in actual operation through the land of the Mineral Fuel Co. (all of the stock of which company is owned by the Elk Horn Fuel Co. subject to its mortgage), and is providing 5000 steel cars for its service. The Chesapeake & Ohio is constructing a branch approximately 22 miles long up the right fork of Beaver Creek, completion of which is guaranteed by contract for Jan. 1, 1914. This railroad is also under contract to construct, at its own expense, spurs aggregating 11 miles in length, as soon as the traffic conditions warrant. The railroad company has further agreed to build extensions necessary for the development of tonnage on Mud Creek. The Baltimore & Ohio has purchased a survey extending up the left fork of Beaver Creek, and its president states that they will commence the construction of this line at once. It has also acquired what is known as the Rockcastle survey (including considerable rights of way). The completion of these branches will afford ample transportation facilities for the development of this company's holdings in the Elkhorn field. The Carolina, Clinchfield & Ohio is now building a connection between Dante, Va., and the Chesapeake & Ohio at Elkhorn City, which line is expected to be in operation within a year and will give an important connection to Atlantic ports. The great value of this field is demonstrated by the interest the railroad companies are taking in its development, the expenditures made in this territory and those provided for by these companies representing a total investment of more than $55,000,000.

Market Conditions—There is a large and steadily increasing demand for Elkhorn coal, particularly by gas-producing plants. It is also used in large quantities in byproducts and coke plants, having demonstrated its superiority in the manufacture of metallurgical coke. The president of one Western company, of unquestionable financial responsibility, using large quantities of byproduct coal, states that within three years his plants alone will consume three and a half million tons of this grade of coal per annum.

There is a great and steadily increasing demand by malleable-iron plants which require a long, hot flame, practically free from sulphur. The expenditures of the railroads to reach this field and the greatly increased production are indicative of the marketability and rapidly increasing demand.

(For a further description of this property see Vol. 4, No. 2, page 74.)

⁂

The Clearfield Bituminous Coal Corporation—This concern was incorporated Oct. 7, 1886, under the laws of Pennsylvania. It owns land and mineral rights in Clearfield and Indiana counties, Penn., and has a capitalization of $825,000, all of which is owned by the New York Central and Hudson River R.R. On June 23, 1911, it foreclosed its mortgage on the properties of the Pennsylvania Coal & Coke Co., controlling about 106,000 acres in Blair, Cambria, Clearfield and Indiana counties, and has leased these properties to the Pennsylvania Coal & Coke Corporation.

Metropolitan Coal Co.

The Metropolitan Coal Co., incorporated under the laws of Massachusetts, has filed with the Massachusetts secretary of state a statement of its financial condition, dated Mar. 31, 1913, which we compare as follows:

Assets	1913	1912
Real estate and machinery	$800,041	$632,012
Material, stock in process	402,899	475,563
Steamers, tugs, etc	162,600	162,600
Cash and debts receivable	511,800	541.444
Horses and vehicles	159,893	164,704
Good-will	400,000	400,000
Securities	469,594	393,425
Total	2,906,829	2,769,750
Liabilities:		
Capital stock	1 500,000	1,378,400
Accounts payable*	716,829	751,350
Funded debt	250,000	200,000
Surplus	125,000	110,000
Floating debt	310,000	330,000
Reserve for bad debts	5,000	......
Total	2,906,829	2,769,750

*Including $400,000 special stock.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 2:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	82	81	82	87	80
American Coal Products Pref	110	100	100	109¼	105
Colorado Fuel & Iron	32½	29½	31¼	41½	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¾	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com	49½	47¼	49	49	47¼
Island Creek Coal Pref	81	80½	80½	81½	80
Pittsburgh Coal	19	18½	19	24⅜	14½
Pittsburgh Coal Pref	83½	82	82¼	95	73
Pond Creek	21	20	20	23¾	16½
Reading	163	158	158¼	168⅞	151⅜
Reading 1st Pref	....	....	86	92½	86
Reading 2nd Pref	88¼	88¼	88¼	95	84
Virginia Iron, Coal & Coke	41¼	40	40	54	37½

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	98	95½	July '13	93⅝	99⅛
Colo. F. & I. gen. 6s	102½	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	82	83	80⅞	82	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	81	82	80	80	73	80
Tenn. Coal gen. 5s	99¼	99⅞	99¾	99¾ '13	99¾	103
Birm. Div. 1st consol. 6s	100¾	102	101	April '13	101	103
Tenn. Div. 1st g 6s	100¼	101⅞	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	103	103	103	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92⅛	93	92¼	92¼	92	98

No Important Dividends were announced during the week.

Reading Co.—The earnings of this corporation for the five months to Nov. 30, 1912, amounted to $12,000,000, as against $7,350,000 in the same period of 1910, or about 1¾ times as much. That a great deal of this is due to the anthracite coal business is illustrated by the figures of the Coal & Iron Co., which showed $2,244,220 net for the five months of 1912, as compared with a deficit in 1910, and less than $275,000 profit in 1911 and 1909.

The Sunday Creek Coal Co.—This concern was incorporated in New Jersey, in June, 1905, taking over the property of the Sunday Creek Coal Co., which owns 16,300 acres of coal land and leases 250 acres. The new Sunday Creek Co. also leased properties allied to the Hocking Valley Ry. namely, the Kanawha & Hocking Coal & Coke Co., and the Continental Coal Co., which together control about 59,500 acres in West Virginia and Ohio, and the Buckeye Coal & Railway, and the Ohio Land & Railway, controlling 24,350 acres. The total acreage leased by the Sunday Creek Co. is 84,100 in addition to which it owns 16,300.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

Volume 4, No. 7
Issued Every Saturday
Hill Publishing Company

NEW YORK, AUGUST 16, 1913

Ten Cents per Copy
Contents, First Page
Advertising Index, Last Page

What Is Real Economy?

There are more boilers ruined in the coal mine power plants—due to bad water—than in any other industry.

Many managements consider it permissible policy to operate boilers just as long as they can without acids eating them up or scale allowing them to burn up. This year, they will adopt one make-shift. Next year, another. When forced to they will put in a reservoir system.

Is this economy? Hardly. The cost of these various half-way methods—added to the upkeep of boilers—will in one or two years pay for a simple dependable system that will do away with the whole problem permanently. In fact, the half-way method is losing game from the start.

Are you in this class?

We do not believe you realize the reliability of a good *purifying* system. Such a system once in, you are free to use any water that comes to hand for *all* mine purposes —without fear of corrosion, scale, boiler explosion, interruptions in service.

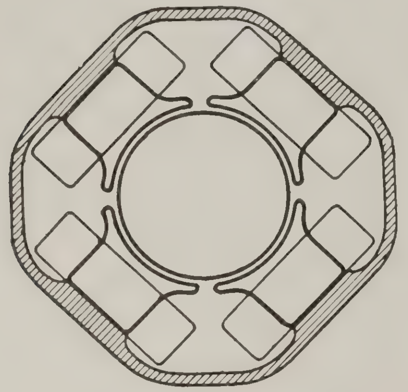
And the last is the most vital point—much more important than the cost of equipment destroyed by bad water.

Good water always available for boilers is the biggest guarantee toward continuous operation of your plant. Think it over—then

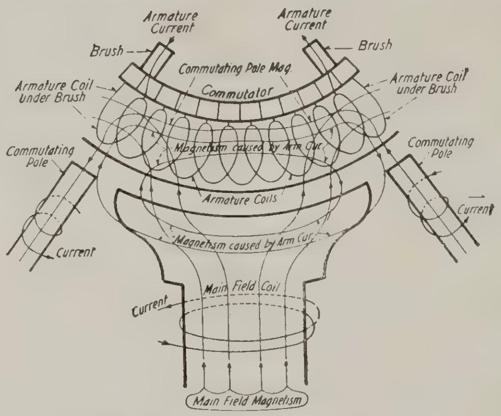
Write to us. Without the slightest obligation, we will describe our water purification systems "Scaife and We-Fu-Go"—and what they do. Dozens of mines have adopted them. Think—and write now.

Wm. B. Scaife & Sons Co.
Pittsburgh, Pa.

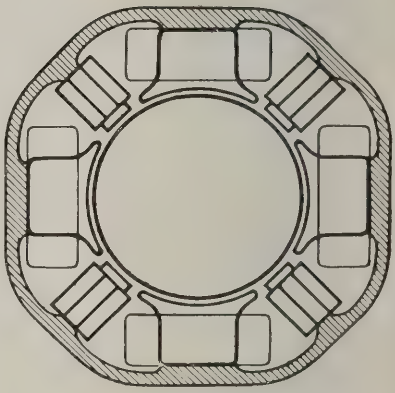
The Reason for the Commutating Poles
In the Motors Used on
Baldwin-Westinghouse
Electric Mine Locomotives



The above sketch shows the general arrangement and proportions of a non-commutating pole motor.



Diagrammatic Sketch of Magnetism and Current in a Westinghouse Mine Motor.



This sketch shows general arrangement and proportions of a commutating pole motor.

In the non-commutating pole machine, the armature current generates magnetism which passes through the armature iron and the pole, as shown in the drawing. Part of the magnetism caused by the armature current passes through the two armature coils under the brushes and through the pole tips. This is the magnetism that makes the machine spark, and is strongest when the armature current is strongest, so the machine sparks the worst on heavy loads.

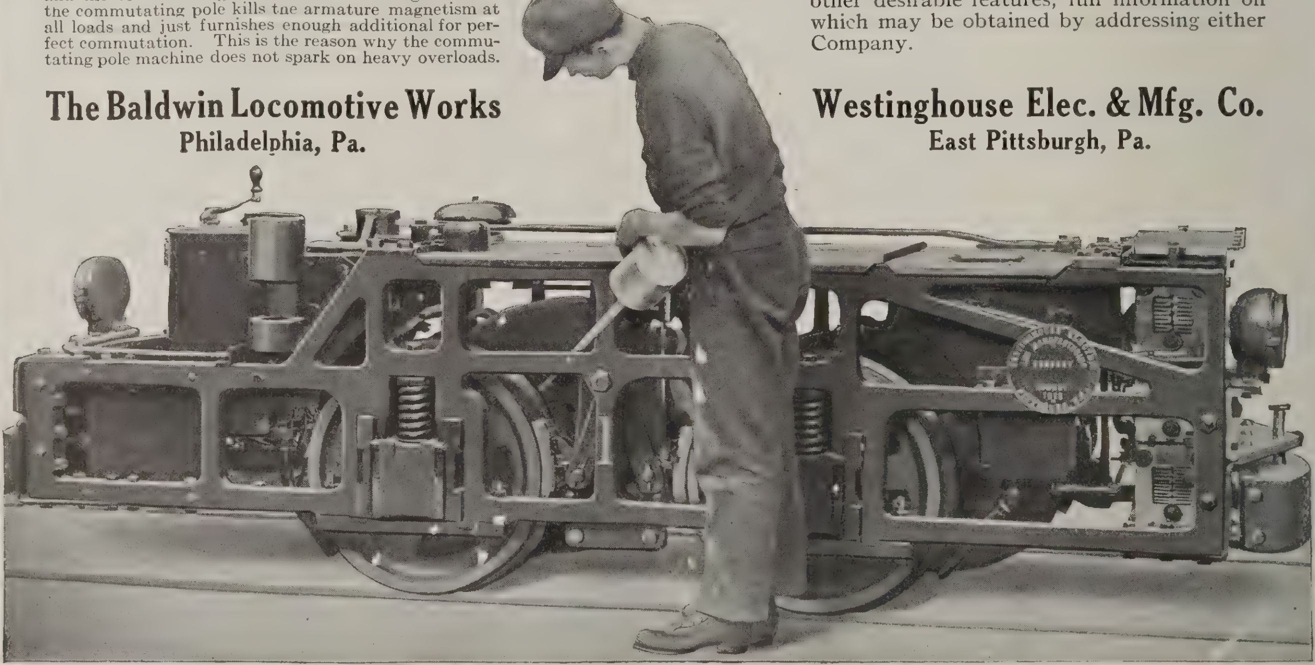
In the commutating-pole motor, the commutating coils are designed to send magnetism through the armature, which will kill the magnetism caused by the armature current and furnishes enough additional magnetism to give perfect commutation of the armature coil under the brush. The same current flows through the armature and the commutating coil, so that the magnetism of the commutating pole kills the armature magnetism at all loads and just furnishes enough additional for perfect commutation. This is the reason why the commutating pole machine does not spark on heavy overloads.

The motor will operate without sparking at all loads and voltages found in service. The commutator is always bright and polished. All bucking or flashing is eliminated. The commutator shows hardly any wear at all. Brushes wear very slowly, often lasting for years. Brush-holders do not deteriorate from flashing. Commutators do not burn out from short circuits due to flashing. There is less likelihood of breakdowns of insulation in armature, fields and brush-holders, as the carbon or copper dust in the motor is practically eliminated.

The commutating-pole motor is one of the most important factors entering into the success of Baldwin-Westinghouse Mine Locomotives. There are many other desirable features, full information on which may be obtained by addressing either Company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Elec. & Mfg. Co.
East Pittsburgh, Pa.



COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,450

None sent free regularly, no returns from news companies, no back numbers

Advertising vs. Good Advertising

The Weekly Ad-Talk Page

"Advertising is something catchy

This is a popular fallacy which, having fastened itself onto advertising, persistently clings. We venture to suggest that you have some such idea in your mind now.

If you were asked to mention some *good* advertising you would rack your brain for some *clever* stuff and you would probably light on—

"Spotless Town" or,
"Sunny Jim" or,
"The Smile That Won't Come Off" or
"Phoebe Snow" or,

One of the hundreds of other "catchy" advertisements that have been produced and backed by hundreds of thousands of dollars.

And, strangely enough, you would have some difficulty in connecting these national characters and slogans with the *product* they are intended to advertise.

It is a fact that whenever the general public is asked to tell which advertisement in a magazine is the best one they invariably name those which are the most "catchy" or the "prettiest" or "cleverest"—never the one which moves unconcerned people to purchase.

We remember very well being called into consultation upon the advertising of a fine old reputable concern manufacturing engineering devices.

The president thereof, who was a good many years short of being an old mossback, greeted us with, "Well, I suppose you will advocate that we stand on our heads and kick our heels in the air."

You see, that was his impression of advertising, and probably his impression of an advertising man was a spouter of "clever" ideas surrounded by a pink striped shirt, a red necktie and spats.

As a matter of fact what this concern needed—and got—was advertising that *informed.*

They had been content with showing a picture, their name and their address. Occasionally, in a spasm of self-righteousness, they boasted about their virtue, reputation and age. But never a word of what the buyer needs to know.

Now their advertising is full of valuable information about their machinery It gives facts that are essential to the man who purchases or recommends.

It performs no "stunts" and in nowise lessens them in the eyes of their customers. Now it produces *results.* It is *good* advertising.

Two things are responsible for advertising failing to reach 100 per cent. efficiency. One is this popular misconception of what advertising is and the other is a popular belief that it is intended entirely for the benefit of the advertiser.

Neither premise is based upon facts The really great advertising successes have been free from froth. Good advertising is as beneficial to the buyer as the seller.

For good advertising keeps the buyer posted, abreast of developments in a fast-moving age.

No man in your line of endeavor, unless he were bent on commercial suicide, would choose to wall himself up where no news of the progress of events could reach him. He would not deliberately choose to remain ignorant of the development of the machinery of this industry.

On the contrary, he would welcome all the information at his command.

Which is simply another way of saying that he would read the advertisements in papers devoted to his industry.

COAL AGE

Vol. 4 NEW YORK, AUGUST 16, 1913 No. 7

The Blight Of Waste

BY BERTON BRALEY

Written expressly for Coal Age

The trees are black with dust and smoke,
The grass is burnt and sere,
The noxious gases from the coke
Pollute the atmosphere,
The valley droops as with a blight,
There is no vivid green,
And reeking ovens day and night
Make desolate the scene.

The land is dull and drab and bleak
And overcast the sky,
With heavy choking fumes that reek
And make the throat turn dry,
—Yet all the beauty that's defaced
And wearisome to see,
Is but the fruit of careless waste
A waste that need not be.

The smoke that pours into the air,
The dust that settles thick,
To make the valley grim and bare
The heart grow sore and sick,
This smoke and dust are golden gain
All lost before our eyes,
Because we will not take the pain
To have it otherwise.

"Byproducts"—what care we for these?
We only want our coke,
We'll go on flinging to the breeze
Our wasted wealth in smoke,
And though we know how much is lost
In soot and gas and flame,
We'll still refuse to count the cost
And waste it just the same.

For all the fumes and all the dirt
Which make the land so black,
Which float above it to its hurt
And leave it smirched and slack,
Are wasted wealth that won't return
But flees beyond recall,
And yet we cannot seem to learn
The pity of it all.

For if we ceased to foul the air
With murkiness and smoke,
We'd have our rich byproducts there
And also have our coke,
It would not prove a huge expense
The profits would be fat,
But it might need some common sense
—And who could hope for that!

Coal Shipping on the Great Lakes

By J. W. Chamberlin*

SYNOPSIS—The second installment of this article. The different types of coal-loading apparatus are discussed and a general description of the growth of the Lake shipping given. A comparison of the trestle and car dump.

⁂

A good indication of the trend of the coal trade on the lakes is shown by the following report of the Buffalo shipments in 1857: To Chicago, 24,879 tons; to Milwaukee, 2898 tons; to Detroit, 4567 tons; to Toledo, 1963 tons; to Cleveland, 2679 tons. The entire traffic in coal to the last three ports was cut off sometime ago by the railroads (with the exception of a few small cargoes to Toledo) in spite of the fact that the long-distance traffic is so great and still growing. As lately as 1865 only 973 vessels passed through the Sault to Lake Superior, having a tonnage of 409,062 tons. The coal tonnage through that passage in 1912, not to mention other freight, was 14,931,594 tons, of which 12,789,109 tons was bituminous and 2,142,485 tons was anthracite. Of this amount 11,992,395 tons passed through the American or Poe lock and 2,939,199 tons through the Canadian.

There are about 350 coal docks on the Great Lakes, scattered all the way from Oswego on Lake Ontario to Chicago at the head of Lake Michigan and the twin ports of Duluth and Superior at the head of Lake Superior; this does not include the smaller docks on the north shore of Lake Ontario and the St. Lawrence River, which are not regularly listed, and which would probably round out the number to an even 400. Of these practically all are receiving docks from lake vessels except those located on the southern shores of Lakes Ontario and Erie (including Toledo), which receive from cars and deliver to vessels.

Besides the shipping trestles already mentioned as far west as Erie, practically all for anthracite handling except the one at Sodus Point, there are eight Lake Erie ports that ship bituminous more or less extensively, Ashtabula, Cleveland, Conneaut, Fairport, Huron, Lorain, Sandusky and Toledo, all in the State of Ohio. Being in easy shipping distance from the bituminous mines of Pennsylvania, West Virginia and Ohio they all load soft coal quite heavily in the lake trade, the railroads generally making a lower rate on such shipments, both from a desire to stimulate the trade and as a matter of competition with each other. The Lake Erie ports, including Erie, Penn., ship about 16,250,000 tons of bituminous coal, of which Ashtabula and Toledo are credited with more than half, with Cleveland and Lorain each running above 2,000,000 tons.

Erie Railway Coal Dock at Cleveland, Operated by the Pittsburgh Coal Co.; Capacity, 1200 Tons per Hour

Methods of Handling

The methods of loading this coal have steadily developed from the wheelbarrow to the horse dock and thence to an elaborate and quite varied system of steam handling. In this connection it may be sufficient to mention the equipment at each port by name only. At Ashtabula there are four McMyler car dumps; at Cleveland, six McMyler and one Wellman-Seaver car dumps; at Conneaut, one car dump; at Fairport, one McMyler; at Huron, two car dumps; at Lorain, two McMyler car dumps; at Sandusky, one car dump, one trestle; at Toledo there are seven docks, equipped with eight masts and booms (for receiving anthracite by lake) and for loading bituminous from car to vessel, three car dumps, one five-ton McMyler and one McMyler locomotive crane.

---

*90 Johnson Park, Buffalo, N. Y.

This immense bituminous traffic, being more than the entire output of all the bituminous mines of the United States in any year prior to 1871, is supplemented, and, in fact, made possible at present low rates (which do not average 40c. a ton) by the great iron-ore trade in the opposite direction, which reached 48,211,778 tons in 1912. In former seasons, when ore was not so entirely in command of the situation, vessels easily obtained cargoes both ways, but now, with the ore tonnage nearly three times that of the coal, it is often found necessary to pay the vessels a living rate on ore alone, so that they can hurry back light for their ore, as there would be a loss of a matter of five days a trip in the case of the larger steamers should they load coal for the westbound trips.

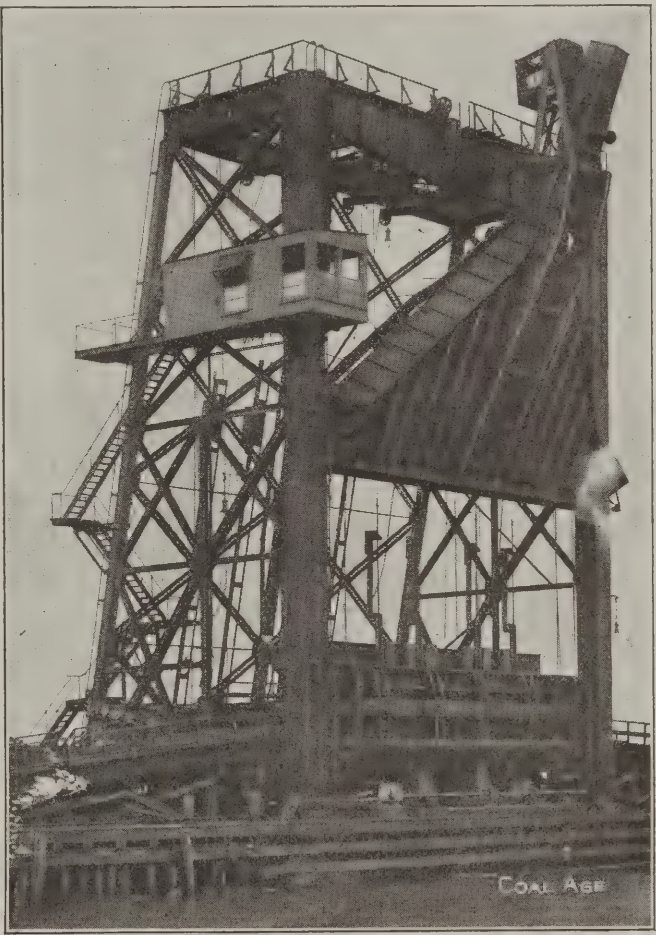
Loading Apparatus Installed at the Harbor in Erie, Penn.

When Shipper Owns His Vessels

Where the ore shipper owns his own vessels he looks on the straight ore trade as easier to manage; the vessel owner without other lake interests, however, prefers to carry cargoes both ways. A good steamer will make about 31 round trips in a season between Lake Erie and the Lake Superior iron mines, carrying coal up to the head of Lake Michigan or Lake Superior and bringing down ore. If the ore goes to Chicago the distance is less, but there is no return cargo. Distance by lake from Buffalo to Duluth is 980 miles and from Cleveland to Duluth, 830 miles, while from Chicago to the mines at Escanaba the distance is only 274 miles.

Car Ferries

There are a good many car ferries on the lakes but only the two on Lake Erie and the one on Lake Ontario can be classed as coal carriers. The one running between Charlotte (near Rochester) and Coburg, Ont., and controlled jointly by the Grand Trunk Ry. and the Buffalo, Rochester & Pittsburgh R.R., is the most active of them all. Ice interferes sometimes, but Lake Ontario is very deep and does not freeze over readily. Charlotte shipped last year 1,107,436 tons of coal, nearly all bituminous, of which 324,814 tons went to domestic ports. It is expected that anthracite shipments from that port will increase steadily. Lake car ferries experience many storms and in winter are sometimes much hindered by both slush and heavy ice.



The Pittsburgh Coal Co.'s Car-Dumping Machine on P. R.R. Tracks, Cleveland, Ohio

There are two coal-car ferries on Lake Erie. They were established in connection with the coal trade of various railroads. One runs between Conneaut, Ohio, and Port Burwell, Ont., and was established some 20 years ago by the Lake Erie & Detroit River R.R.; this company was absorbed by the Pere Marquette R.R., and the ferry is owned jointly by that interest and the Bessemer & Lake

Erie R.R. The other runs from Ashtabula, Ohio, to Port Burwell and Rondeau, Ont. It is owned by the Canadian Pacific Ry. The ferries carry about 25 cars at a trip and cross back and forth as fast as possible. The Pere Marquette ferry has also a collier in connection, which carries in bulk, as most lake vessels do. Lake Erie is shallow and it is impossible in ordinary years to keep navigation open all winter. It was tried at the outset, but the ferry steamers were too often caught in the ice for either safety or profit. One steamer was lost two or three years ago with all on board.

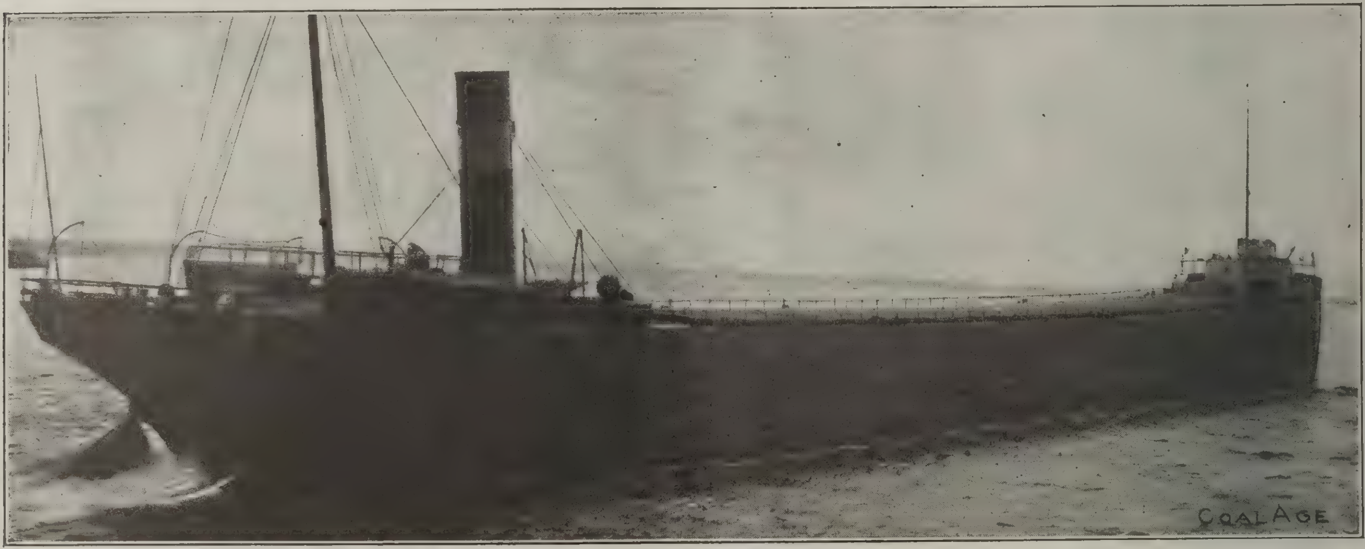
There is also a car ferry on the St. Lawrence River between Ogdensburg and Prescott, that is, at least, indirectly connected with the lake trade, and formerly the ferries of Detroit River carried considerable coal into Canada, but the tunnels in that district are absorbing that business. The car ferries of Lake Michigan are active and run all the year, but they do not carry much coal. The object of these ferries is, of course, to shorten the distance between the mines and the consumers and also to get around blockades all-rail. As to the freight charges it is found that the Ogdensburg ferry rate is 15c. a ton, the rate from the Reynoldsville district, the source of the coal handled by the Lake Ontario ferry, is $1.25 to Rochester, at one end of the route, and $1.75 to Coburg, at the other end. The rate from Pittsburgh to London, Ont., is $1.83 by ferry route and $2.13 all-rail via Buffalo. These ferries often shorten the time between shipping point and destination considerably by avoiding the delays at junction points, as well as shortening the actual distance traveled.

The coal-car ferry idea has always been a favorite one on the lakes, where there is a large amount of coal passing around the end of any of the large lakes to the other side. The Grand Trunk Ry. took steps some time ago to provide itself with coal in Ohio and proposed establishing a ferry line from some Ohio point, perhaps Cleveland, to the Canadian shore. Preliminary arrangements were concluded and President Hays went to London and obtained the proper signatures authorizing the full carrying out of the plan; the contract went down with him in the "Titanic," on Apr. 15, 1912, and the new management has not again taken it up. The Canadian ports of Lake Erie are mostly shallow and require a great amount of deepening; there is also much drifting sand so that constant dredging is often necessary. This sand appears to originate on the north shore, but it often crosses to the south shore. Before the long breakwater was built at Buffalo the sand piled up on the south beach so that a special sand-catch pier had to be built.

Apparatus Used in Loading and Unloading

Mention has already been made of the apparatus for handling coal from car to vessel at the lower-lake shipping ports. These equipments are practically all efficient and ample, but such can hardly be said of that used at the docks on the upper lakes and the farther side of Lake Ontario. Some of it is very extensive, efficient and capable of taking 1000 tons an hour from the hold of a properly constructed vessel. There are 350 regularly listed coal docks on the lakes for unloading vessels and this list does not include the minor docks on Lake Ontario, some of which are hardly worth mentioning, as they receive only a hundred tons or so of coal in a season, and perhaps have no apparatus at all. The complete list is about 400.

A "Whaleback" in Conneaut Harbor



Freighter "J. C. Wallace" (the Yellow Kid). Capacity, 10,300 Tons; Length, 530 Ft.; Beam, 56 Ft.

Some of the big upper-lake coal ports are lavishly equipped for coal handling. Milwaukee, for instance, has 28 sets of handling apparatus, Duluth and Superior have together 29 and Chicago and South Chicago, 21. Some of these, of course, do not represent separate interests and some are massed more than one on a single dock, as where one dock in Milwaukee has 11 Brown hoists, but they are commonly one at a dock. Included in the list of nearly 50 styles of hoist are rigs, whips, steam hoists, whirlies, McMylers hoists, derricks, Mead hoists, hoisting boats, Mead-Morrison hoists, horse rigs, donkey engines, rigs with clams, Brown hoists, McMyler whirlies, Coney rigs, Hunt towers, clam-shell hoists, Heyl & Patterson fixed timber masts, Pittsburgh rapid bridges, no equipment, Robbins hoists, Hulett machines, masts and booms, swinging booms, Haiss hoists, friction hoists, booms and blocks, figure-four rigs (numerous), horse docks, hoist with clam, industrial rig, portable towers, nonportable rigs, Ellington hoists, steam drum, electric cranes, Fairbanks-Morse towers, Dodge rigs, McMyler bridges, Lockport whirlies, steam A-shaped rigs, hoisting boats, Parker derricks, Wellman-Seaver-Morgan hoists, dredges, revolving cranes and fixed masts.

These names, of course, run into each other in a way that would make it impossible to say just how many styles there are. In addition to these there are a few lake vessels that carry a simple hoisting apparatus on the deck for use where there is nothing available on the dock. They charge an extra freight and have a monopoly of nonequipped docks. The capacity of these rigs varies almost with every dock on which they are found. The lowest capacity for mere bucket dock rigs is given at 250 tons per ten-hour day and the highest is 8000 tons. The fast docks are usually provided with several rigs of the same sort.

Loss in Breakage

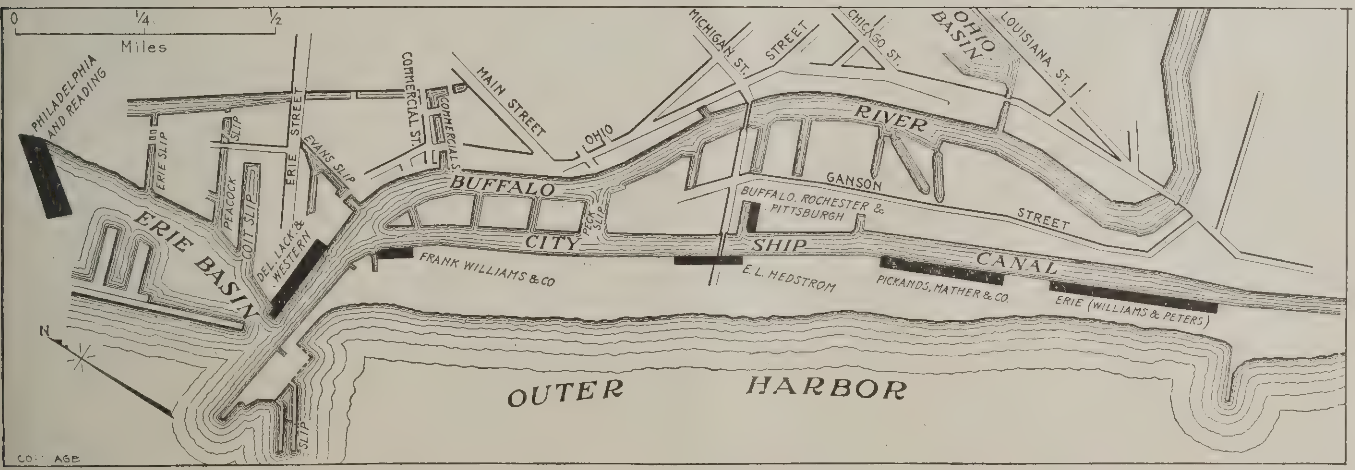
In connection with all the methods there is always the vexed question of breaking up or degradation of the coal, as it is called. The lake coal trade falls under the disadvantage of two or more extra handlings. If the coal, as is sometimes the case with anthracite, must be put into stock, at or near the shipping port, there is another handling to the stock pile and back to the car before it goes on board the vessel. The Delaware, Lackwanna & Western Co. has a stocking and transfer trestle at Cheektowaga, near Buffalo, a mile in length, and the Lehigh Valley Co. has a large one a few miles further east.

In case of most bituminous coal the loss from breaking up is not very great, as the slack is often worth nearly as much as mine-run and is generally within 50 to 75c. a ton of the large sizes. Anthracite, however, depreciates by breaking, as screenings are worth only about $1 a ton. Everybody in the business has figured on this loss, but the problem remains unsolved, as some coal breaks easier than others and some cargoes are also dumped further, while dry coal breaks up more readily. One shipper estimates that he gets only 86 tons of full sizes out of every 100 tons of anthracite shipped by lake; 7 tons is degraded into pea size, worth not much more than half its original value and 7 tons into screenings. A shipper once kept an estimate of a cargo of anthracite shipped from Buffalo to the Canadian Northern R.R. dock at Port Arthur, Lake Superior. It consisted of one-third egg and two-thirds stove and it came out 30 per cent. egg, 34 per cent. stove, 21 per cent. chestnut, 10 per cent. pea and 5 per cent. screenings. The change of size looks a trifle odd in some respects. However, every experiment of this sort will inevitably produce a new set of figures.

The Car Dump

It is becoming evident that the end of the high shipping trestle is near; it has been an institution at lower-lake ports for a long time, but the car dump is now superseding it. A trestle has lately been torn down at Erie and a dump put in its place. Buffalo is already considering the change, one company having about concluded to give up its trestle and other shippers agreeing that they must go. The wooden trestle is cumbersome, taking up a large amount of expensive waterfront, which is all the time becoming more valuable. Then the expense of upkeep is large. After such a structure begins to get old it has to be fairly rebuilt every year or two to keep it in good working condition.

The dump is a new dock appliance and it did not work in very fast at first. The machinery must be heavy and is somewhat complicated, while the power required must be large to pick up a big steel car and its freight of 50 tons or more; the problem of dumping the coal where it is wanted is also a delicate one. The first dumps did little but turn the car over and empty it upon an apron, where the coal ran down into buckets, to be hoisted to the vessel afterward. The one used in Buffalo for handling the soft coal of the Rochester & Pittsburgh Co. was rigged so that the buckets were hoisted by the weight of the car as it came back to place. This made too many handlings of the coal and it was not long afterward planned to dump the car into the vessel direct.



Plan of Harbor at Buffalo, N. Y., Showing Coal-Shipping Piers

Besides the relative cost and efficiency of the trestle and car dump, there is also the rapidity of handling and the breakage of the coal to be considered. All coal will break up considerably with any sort of handling, though in case of an empty vessel-hold the breakage is much more than after the cargo is nearly all in. Bituminous coal ships most satisfactorily in three-quarter size, though the preparation also involves the production of a large amount of slack. The problem is also complicated by the action of the stokers, who sometimes refuse to handle anything but three-quarter in feeding their fires.

Shipments

Lake Ontario—	Tons	
Charlotte	185,000	Bituminous, to Coburg only
Sodus Point	6,000	Anthracite, to Lake Ontario and St. Lawrence Ports.
Sodus Poin	70,000	Bituminous, to Lake Ontario and St. Lawrence Ports.
North Fair Haven	150,000	Anthracite, to various ports, including the upper lakes.
Oswego	675,000	Anthracite, to various ports, including the upper lakes.
Lake Erie—		
Buffalo	3,925,000	Anthracite, to upper lakes.
Erie	275,000	Bituminous, to upper lakes, and to Lake Ontario.
Erie	543,000	Anthracite, to upper lakes.
Conneaut	165,000	Bituminous, to upper lakes and Lake Ontario.
Ashtabula	4,370,000	Bituminous, to upper lakes and Lake Ontario.
Fairport	375,000	Bituminous, to upper lakes and Lake Ontario.
Cleveland	2,100,000	Bituminous, to upper lakes and Lake Ontario.
Lorain	2,250,000	Bituminous, to upper lakes and Lake Ontario.
Huron	735,000	Bituminous, to upper lakes and Lake Ontario.
Sandusky	1,349,000	Bituminous, to upper lakes and Lake Ontario.
Sandusky	17,000	Bituminous, to Buffalo.
Toledo	4,630,000	Bituminous to upper lakes.

Receipts

Upper Lakes—	Anthracite Tons	Bituminous Tons
Alpena	3,000	126,000
Ashland	35,000	500,000
Buffalo	......	17,000
Chicago	947,000	600,000
Detour	10,000	151,000
Detroit	......	21,000
Dollar Bay	2,000	100,000
Duluth	190,000	2,370,000
Escanaba	20,000	475,000
Gladstone	2,000	220,000
Grand Traverse Bay	......	47,000
Green Bay	101,000	450,000
Hancock	167,000	440,000
Kenosha	29,000	20,000
Kewaunee	2,000	40,000
Lake Linden	13,000	390,000
Manistique	2,000	47,000
Manitowoc	29,000	495,000
Marine City	1,000	38,000
Marquette	31,000	303,000
Menominee	3,000	110,000
Milwaukee	1,080,000	3,080,000
Ogdensburg	21,000	190,000
Port Huron	3,000	117,000
Racine	43,000	100,000
St. Clair	1,000	55,000
Sault	29,000	140,000
Sheboygan	250,000	340,000
Superior	1,270,000	4,700,000
Two Harbors	......	253,000
Washburn	6,000	200,000
Waukegan	110,000	60,000
Passed through the Sault in 1912	2,142,000	12,789,000

ANTHRACITE SHIPMENTS BY LAKE FROM OSWEGO, NORTH FAIR HAVEN AND SODUS POINT, SEASON OF 1912, BY RECEIVING PORTS

New York		
Alexandria Bay	6,300	
Cape Vincent	875	
Clayton	2,500	
Henderson Harbor	800	
Ogdensburg	25,000	
		35,475
Ontario		
Bath	1,300	
Belleville	18,000	
Bowmanville	3,000	
Brockville	23,000	
Bronte	600	
Cardinal	3,300	
Coburg	7,000	
Collins Bay	700	
Conway	300	
Desceronto	3,500	
Gananoque	10,500	
Hamilton	1,600	
Iroquois	2,300	
Kingston	45,000	
Morrisburg	1,700	
Napanee	8,500	
New Castle	1,200	
Oakville	1,500	
Pickering Harbor	900	
Picton	1,500	
Port Hope	1,800	
Port Milford	500	
Portsmouth	600	
Prescott	3,700	
Smitns Falls	5,900	
Toronto	90,500	
Trenton	4,300	
Whitby	1,800	
Wolf Island	1,000	
		245,500
Quebec		
Chicoutime	1,800	
Lachine	400	
Montreal	270,000	
Quebec	15,500	
		287,700
		568,675

The use of the car dump has been much facilitated by the modern vessel hatch, which is so large that the deck seems to be practically all hatch, in place of the old-fashioned style, which merely provided for an opening big enough for hoisting out a barrel or two. In all this improvement of late years it must be confessed that the lake coal trade has followed the iron-ore trade, which demanded rapid handling if costs were to be kept down. It is claimed that handling appliances on the lakes are usually far in advance of anything known on salt water and with good reason, for the trip never exceeds 1000 miles, so that time lost in port is fatal. In case of ocean vessels there must be time in port for repairs and speed in handling is not so essential.

The Coke Made from West Virginia Coal

The quantity of coke made in West Virginia in 1912, according to E. W. Parker of the U. S. Geological Survey, was 2,465,986 short tons valued at $4,692,393. In 1911 the production was 2,291,049 tons valued at $4,236,845. The increase in 1912 was 7.64 per cent. in quantity and 10.75 per cent. in value. In spite of this increase the production of coke in West Virginia in 1912 was smaller than that of any year from 1905 to 1910. The smaller production in the last two years is attributable simply to the larger production of coke from West Virginia coals by plants in other states.

In 1912 the quantity of coal made into coke in West Virginia was 4,061,702 short tons, while it is probable that the quantity of West Virginia coal made into coke outside of the state exceeded 5,000,000 short tons. In coke making as in the coal-mining industry, West Virginia suffers from having relatively little home consumption for her products; 80 per cent. of the coal mined in the state and nearly all of the coke made there is sent to consumers outside of her boundaries.

Next to Pennsylvania, West Virginia possesses more wealth in supplies of high-grade coal than any other state in the Union, but as long as both coal and coke continue to be shipped out of the state, West Virginia will not attain the position she should occupy as a manufacturing commonwealth. At the present time ranking second in the production of coal and third in the production of coke, West Virginia stands thirty-fourth in the value of her manufactured products.

Richmond Basin in Virginia

The presence of coal in the Richmond basin of Virginia was known as early as 1700 and mines were opened and worked in 1750. In 1789 shipments were made to some of the Northern states. In 1822, according to R. C. Taylor in his "Statistics of Coal," the production amounted to 54,000 short tons. For nearly a century the Richmond basin maintained some prominence as a coal producer, but in 1882 when the Pocohontas district was opened, followed shortly afterward by the development of the New River field in West Virginia, the mines in the Richmond basin were put at a disadvantage, and operations were for many years practically suspended.

During the last four years, however, new life has been introduced into the Richmond basin areas by the reopening of the old Gayton mine in Henrico County. This region is the only area producing free-burning coal which lies immediately adjacent to the Atlantic seaboard.

Large Coke Production in Indiana

The production of coke in Indiana in 1912, according to E. W. Parker of the U. S. Geological Survey, amounted to 2,216,339 short tons valued at $12,528,685.

With the completion and puting in operation of the 560 Koppers ovens by the United States Steel Corporation at Gary, Indiana in 1912 advanced to third place among the coke-producing states, displacing West Virginia, Illinois and Colorado. Indiana's production in 1912 exceeded that of West Virginia by about 150,000 tons and was only 350,000 tons or thereabouts less than that of Alabama.

It is probable that within two years if not in 1913 Indiana will surplant Alabama as the second coke state as at the close of 1912 there were 169 retort ovens in course of construction.

In addition to the ovens at Gary there were 50 Otto ovens operated by the Citizen's Gas Co. at Indianapolis, and during the year 22 ovens were completed by the Central Indiana Gas Co. at Muncie. These latter ovens are heated by producer gas made from the coke in producers in front of and below the ovens. Gas coal from the Youghiogheny region of Pennsylvania is used in these ovens and the coke is marketed for domestic consumption. The coal used at Gary and Indianapolis is chiefly from West Virginia.

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Maryland's Coal Output

Maryland's coal production has been fairly constant for the past 15 years, during which period it has averaged about 4,860,000 short tons. The smallest annual output was 4,023,241 short tons, while the maximum was 5,532,628 tons in 1907. The production in 1912 was 4,964,088 short tons, valued at $5,839,079. These figures were compiled by E. W. Parker, of the U. S. Geological Survey, having been obtained in coöperation with the Maryland State Survey.

This production was about 100,000 tons over the average for the 15-year period, but more than 600,000 tons less than the maximum; compared with 1911, the production in 1912 was a gain of 278,243 short tons in quantity and $642,013 in value. In sympathy with the generally higher values throughout the country in 1912, the average price per ton for Maryland coal advanced from $1.11 in 1911 to $1.18 in 1912.

The coal deposits of Maryland are confined to a small area in the two western counties of the state, Allegheny and Garrett. Most of the production in the past has been made in the Georges Creek basin, which, in Allegheny County, contains a detached portion of the Pittsburgh seam, known generally as the Maryland Big Vein. This bed has been worked for nearly a hundred years and is now approaching exhaustion. The greater prominence of this basin as the source of Maryland's coal products has given the name Georges Creek to most of the coal shipped from the state.

Georges Creek coal has a high reputation as a steam and blacksmith fuel. The gradual exhaustion of the big vein has led to the exploitation of some of the smaller beds in the Georges Creek basin, and many companies that formerly worked the Big Vein only are now mining the thinner beds, either independently or in conjunction with the Big Vein.

The total amount of coal recoverable from the numerous small beds far exceeds the original contents of the Big Vein, but they cannot be so cheaply worked, and it appears doubtful if in annual production they will do more than make up the deficiency caused by the exhaustion of the larger deposits.

The U. S. Bureau of Mines reports a total of only 13 men killed in the coal mines of Maryland in 1912, a decrease of two from 1911, when there were fewer men employed and fewer tons mined. Maryland also presents an excellent record in regard to labor troubles, of which there were only three in 1912, the longest one lasting for 12 days. No strike of any kind was reported in either 1910 or 1911. Most of the mines are operated ten hours per day.

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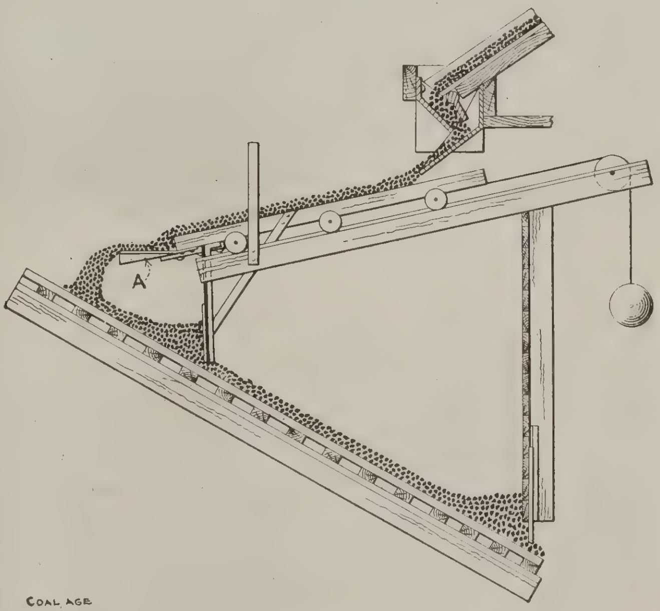
Traveling Chute for Coal Pockets

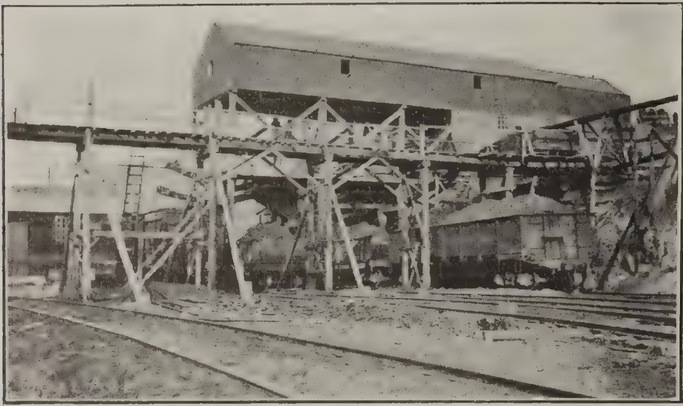
One of the objects of the device shown in the accompanying figure is the provision of a traveling or movable chute operative upon an inclined track, the chute being provided at the lowest end with a spreader plate *A* for evenly spreading the coal in the upper portion of the pocket, against a regulating plate projecting downwardly from the under surface of the lowest end of the movable chute. As the coal piles up against the regulating plate the chute is moved upwardly upon the inclined track, so as to gradually regulate the coal down the incline of the pocket, where it passes through a gate opening.



THE CHUTE IN OPERATION

In practice there is a series of pockets, and each gate opening of each pocket is opened or closed by means of a gate, there being an attendant, known in practice as a "loader," for operating each gate. When it is desired to load a car at the gate opening, the "loader" gives a signal, and the coal is allowed to pass from the coal regulator, upon the traveling chute, from which it is spread into the pocket, then the "loader" opens the gate, thus allowing the coal to flow into the car. A patent (1,061,151, May 6, 1913) was granted on the above chute to W. N. White of Fortyfort, Penn.

SNAP SHOTS IN COAL MINING



Tipple of the International Coal Co., Carbon County, Mont.

New Rail and River Tipple of Pittsburgh Mining Co., Minersville, Ohio

Men Who Took the Mine Manager's, Mine Examiner's and Hoisting Engineer's Examination, Springfield, Ill., June 16

The Man Trip about to Enter the Nantyglo Coal Co.'s Mine at Nantyglo, Penn.

The Industrial Importance of Coal

By Frederick W. Saward*

SYNOPSIS—An interesting paper in which some facts and figures on the importance of coal are presented. It has been quite pertinently said the coal production must continue so long as a wheel is to turn any place. The possible results of a general and abrupt cessation in production are discussed and the gradual development of the industry reviewed.

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The consumption of fuel is the best measure and truest index of a nation's industrial status, but notwithstanding the extent of the coal trade today, which statistics available to all plainly make evident, it is a lamentable fact that the industry has had much to contend with in past years in the way of adverse public sentiment and lack of esteem. Too often even now the personnel of the trade is collectively regarded either as a robber baron swollen with ill-gotten gains or a more or less prosperous peddler delivering his tonnage with a horse and cart, while only some vague ideas of dust, dirt and a deep hole give shape to the more general features of the trade.

Little Early Incentive to Development

With little in the way of incentive to development, and with such limited opportunities for traffic in coal as existed a century or more ago, it is easy to believe that the industry appealed only to a nondescript element of the population and there was not the opportunity for anything like the facilities that we see in common use today. We may well shudder to think of the severe underground work performed by women in the old coal mines of Britain. Their tasks would be put today under the heading "cruel and unusual," and the men indeed were little better off, for such work as carrying coal in baskets up crude ladders lining a shaft may well appall the workingman of today, who insists upon no more than eight hours of work that is none too severe. Even the employment of dogs today in such underground work as then prevailed would call forth protests from a certain society with a long name.

How little the industry was esteemed may be gleaned by a few lines taken from Adam Smith's celebrated work on "The Wealth of Nations," the great classic among economic writings. This was written, I might say, at Kircaldy, whence (including Methill) the largest export of Scotch coal is now made. Professor Smith stated: "Coals are a less agreeable form of fuel than wood, and they are said to be less wholesome. The expense of coal, therefore, at the place where it is consumed must generally be somewhat less than that of wood."

Thought Coal Could Not Compete at a Distance

The production of distant coal mines can never be brought into competition with one another. He, however, condemned the duty on their exportation, which was then in most cases more than the value of the commodity at the pit, or even at the shipping port, on the ground that it is always inexpedient to restrain the export of "the instruments of trade."

Charles Dickens made light of the coal trade as the last resort of the unsuccessful man, and even our own Chauncey M. Depew, in later life identified with coal companies, in one of his earlier addresses supported in a measure the Dickens view of the coal man. Also, the railroad people of the early days were slow to see the possibilities of coal as a traffic producer. At the time of the English coal development—and, as you all know, it was in that country that the mining of coal first became an established industry—shipments were made largely by water, short tram roads affording access to navigation.

Even when the railroad era was well under way coal was not considered in the light of legitimate traffic, though a supply of it was provided at terminals for locomotive purposes. It is one of the traditions of the English trade that when a pioneer coal-mining company made application for a freight rate on coal the officials of the road approached were so much surprised at the novel proposition that they submitted it to the board of directors, causing one of these worthies to exclaim with astonishment and indignation: "Carry coal; next they'll want us to carry dung!"

Presuming, then, that the coal trade as an important industry started with the utilization of steam power on a large scale, it ranks as distinctively a modern enterprise, and considering the relatively short period of its growth the achievements have been remarkable. Statistics show that the coal tonnage of the world approaches a billion and a half tons a year, while the tonnage of the United States alone is over half a billion and growing at such a pace as to be pretty certain of passing the billion mark ten years hence.

The Great Importance of Coal

Whenever there is a stoppage of industries or public utilities by scarcity of coal it is indeed a calamity. Fortunately, there has never been at any time a shortage of coal of such degree as to interfere generally with public utilities, and probably only a failure of food and water would compare with an actual coal famine. In fact, in many localities absence of a coal supply would in itself speedily cause a water famine in view of the constant pumping that is requisite to meet requirements, while the food supply of cities would be exhausted in a few days, for without coal no trains could run, no steamboats ply our lakes and rivers.

With all means of transport devoted to the single matter of keeping the populace alive, and, of course, that would be the first requirement, there would be no transit facilities available for mail service and any journey, however important, would have to be deferred if it could not be performed on foot. All our electric service not derived from water power would soon terminate, we would have no gas and no oil—not even candles—for such an inconvenience as darkness, with all its evil potentialities, would have to be endured while all efforts were made to expedite the carrying of the most necessary articles of food to starving cities. In some places a catastrophe would develop through the absence of power by which to dispose of sewage and indeed the opportunities for misadventure might be narrated at such length as to tax your patience.

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*Editor, "The Coal Trade Journal," New York.

Note—Abstract of paper read before the joint annual convention of the M. O. I. Coal Association and the Kokoal, at Cedar Point, Ohio, June 17, 18 and 19.

With the development of the business many of the shortcomings of the past have been remedied, and today coal is produced for the most part at mines equipped with mechanical installations representing great fortunes. Without these equipments the tonnage required could not be turned out. And in the transportation and in the retail distribution of tonnage great investments are to be seen at every hand. The trade is becoming a business of large units and the conditions as regard capital investment, the safeguarding of market interests, and so on, are such as to cause it to become a business of relatively few factors. Consolidation is eminently the order of the day. In the anthracite field, in the Pittsburgh territory and elsewhere we have seen mining companies merged into large organizations, and in the retail trade a similar development is in progress.

The Retail Trade

Originally, it would seem, the retail distribution of coal was taken up as a personal enterprise by a man with a horse and a cart—a business descendant, as one might say, of the old-time carman with his long jacket or leather apron, who distributed wood throughout the Eastern cities. But the circumstances of the times, to narrate which would take more time than I have at command, have operated steadily in favor of the concerns with large facilities and capable equipment. The mere matter of being required to take care of 50-ton steel cars that are becoming the standard railroad vehicle has made demands upon the retail trade which have had a conspicuous effect upon the personnel and the general type of the coal yard in towns and cities.

So while the number of people in the coal trade is probably not increasing, they are all becoming more important business factors, collectively, and as such will make their mark in the community and be more highly regarded than the one-horse operator and the one-horse dealer ever could be. This will redound to the advantage of the trade, for the big business enterprise is pretty sure to command respect when properly managed. And surely there is little to complain of with regard to the management of the coal trade so far as the public welfare is concerned. Far and wide coal has been sold at a price representing a very small margin of profit to anyone engaged therein.

Substitutes for Coal

Having achieved its present position, it is practically certain that coal will continue to grow more important, both with regard to the volume of tonnage and its recognized place in the community. One could scarcely go so far as to say that no substitute for it will be discovered, but certainly there seems to be nothing in view at the present time. Oil is frequently alluded to as a rival fuel possessing great possibilities, but as a matter of fact the whole oil production is not equivalent to more than the annual increase alone in soft-coal requirements. Any changing of large classes of steam users from coal to oil would cause such an increase in the market price of the latter as to quickly eliminate all possibilities of economy save in exceptional cases.

Natural gas has played a large part in certain sections of the country roundabout us, but I need not remind those of you who come from the natural-gas towns what a difference there is in the gas situation today compared with the situation 20 to 25 years ago. The limitations of the supply are only too evident.

Therefore, as the country develops and modern conveniences and improvements are introduced in one place and another, more steam power becomes necessary and more coal is called for. In fact, it might be said that the possibilities of the trade are such as to give pause to the most heedless. The growth to a billion tons and more which I have referred to as something to be anticipated ten years from now, signifies two billion tons output a little more than 20 years hence, for the growth is at the rate of nearly 10 per cent. a year. Recent progress has accomplished this, notwithstanding the setback following the 1907 financial difficulties, and there is no prospect of this growth being suddenly checked or impeded. Such slowing down in the rate of increase (as distinguished from the absolute increase) will, no doubt, come about gradually.

Looking into the Future

There is lots of coal, but so far as regards the accessibility of tonnage convenient to the Eastern and Middle Western states, so far as regards its availability with respect to men to dig it and cars to carry it, the supply is by no means so superabundant as to cause coal to be lightly regarded. In fact, I venture to say that with the demands of the country approaching a billion tons a year, and later two billion tons, the coal man will be looked up to with a great deal of respect and it will be thought that he is accommodating the public in furnishing fuel, for as the years go by the important, all-essential merit of an adequate coal supply will be better recognized than it is today, now that we are scarcely more than emerging from the crude and plentiful era of the industry.

With such facts before us, with a future perhaps better assured than any other trade has, since the control of the industry rests definitely with the comparatively few owners of large coal areas, should we not all consider this a great industry that we are connected with?

I have pointed out to you that the change in railroad equipment has been a factor in improving the individual status of the retail dealer, and with the growth of the trade in general we may expect to see the best minds in our several communities giving attention to the coal trade and having no hesitancy, as they did in past years, with regard to being connected with something once looked upon as a dirty, dusty enterprise of slight importance.

It is well known that some of our greatest capitalists are among the investors in coal properties. Banking interests in all the coal-producing centers have been quick to recognize the prospective value of coal lands. Steadily the business is getting into better, firmer control, and I venture to say that the time is not far distant when practically throughout the year the buyer will have to seek the seller, and surely such a condition will serve to convince us, if we are still reluctant, that coal is an important article, that it is the all-essential element of progress in this age, and that the industry which we represent stands second to none in the affairs of the country. I submit this, gentlemen, to your careful consideration. May these remarks prompt you to stand up all the more strongly for the interests of the trade.

Hand Hammer Drills in Shaft Sinking

Special Correspondence

SYNOPSIS—At Nokomis, Ill., hand hammer drills were employed in sinking two shafts. In soft rock the bits tended to bury themselves. Although it may seem paradoxical, greater speed was made when larger holes were drilled. The saving effected over hand work is also shown.

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The Nokomis Coal Co., with headquarters at St. Louis, is opening a new mine on the No. 6 seam, at Nokomis, Ill. At this point the coal is 631 ft. below the surface and is reached by a main hoisting shaft 17 ft. 5 in. by 11 ft. 5 in. inside the timbers, and an air shaft of equal dimensions located 500 ft. distant.

In sinking these shafts, the company employed eight Sullivan air-jet sinkers or hand-feed hammer drills, class DB—19, weighing 40 lb. each, and one Sullivan single-stage, steam-driven air compressor, class WA—3, size 9x10x12 in., providing 174 cu.ft. of free air per min. at a terminal pressure of 100 lb. per sq.in.

It was found that in trying to bore holes in the soft shale with these hammer drills, the tool cut so rapidly as to choke the passage in the bit with muck, stopping the flow of exhaust air and preventing proper cleaning of the drill holes. Hand drilling was temporarily substituted, but on adopting certain recommendations of the manufacturers, the hammer drills worked satisfactorily, and their use was resumed with a marked increase in speed over the hand work.

The change made was in the gage of the bit, which was increased from 2 to 2½ in. on a 3-ft. length, and from 1⅞ to 2¼ in. on a 6-ft. steel. Later on, three steels were employed instead of two, their lengths being 2, 4 and 6 ft., and their gage 2¾ in., 2½ in. and 2¼ in., respectively. It is but natural to suppose that steel of the small gages intended for use in hard rock should travel too fast in soft formations, and in this way give the air insufficient chance to properly clean the drill hole. The wide gages finally employed gave large openings between the wings of the bit and allowed free escape of air around the steel from the center hole.

Power House and One of the Shafts during Sinking

The type of drill above mentioned has a double-grip, push-throttle handle, a cushion valve for reducing vibration, and the exhaust ports are so connected as to permit any desired portion of the expanded air to be discharged through the hollow drill steel to clean the hole of its cuttings. Six-point rose bits were employed.

After passing through the upper capping of hard rock, shale of various degrees of hardness was encountered with an occasional layer of limestone 10 or 12 ft. thick. The rock at times consisted of slaty bands, sandy shale or soft gray material, more like indurated clay than shale.

In sinking through limestone, from 28 to 32 holes constituted a round, the corner holes being bottomed 2 in. outside the line of curbing. As the shafts were timbered throughout, the break lines were 12 ft. 5 in. by 18 ft. 5 in. The holes were 4½ ft. deep and were connected and fired with an electric battery in the ordinary manner. Three 8-hr. shifts were worked, a round being drilled, blasted and mucked out on each shift. Four drillers, four muckers and a shift leader or boss constituted a sinking crew.

The throttle was next fastened open, the air being regulated by the valve on the hose. A device was added for holding the drill steel fast to the tool. These changes enabled the operator to move the drill, bit and all up and down in the hole with the piston running, thus keeping it cleaner and preventing the exhaust-air passage in the steel from clogging with muck, so that the tendency to bury the bit was diminished.

The holes were kept full of water to assist the action of the exhaust air from the drill bit in keeping the cuttings stirred up. The exhaust opening at the top of the cylinder was also plugged, thus enabling the entire exhaust to be discharged through the steel when desired.

These changes gave the following results in soft shale, as compared with hand drilling. Hand drillers using 2¼-in. steel worked at the rate of 4½ ft. per man per hour, or four men put in a round of 54 ft. in 3 hr. With the air drill, four men drilled 18.9 ft. per man per hour, or a round of 54 ft. in about 45 min., thus accomplishing a saving of 2 hr. and 15 min. per 54-ft. round.

Owing to the variation in the time required for shooting and mucking, this increase in drilling speed meant an increase in depth per day of 1 ft., or 4½ ft. per 24 hr., as compared with 3½ ft. per 24 hr., with hand drills.

Sinkers, including drillers and muckers, were paid $3.39 per 8-hr. shift, the shift leader receiving $4, making a total labor cost per day of roughly $93, or $26.50 per foot by hand drilling. The saving by using the hammer drills, therefore, amounted to one foot in each shaft; or $53 per 24 hr. for both shafts.

A Nearer View of the Temporary Headframe

The device for holding the hollow drill steel in the chuck of the hammer drill, as described above, was a home-made affair. A more scatisfactory and permanent device has just been worked out by the makers of the drills, as shown in the accompanying sketches. This consists of a yoke and side rod fastened by means of a clamp on the nose of the tool. A retaining spring is arranged to pass half around the drill steel just below the collar, exerting a spring grip upon it and holding it firmly.

On the upper end of this retaining spring are forged trunnions, which are held in place on the side rod by spiral springs, which exert a constant pressure upon them. When changing steels, it is merely necessary to bear down on the retaining spring, where it half circles the steel, until the collar on the steel can slide past this spring. The spring will snap back into position when released because of the tension on the side-rod spring and the action of the trunnions. The device may be easily removed from the drill by taking out the transverse bolt.

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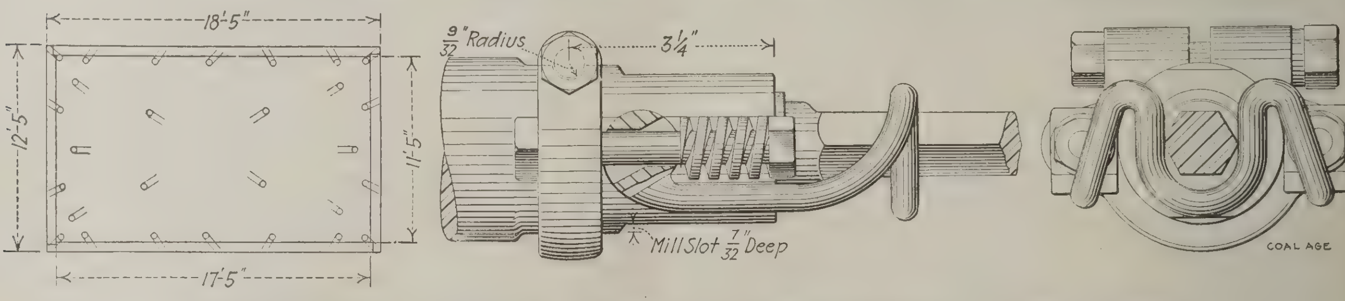
Anthracite both Prepared and Mined

The ignorance of retail coal dealers of the details of the production of anthracite coal has been a subject of comment among the operators since several of the large companies entertained the retailers at the mines in northeastern Pennsylvania recently. The lack of knowledge which the operators chiefly deprecate is in regard to the preparation processes after the coal has been mined.

"It is hard enough to have the general public think that we merely dig the coal out of the ground and sell it at an enormous profit," said one of the operators, "but when we find some of the men who are the intermediaries between us and the general public cherishing the same delusions it is most discouraging. Of course, there is a certain number of them who are well informed.

"Some of them seem to think, however, that we just back up a wagon to a hole in the ground and haul the coal away. Few of them realize that this is a manufacturing as well as a mining proposition, and that 20 per cent. of the cost of mining and preparing the coal is incurred above ground.

"The big breakers in which the coal is prepared cost on an average $200,000 each. In recent years two concrete breakers have been built, each of which cost approximately $300,000. The preparation of anthracite consists primarily of sizing it into the various grades furnished to the retailer and eliminating the slate and rock.



The Bit-Holding Device and Diagram, Showing Location of Holes in Shaft

"The sizing of coal first requires a breaking down of the large lumps by rolls which are equipped with teeth so arranged as to crush the fuel with the production of the least amount of small sizes. Another delusion cherished by the retail dealer is that we can break all of the coal into any size we please. This is not true. The best machinery we have been able to devise produces a large proportion of the small and unprofitable sizes.

"The contents of a car of coal as produced in a mine with heavy pitching breasts consists of everything from dirt to lumps of slate and rock weighing as much as

500 lb. Under the best conditions of mining there is always a percentage of foreign substances. These must be eliminated by the big shakers and by hand picking. After that the coal must pass over screens, down spiral separators and through a water jig before it is ready for loading. The cars are loaded by special machinery, and are carefully inspected before they are allowed to leave the breaker yards.

"In addition to all this, vast quantities of coal of the sizes not marketable during the summer must be stored in order to keep the mines in operation during the dull season. The storage yards range in capacity from a hundred thousand to a million tons. All of this is tremendously expensive, and if the retail operators would only realize that the production is physically limited to from five and a half to six million tons a month, and that it is utterly impossible for us to supply them with all the sizes they want when and in what quantities they order them, it would do much to simplify our relations."

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Farmers' Right vs. Coal Operators' Right in Cherokee County, Kan.

The suit of a farmer vs. a coal operator in Cherokee County, Kan., was recently decided in the Federal Court of Kansas City, and the decision which directly affects 160 acres of land and indirectly more than a million dollars' worth of real estate was decided against the operator.

The suit was an injunction brought by the J. R. Crowe Coal & Mining Co. against William P. Daugherty owner of the 160 acre tract, and his agent William Humble.

Several years ago the St. Louis & San Francisco R.R. sold Daugherty the land, retaining the mineral rights. Recently the railroad leased the coal to the Crowe Co. and this spring the latter started to move a steam shovel onto the land with the intention of mining the coal by the stripping process. Due to the shallowness of the coal measure, this is the only means by which the coal may be secured.

Daugherty objected so strenuously to having his farm ruined that the coal company finally had recourse to an injunction suit. Judge Pollock, before whom the suit was brought, appointed J. S. Dean, of Topeka, Special Master in Chancery, to hear the testimony, report and recommend judgment. His decision was to the effect that the coal company had no right to mine by the stripping process to the detriment of the land.

Fifteen hundred acres of coal land becomes involved by this ruling. Under this area the coal bed cannot be mined by the ordinary process and the operators must turn to stripping. This is a method of which the farmers did not know when the land was leased to the operators, and many of them have been compelled to stand by and see the shovels tear huge furrows across their level acres.

It is now believed that all men who leased their land with the idea that the coal would be mined by the old method, will endeavor to protect themselves. However, since it is believed that the land, after it has been stripped, is much more valuable agriculturally than before, the most stringent action which many farmers will take, will be to require the operators to level down the ground after the coal has been removed.

Pennsylvania Smashes Coke Record

Pennsylvania stands pre-eminent among the states in the production and manufacture of coke. According to the figures of E. W. Parker of the U. S. Geological Survey the quantity of coke produced in the state in 1912 was 27,372,018 short tons valued at $56,054,478. In 1911 the production was 21,923,935 tons valued at $43,053,367. The increase in 1912 was therefore 5,248,083 short tons or 24.85 per cent. in quantity and $13,001,011 or 30.2 per cent. in value. The quantity produced in 1912 was the largest on record, exceeding the previous maximum of 26,513,214 tons in 1911 by 858,804 short tons, but falling behind the earlier year in value by $11,583,546.

As a producer of coke Pennsylvania is relatively of greater importance than as a producer of coal. Including the production of anthracite Pennsylvania contributes less than one-half of the entire output of coal in the United States, while nearly two-thirds of the total production of coke comes from within her boundaries. The state has, however, not progressed as rapidly as some others in the matter of conserving the byproducts of coke making. All but a very small quantity of the state's coke is made in beehive ovens or in those of rectangular sections without the recovery of any byproducts or the utilization of the heat generated in the coking process.

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Increased Coke Production in Alabama

Alabama's output of coke in 1912 amounted to 2,975,489 short tons valued at $8,098,412 against 2,761,621 short tons valued at $7,593,594 in 1911. According to E. W. Parker of the U. S. Geological Survey, the increase in 1912 was 213,968 tons and $504,818 in value.

Alabama retained second place in the rank of coke-producing states in 1912, having superseded West Virginia in 1911. The average price per ton for Alabama coke has declined from $2.82 in 1910, to $2.75 in 1911, and $2.72 in 1912. This does not necessarily indicate an actual decline in the price of coke. A large proportion probably over 90 per cent. of Alabama coke is consumed in furnaces which are owned by the same interests owning and operating the coal mines and coke ovens, and the placing of a value on the coke is largely a matter of accounting. The value per ton of the coke produced in 1912 was lower in spite of the fact that the value of the coal used advanced from $1.28 in 1911, to $1.35 in 1912.

That this state has developed her coking industry along the lines of modern practice is evidenced by the fact that in each of the last three years the only new ovens under construction were those of the retort variety. Moreover during 1912, there were 191 beehive ovens abandoned.

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Petroleum Production in 1912

According to the U. S. Geological Survey the great production of petroleum in 1911, which was 220,449,391 barrels, was surpassed in 1912, when the total reached 222,538,604 barrels. Higher prices were the rule in 1912, except in California, and even in that state there was no material decline. The total value increased markedly, reaching $164,087,342, or 22.41 per cent. above the value of 1911.

POWER DEPARTMENT

A Large English Air Compressor

Special Correspondence

SYNOPSIS—The essential points of efficient air compression with particular reference to the type and placing of valves is first discussed. A new kind of valve is then described as is also a large-capacity machine in which they are employed.

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Although the use of electric power has been a serious competitor with compressed air in colliery work during the last few years, there is a feeling, which has a strong foundation in fact, that in some of the more gaseous mines at any rate, electric power is not as suitable for the work required as compressed air. The endeavors of compressor manufacturers have, therefore, been directed toward the production of machinery which would give the maximum economy in operation.

The Requisites of a Good Compressor

As regards the compressor itself, the conditions which have to be fulfilled are that on the suction stroke the cylinder should be filled with air at atmospheric pressure throughout the entire piston travel. When the compression stroke is made there should be no loss of any portion of the air previously drawn in either by return to the atmosphere or by leakage, but the whole contents of the cylinder, with as little deduction for clearance space as possible, should be discharged through the outlet valves.

Moreover, in a good compressor, the outlet valves should have large discharge area and should open automatically when the pressure in the receiver has been reached in the compression cylinder. These valves should also have sufficient width of seating to insure their being kept tight, so that there be no loss by leakage back into the cylinder; they should be self-adjusting under all speeds and pressures. The piston should be easily accessible for examination and renewal, and wear and tear should be minimized as much as possible.

The key to the situation appears to be in the kind of valve used, inasmuch as leakage during both intake and discharge depends on their design and efficiency. The clearance space is governed by the type and position of the valves and air passages, while excess pressure in both suction and expulsion is directly attributable to their area and durability.

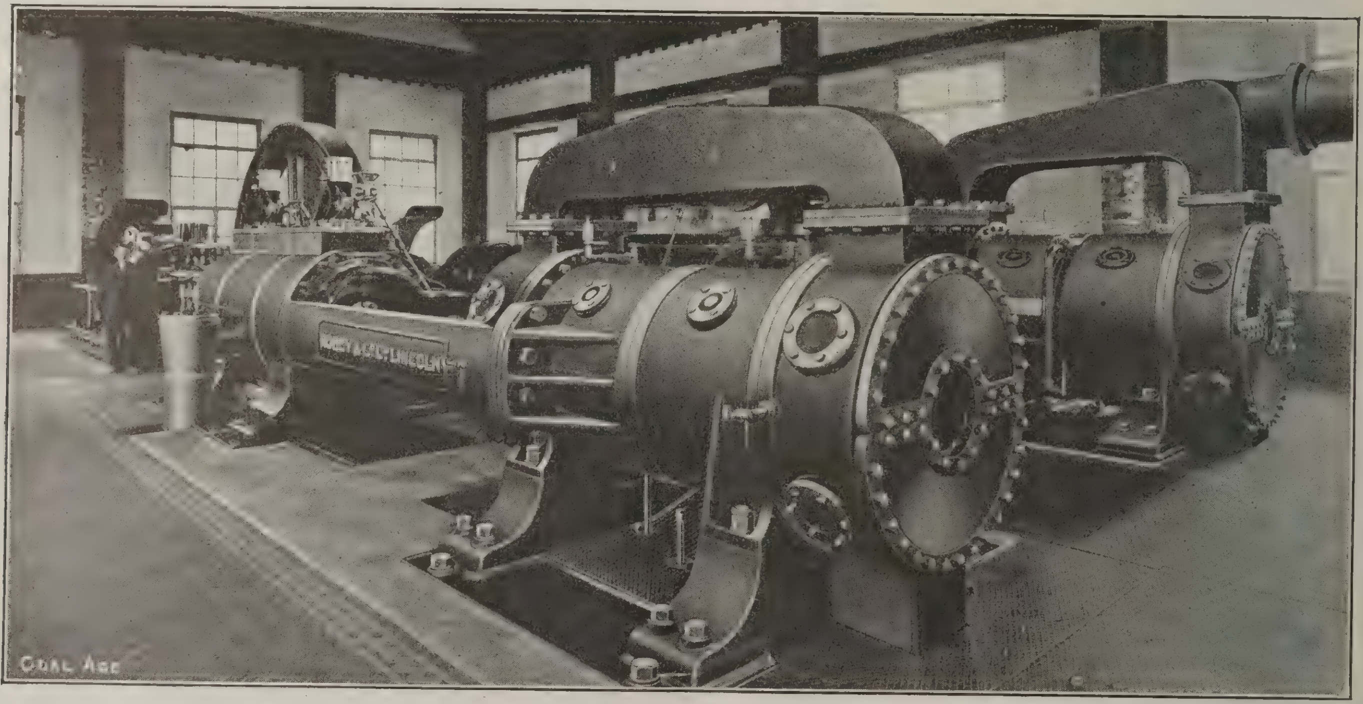

Fig. 1. A 6300-Cu.Ft. Air Compressor, Using New Type of Valve

Examining the valve systems which are adopted in air compressors as made today, it will be seen that these systems fall into series or groups. In the first, poppett valves are used, both on the inlet and discharge. In another group may be classed compressors having large flat hinged valves in the cylinder covers, actuated similarly to poppett valves. Yet another type of compressor has mechanically operated inlet and discharge valves, which open and close by means of direct mechanical connections. Still another modification adopts inlet valves mechanically operated and poppett discharge valves.

The remaining groups consist of compressors using direct air controlled and balanced inlet and discharge valves, which lend themselves to increased piston speed and efficiency, but are somewhat expensive in first cost and have to be maintained in a careful manner; and compressors using light disk valves with a small lift. This latter appears to be the latest word in compressor design, and it may therefore be well to briefly refer to details.

An interesting type of this valve is shown in Figs. 2 and 3, the former showing an automatic disk valve in its assembled condition as made by Messrs. Robey & Co., Ltd., of Lincoln, Great Britain, the latter showing the valve disk itself. The inlet and outlet valves and their seats are complete in themselves and are secured to the cylinder by means of three lugs. The seating is a metallic contact joint and can thus be made and broken many times without damage. The valves are multi-ported, thus requiring only a small lift. They are therefore silent in action and practically free from wear.

As seen in Fig. 3, the valve disks themselves are corrugated, and, being made from special mild steel they are extremely strong and elastic. They are held in position by coiled springs of square section, fitting into the flanges on the outside and inside edges of the valve, the springs being held at the other end by the guide plate. Hence the valve is pressed firmly into position on its seating, but can move in all directions without the use of guide studs or other supports. It is thus free to seat itself accurately and noiselessly at each stroke, lubrication being rendered unnecessary.

An Illustration of Application

These valves are now being adopted in connection with the Robey horizontal, two-stage air compressors which are coming into considerable use in colliery work. A typical installation is shown in Fig. 1, it being the compressor supplied to the Altofts collieries of Messrs. Pope & Pearson, Ltd., of Normantown. This compressor is capable of handling 6300 cu.ft. of free air per min. when running at 56 revolutions under a boiler pressure of 120 lb. per sq.in. The high- and low-pressure steam cylinders are 27 in. and 46 in. in diameter, respectively. The corresponding air cylinders are 30 in. and 46 in. in diameter. The piston rods are 5 in. in diameter and the stroke is 60 in. The machine is provided with a flywheel of 16 ft. diameter. Between the two air cylinders is placed an intercooler. The cylinders themselves are water-jacketed and fitted with an improved type of piston, which provides for the use of the whole of the depth of the piston body and rings for bearing surfaces.

The control of the engine, while being dependent on the ordinary centrifugal governor, is also carried out by means of the air itself. Should the pressure in the receiver fall, the air governor lengthens the cutoff of the steam valves while if pressure rises it shortens it. The speed of the engine varies therefore with the amount of air required, and the pressure in the receiver is maintained within very fine limits.

The steam drop valve employed on this machine represents the highest class of gear that can be applied to steam cylinders, especially when high pressures and superheating are adopted. The gear is actuated from a lay-shaft driven by skew gears from the main crank shaft. The eccentrics operating the admission and exhaust valves are small, as the work they have to do is light.

Both the admission and the exhaust valves are in equilibrium and as soon as the admission of the steam has been carried far enough to do the work required, the admission valve is immediately closed. The governor, when rising, actuates two cams, which regulate the length of time in which the trippers are in contact.

This gear, controlled by the governor in combination with the automatic air-pressure regulator, insures that the supply of air is kept constant without waste and without attention on the part of the driver.

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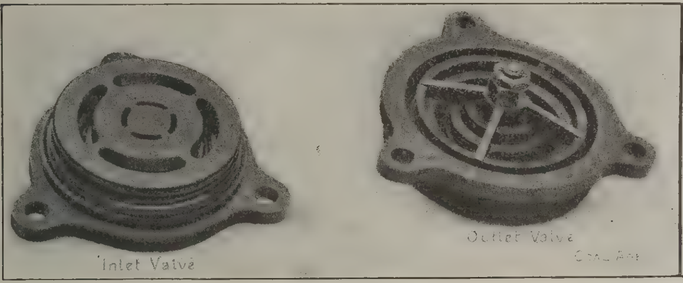


Fig. 2. Assembled Valve

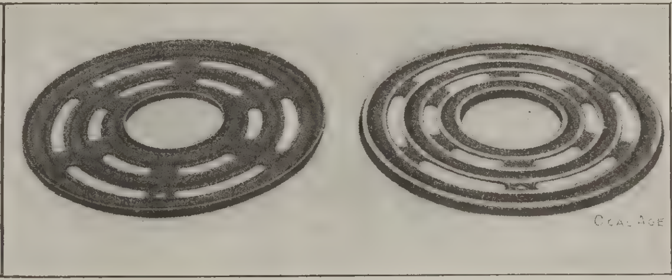


Fig. 3. Steel Valve Disk

The Ball Bearing on Locomotive Armatures

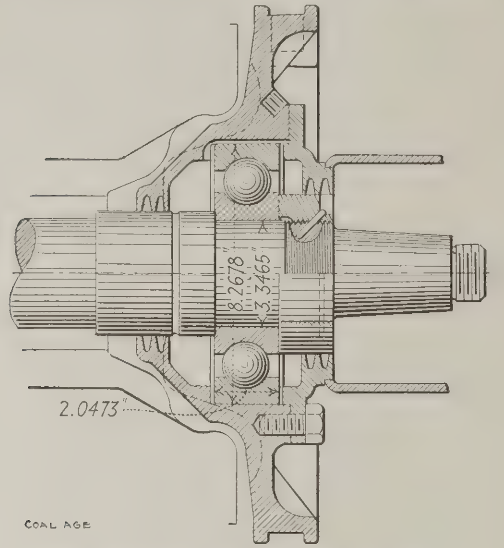
From their use in bicycles and automobiles there are but few people who do know something at least of ball bearings and their application. But compared with the present-day development of this device the bicycle bearing of one or two decades ago was an extremely crude and inefficient affair.

The general impression regarding this type of journal is that its use is justifiable only where a great reduction in friction is necessary or desirable. This may or may not be the case. Other considerations and characteristics may enter into the selection of a ball bearing which are vastly more important than a lessening of resistance to rotation.

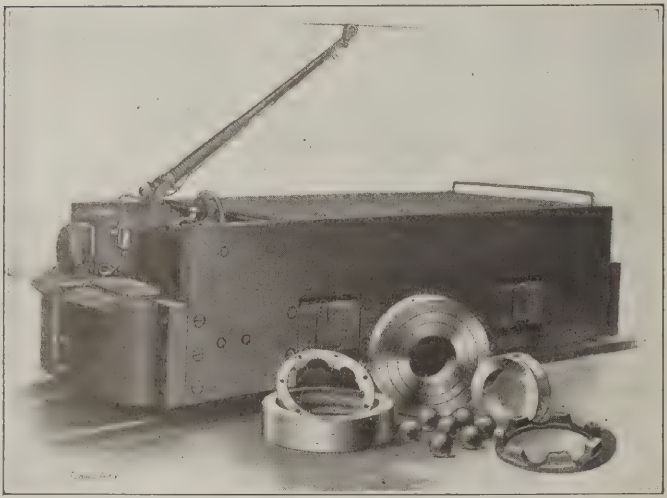
It has been now about five years since the Jeffrey Mfg. Co., of Columbus, Ohio, placed the first ball bearing upon the armature shaft of one of their electric mining locomotives. So satisfactory were the results obtained, not so much because of any reduction in friction as from the standpoint of durability that at the present time ball bearings are the standard journal for all armature shafts upon this company's mine motors. Other manufacturers of this class of machinery also are rapidly adopting this means of armature-shaft support.

There are two principal advantages gained in the use of this type of bearing upon armature shafts. First the wear and consequent lowering of the armature toward the pole pieces is practically a negligible quantity. The armature is consequently at all times subjected to a uniform action from the field.

The second advantage is perhaps less immediately apparent, although it depends upon exactly the same cause. The armature pinion and gear with which it meshes are carefully machined. Their efficiency in power transmission therefore largely depends upon the accuracy with which they mesh. If a bearing wears rapidly this allows these gears to spread apart and their center lines to recede, allowing excessive backlash, which causes the gear teeth to wear rapidly at or near the point giving rise to the grinding sound so well known by those familiar with this type of machinery. This improper meshing soon cuts out the pinion and renders frequent renewals necessary. The ball bearing removes the cause of this trouble.



Cross-Section of Pinion Bearing of Armature Shaft



Mine Locomotive and Enlarged View of Armature Bearing

The Hess-Bright Mfg. Co., of Berlin and Philadelphia, have perhaps done more toward the commercial development of the ball bearing in this country than any other one firm. In the construction of their bearings a high-grade composition steel is used for both balls and races. This material requires a heat treatment exactly similar to the "silver steel" so well known in this country and employed in the manufacture of edge tools for cutting both wood and metal. The hardness and toughness of this steel in the finished state is well shown on crushing test. When three 1-in. balls are placed one above the other between the stationary and moving heads of a Riehle testing machine they withstand between 65,000 lb. and 70,000 lb. before failure. Furthermore, when finally split by this enormous stress the fracture shows an extremely fine, silky texture such as may be seen in the best of steel springs or edge tools. This size of ball is that ordinarily employed on the pinion end of a 15-hp.-motor aramature where the bearing is subjected to a maximum working load of 1400 lb. It will thus be seen that the factor of safety is extremely high.

It is probable that this high factor of safety has had much to do with the good results obtained with these bearings when given even reasonable care. An operating company in the bituminous region of Pennsylvania some years ago purchased some very heavy locomotives equipped with plain or ordinary bearings. In the first year's operation this firm spent $760 in repairs to two machines, all of which was directly traceable to armature-bearing wear or failure. Ball bearings were then substituted for the plain ones with the result that in the ensuing year not one cent was expended for armature repairs.

The use of ball bearings in heavy industrial machinery although demonstratedly practical is as yet relatively only in its infancy. Nor is it strange that among engineers, mechanics and locomotive drivers generally there may be found many skeptics and men "from Missouri." In the face of such an experience as that given above—which has been related because it was typical—there is but one conclusion that may be drawn.

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The Steam Turbine in Mine Pumping

The peculiar adaptation of a well designed steam turbine to mine pumping is worthy of careful consideration. The essential characteristics of a mine pump are, simplicity in construction and operation; durability of all working parts; and compactness and efficiency.

The centrifugal pump, unquestionably, combines some of these features to a remarkable degree. It is compact in size and when well designed is simple in construction and durable. It possesses the marked advantage of continuous action, in contrast with the reciprocating motion of pumps of the piston or plunger type. The construction of the centrifugal pump admits of its being directly connected with an electric motor or steam turbine, which feature alone insures no loss of power between the motor and the pump. The continuous action of the pump eliminates the question of water-hammer.

The turbine, also, possesses features that recommend it particularly to mining use. It requires less steam than a direct-acting reciprocating pump of equal power. It possesses an advantage over the electric motor, in being free from injury by dampness. This is an important feature in mine work. The statement is made that a low-pressure turbine-driven centrifugal pump can frequently be installed in conjunction with suitable condensing apparatus to operate on the exhaust steam of the power plant, which would mean a saving in power.

In the selection of a steam turbine or a centrifugal pump, for mine work, it is extremely important to give due regard to the detailed construction of each machine as being such that the working parts are easily accessible and that all parts subject to wear or corrosion are readily replaceable.

EDITORIALS

What about Ohio?

During the past year, developments in Ohio, in respect to state government, have assumed some proportions. Things have been doing that keep one guessing as to their ultimate outcome. That the pronounced changes growing out of recent enactments by the legislature are in the nature of an experiment, none can doubt, and the result will be watched with interest.

Probably the most important and far reaching in effect, of the many bills before the last legislature, is Senate Bill No. 137, passed Mar. 12, and approved by Gov. James M. Cox, Mar. 18, 1913. This is a bill creating the Industrial Commission of Ohio, superseding the State Liability Board of Awards, abolishing the departments of Commissioner of Labor Statistics, Chief Inspector of Mines, Chief Inspector of Work Shops and Factories, Chief Examiner of Steam Engineers, Board of Boiler Rules, and State Board of Arbitration and Conciliation; and merging certain powers and duties of said departments in and transferring such powers and duties to the said Industrial Commission of Ohio. Besides granting the commission certain other powers, the bill has repealed 38 sections of the General Code and modified seven other sections.

The enactment provides that the Industrial Commission of Ohio shall be composed of three members, to be appointed by the governor within thirty days after the act goes into effect. The first appointment under the act, will be one commissioner for two years, one for four years and one for six years; and, thereafter, one member of the commission will be appointed biennially, for a term of six years. Not more than one of the persons so appointed can, by previous vocation, employment, or affiliation, be classed as a representative of employers; and not more than one, a representative of employees; and not more than two of the members of the commission shall belong to the same political party.

This act of the Ohio legislature goes into effect Sept. 1, 1913. In accordance with its provisions, Gov. Cox has appointed the following named persons to constitute the commission: Wallace D. Yaple, Chillicothe; Thomas J. Duffy, East Liverpool; and Prof. M. B. Hammond, Ohio State University, Columbus.

The act provides for the removal by the governor of any member of the commission for inefficiency, neglect of duty, malfeasance, misfeasance, or nonfeasance, in office. No commissioner shall hold any position of trust or profit, or engage in any occupation or business interfering or inconsistent with his duties as commissioner, or serve on any committee of a political party. The commissioners are to receive each an annual salary of $5000, subscribe to the usual constitutional oath of office, and give a $10,000 bond, approved by the governor.

It is further provided that, within thirty days after the act goes into effect, the commission shall meet at the seat of government and organize by choosing one of its members as chairman; the majority of the commission to constitute a quorum to transact business, and no vacancy to impair the right of the remaining commissioners to exercise all the powers of the commission.

The scope of the commission is shown by the following:

> Sec. 11. On and after the first day of September, 1913, the following departments of the state of Ohio, to wit: Commissioner of Labor Statistics, Chief Inspector of Mines, Chief Inspector of Work Shops and Factories, Chief Examiner of Steam Engineers, Board of Boiler Rules, and the State Board of Arbitration and Conciliation shall have no further legal existence; except that the heads of said departments and said boards shall, in ten days after the said date, submit to the governor their report of their respective departments, for the portion of the year 1913 during which they were in existence; and, on and after the first day of September, 1913, the Industrial Commission of Ohio shall have all the powers and enter upon the performance of all the duties conferred by law upon the said departments.
>
> Sec. 12. The Industrial Commission shall supersede and perform all of the duties of the State Liability Board of Awards. . . . etc.

The State Liability Board of Awards was provided by Act of General Assembly, May 31, 1911, to administer the state insurance fund for the benefit of injured workers and the dependent survivors of those killed in the performance of their duties, in industrial operations.

In connection with the practical working of the new law creating the Industrial Commission of Ohio referred to above, several grave questions present themselves that the future alone will determine. The wisdom of committing so large a portion of public trusts and interests to the charge of three individuals is yet to be proven. While such a concentration of power will undoubtedly be beneficial in a supervisory sense, there would be *positive danger* in the abolishment of the offices of the heads of the several state departments whose responsibilities demand an intimate knowledge and acquaintance with the work of the department. We understand that, for the most part, these departmental heads or chiefs, though deprived of their titles, will be retained in charge of their respective divisions.

In the opinion of Coal Age, good results can only be obtained, in mine inspection, by organization of an efficient corps of inspectors under a Department Chief, who in turn is held accountable to the governor or a supervising commission. We do *not* believe any commission of three members, whatever their intelligence, can assume to personally direct the work of the numerous state departments.

Another question that presents itself is in reference to the legality of this act of the legislature by which it presumes to summarily terminate a state office, though only appointive, during the term of its incumbent.

There is grave doubt of the legality of any enactment of legislature that curtails or limits the will and voice of the people. On this account, we may seriously question the legislative right to abolish, by enactment, any *elective* office, during the incumbency of a regularly elected officer. In respect to an *appointive* office, as in the Ohio cases, however, the illegality of such enactment is not as clear, but is debatable. The office of chief mine inspector is an *appointive* office.

The legislature is an instrument of the people and, as such, is subordinate to the will of the people. The creature is never greater than its creator. Many will question if the *appointments* of an officer elected on a certain platform, are not as much the expression of the will of the people as the officer elected. This is an open question.

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That Mysterious Physician

The remarks of the physician which recently appeared in our columns regarding the American Mine Safety Association, have created some little unfavorable comment. It has been thought by some that it is inexcusable that *anyone,* without making his name public, should criticise, an association having such a laudable purpose, but we cannot feel that he is unentitled to his incognito.

The "physician" attacked specifically the constitution of the advisory or executive committee on first-aid methods on which the duty of accepting or rejecting new dressings, which may be offered in any field contest, is imposed. This committee was to contain two first-aid men, two operators, two physicians and one representative of the Bureau of Mines.

In the end, this body was not formed according to the recommendations of the committee on first-aid methods, it being left to the executive committee proper to make its own selection. But we are obliged to take up the cudgels for this unnamed physician and defend him against the suggestion of Dr. Rountree, who characterizes him as "a person ignorant of the facts or else intentionally misrepresenting them." The unknown author of the article depended on Coal Age for his information and this journal was misled into publishing the statement as it was furnished by the American Mine Safety Association, several days after the meeting closed. In future, we shall be more careful and not rely so confidently on uncertain sources for fear the parent may fail to recognize its own child.

Even Dr. Knoefel, the chairman of the original committee on first-aid methods carefully avoids admitting that his committee introduced resolution 27, which proposed to put laymen on the board appointed to discuss first-aid methods. He fails to state that he rose to object to the submission of this specific resolution to the action of the main executive board, though it must be conceded that his reasons for the objection did not arise from his desire to confer on this subject with the said laymen.

It appears in a later publication that the association did not approve the resolution though the report of the meeting as it reached us overlooked this fact and mentioned only that it was *presented,* naturally leading our "ignorant" friend into a misapprehension. From Dr. Rountree we learn that about two dozen physicians were afterward appointed; 13 more, it is to be noted, than were to be found at the Pittsburgh meeting, in which the medical profession was inadequately represented, the inadequacy being rather in numbers, however, than in quality of representation. The author of that much debated article, "The First-Aid Muddle," probably does not even *now* know that criticisms, such as his, were admitted to be so valid that the committee was entirely rebuilt. How could he learn that fact without being a member of the Committee of Seven, which contains ten members? Though but seven were mentioned in the report of the meeting forwarded to this paper, we see now there is really a decemvirate in control of its destinies. A belated bulletin has cleared up this difficulty among many others.

Whatever was the constitution of the final advisory committee, the fact remains that the first body on first-aid methods did contain several laymen: E. B. Sutton, W. A. Raudenbusch, W. D. Roberts, Atherton Bowen and J. E. McDonald. We do not think that the committee was the weaker for these lay members, but a physician might feel that such men should be excluded and surely he is permitted to say so without giving his name.

The physician judged the committee incompetent because it ordered that the Sylvester methods were to be approved in all cases, unless an injury made their use inadvisable. Trained physicians and physiologists know that the "tidal" air passing in and out of the lungs is greater when the Schaefer method is employed than when the Sylvester treatment is practiced and they believe there are six or seven other arguments against that method of operation, and, as the unnamed physician states in his article, an important body of surgeons and physicians has given the Schaefer method preference.

The critic also judged the reliability of the association by its rating of demerits. We, ourselves, cannot understand how aseptic treatment can be so important as the members at that meeting appeared to deem it, and we know physicians who agree with that view. The hands of the first-aid man in the mines are sterilized with acids and alkalis and at worst they are not likely to be more harmful than the dirt ground into the wound. The air itself is sterilized by mine gases, falling moisture and cooling and tetanus almost never sets in as a result of mine injuries.

Grossly septic treatment is not likely to occur at the hands of trained men. We hardly believe that the first-aid man at a meet will remove a tobacco quid from his jaws and revert to the barbarisms of the past. But if a helper should pass a hand, supposedly sterilized by mine acids, over the face of a bandage, we agree with the "physician" he has not done the patient five times as much harm, as another man who, by wrongful methods of respiration, has permitted a victim to perish under his charge. Because he has pointed out this folly, the unknown "physician" has been the butt of criticism which seems to us by no means fair. Almost any part of first aid can be done so badly as to entitle the team which is guilty of it to 10 demerits or even total disqualification.

The Bureau of Mines and H. M. Wilson are to be commended for the forming of the association. It cannot at once attain to the position in which it will ultimately stand, but we think that if it is not querulous under criticism, it will grow in strength and in numbers. If at its start it may have put the cachet of its approval on the wrong treatment, if it has made the judgment of a few appear as the counsel of the many, if it has unsettled some minds which argued that first aid was a shallow study on which at best 200 pages could be written, no one should be discouraged.

The American Mine Safety Association is experiencing the trials of the beginner. The student who finds he has been wrong, that there are several mathematical solutions of the same problem, that quadratics do not end algebra, soon plucks up spirit to go ahead with a study which is only the more valuable because it requires judgment, plodding and continued effort.

SOCIOLOGICAL DEPARTMENT

The American Mine Safety Association

By August F. Knoefel*

The May 17 issue of Coal Age contained an article entitled the "First Aid Muddle" from a "Physician." When I read these remarks my first thought was to reply but I was deterred from so doing by the fact that the "physician" was not honorable enough to sign his name to his remarks, but after reflecting upon the matter and realizing that Coal Age holds a prominent place in the mining industry and that whatever it presents to its readers is received by them as the fact, I would like to make the following statements.

Need for First-Aid Standards

The American Mine Safety Association had its inception in the crying need for standardization of first-aid methods. The Bureau of Mines, being better acquainted with this need than any other organization or individual, called together last September those who were directly interested. At this meeting plans were laid to bring together officially all those who knew anything about or who practiced first aid and mine rescue. This being the first meeting, all plans and suggestions were tentative until standards could be evolved.

It is rather surprising that a physician would permit himself to be the author of the remarks made in your issue of May 17. Medicine is centuries old, has always been the subject of criticism and always will be. With all the investigations and researches, the treatment of typhoid fever is as variable as the winds. One can go to one hundred doctors and find each treating typhoid differently. If a student would collect the remedies recommended for that disease in the standard textbooks of medicine, he would have an apothecary shop on his hands.

I feel that I am perfectly safe in the assertion that it will not take the American Mine Safety Association nearly as long by several hundred years to standardize first aid. The St. John's Ambulance Corps was not established in a year or its methods evolved at one meeting of two days' duration.

Surgeons Do Not Practice First Aid

As to the need of the advice of leading surgeons, it may be replied that there are but few surgeons with all hospital facilities at hand who could apply a triangular bandage neatly and properly. The practical suggestions will come from those whose daily occupation is at the mine and at the scene of the accident. The purpose of first aid is not to make a surgeon or a hospital attendant out of the coal miner, but to teach him what are suitable, efficient and safe dressings and to instruct him as to what he should not do.

The matter of standardizing first-aid methods and dressings was not referred to the committee mentioned but to one made up of surgeons, these being men who are not only acquainted with the work but also practice it. This is the class of experts who will receive and pass upon all suggestions. To do this intelligently will take time because all proper investigations will have to be made and evidence produced as to the worthiness and efficiency of the methods adopted. Nothing will be rejected which will promote the ends sought, and anything adopted must be simple, yet efficient.

Bacteria of the Mouth

As to remarks upon asepsis, the writer evidently has overlooked that there are numerous forms of infection, and because you have one form of bacteria present there is no reasonable excuse for adding another of a different type. It is a common procedure among miners to use a quid of tobacco upon a wound. Within the last month I attended a miner who adopted the above treatment upon a laceration of the leg with the result that he had an infection from bacteria such as inhabit the mouth and was incapacitated five times longer than if he had not adopted this treatment. It is such instances as these which lead the instructors to impress on their students the need of asepsis.

The value of the Schaefer method of resuscitation will receive from the committee appointed the consideration it deserves. All the association asks is the assistance of all parties interested, and I trust that those who differ from its views will make them known in an honorable manner. Furthermore, if they are vitally interested as I believe the writer of the article on "The First Aid Muddle" is, let them attend the next meeting in September and add their opinions to ours.

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*Member of the Executive Committee, American Mine Safety Association; mine physician, Vandalia Coal Co., Linton, Ind.

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Occupational Schools

The annual report from the Lost Creek school of the Lehigh Valley Coal Co. shows that the school held 140 sessions between Sept. 9, 1912, and June 10, 1913, and the number of students increased during this time from 72 to 113. Since the school opened 191 students have been enrolled. This year an average attendance of 29 was maintained. Twelve of those instructed were not in the employ of the Lehigh Valley Coal Co., and seven were not engaged by any of the mining corporations. Since the beginning of the school in 1910 two students have been granted mine foremen's certificates and fifteen have qualified for assistant mine foremen. The number of students who have partly completed courses is 153, and 102 final certificates have been granted.

There were 143 sessions of the Centralia school, and the number of students increased from 143 to 209. Eighteen of the students were in the employ of other coal companies, and twelve were not employed by any coal corporation. The average attendance this year was 35. Since the opening of the school in 1910 twelve students have been granted mine foremen's certificates and sixteen have received papers qualifying them to act as assistant mine foremen. The number of students who have partly completed their various courses is 74, and 32 final certificates have been granted.

The Michael Lavelle Burke Gold Medal for the student of the graduating class at Lost Creek who attains the highest proficiency in his studies was won this year by Patrick J. Kelly. This solid gold medal is given by the E. J. Burke Co. in commemoration of the son of Edward Burke, a former employee of the company. Edward Burke is well known as one of the pioneer miners of the Packer collieries.

The Commissary: Its Indispensability and Purposes

By B. F. Roden*

SYNOPSIS—The commissary serves the lawful interests of both operator and employee and should not be discontinued. It should not, however, be used as the main source of profit while coal is sold at less than actual cost.

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The commissary is a legitimate department of the mining business, a species of byproduct in the process of mining. A mining company has a right to enter into the business of selling necessities and luxuries to the population assembled and maintained as a result of its industrial developments. There is no reason why these profits should be turned over to outside parties; but it is quite essential that the store operated by the employer should be properly conducted. A high standard of quality should be maintained.

Dishonest Merchandise

Canned goods may be purchased which have been packed with water at a lower price than is asked for a standard quality of goods with the proper proportion of solids to the can. A 3-lb. can of tomatoes does not always contain an equal amount of the vegetable. Sirup is supposed to consist of cane sugar and molasses, but a cheaper article may be sold composed of a mixture of the latter with glucose. Pickles and other canned goods may be packed with preservatives which are injurious to health, and vinegar may be manufactured with a barrel, a hose and some acid, but commissaries should not handle such goods.

Dry Goods Department

Grocery Counters and Shelves

The Alabama law specifies that all food stuffs sacked in the state shall be of full weight, but the same merchandise can be purchased across the state line packed in 70- or 80-lb. sacks, and they can be sold as containing 100 lb., if the merchant sells by the sack and makes no statement as to the weight which a sack is supposed to contain. Off-grade, damaged or remanufactured goods such as redyed ribbons can be sold as first-grade merchandise. Second-grade cloth can be palmed off as first. Poor thread, and shoes with parts of cardboard instead of leather, treated meats, and "all-wool" clothes which are three-quarters shoddy can be made to pass muster as good materials and the public can be fooled into the belief that it is securing first quality or goods at cut prices. While this dishonesty is common in the open market the commissaries are usually above such tricks.

All the Public Will Stand

Commissary customers should receive full weight and good value, and every sale should be made at a reasonable profit above the cost of handling. Reasonable profit is a flexible term and depends on the disposition of the man using it. But the limit is certainly not to be placed as high as "all that the customer will stand." Miners, like operators, do not feel well disposed when they find they have paid a price for merchandise higher than they would have been charged for the same article elsewhere.

The Roden Store Has No Show Windows

A department store rarely handles groceries, as little profit can be made on these staples. The commissary trade is largely in such articles and so some profit must be made on them if any is to be obtained.

Courtesy from clerks should be enforced in the commissary as much as in a store which is dependent on the trade of the general public. Because the clerk has a cleaner job, his work is not in any way more honorable. He is employed to sell and not to comment on the customers. Some miners have been farmers and small dealers or have been in other lines of work, but they have engaged in mining because it is more profitable. They have accumulated savings, have education and breeding, and the commissary clerk has no reason to believe he has any measure of superiority.

But, as an excuse for the brusqueness of the store clerk, it must be remembered that business is confined mostly to the early morning and the late forenoon. The trading is done in three or four hours, and in the rush that results, impatience which engenders ill-feeling often arises.

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*President and general manager, Roden Coal Co., Marvel, Ala.

Note—Abstract of article read before the Alabama Coal Operators' Association at the session held July 26, at Marvel, Ala.

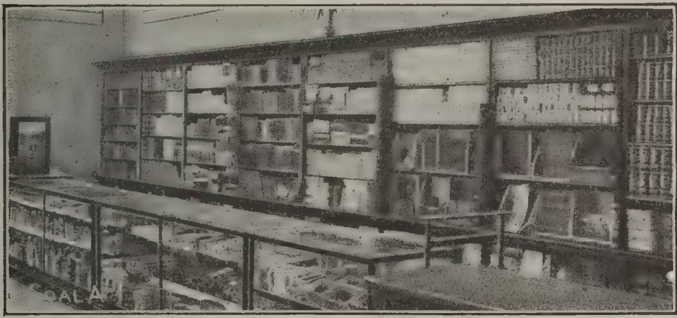
The Interchangeable Store Check

The practice of paying off daily in store checks which are redeemable on pay day, is bad. It saves some clerical work, but the men tend to spend more than they can afford when the checks are so handy. Moreover many are lost and never redeemed. When this scrip is exchangeable, it promotes drunkenness and gambling.

The operator owes it to the public to abolish the interchangeable store check, which may be sold to the speculator for 60 or 80c. on the dollar. With it the storekeeper can purchase goods in the store, selling them at prices below those at the commissary. The effect such sales have on the minds of the men is easily realized; they cannot understand how an outsider can sell for cash at a price considerably below the commissary store and yet make money. The interchangeable check is also a boon to the bootlegger.

At some mines, the right to buy checks is restricted to the superintendent, store and office force, and they purchase them at a discount to pay their store bills. This justly creates dissatisfaction among those who are not permitted to engage in the lucrative business.

I realize that the boarding houses must have some way of securing their board money, but the use of interchangeable store checks is not the method I prefer. At Marvel, we allow each boarding-house keeper to turn into the office his charges against the boarders. This amount is charged to the men and credited to the boarding-house keeper who can then draw checks bearing their name. In this way he does not accept the boarders' checks in payment and use them in trading at the store.



Drugs, Candy and Tobacco Department

Millinery Section with Appropriate Fittings

Many managers and store clerks claim that they cannot remember their customers' names. This is because they do not wish to take that trouble, and I would recommend that in such cases, the commissary force be changed.

Advantages of the Commissary to the Employee

When a man is improvident or a heavy drinker, though he may be a good worker when sober, the commissary prevents hunger and want. His wife can always draw a check if the man has any credit for time at the office. If there is one pay day or even two a month, his earnings if paid to him in bulk would be spent in a day or two and there would be nothing for the remainder of the month or fortnight. Many wives and mothers declare that the commissary is a blessing to them. The ability to secure food and clothing if the husband works only a few days in the week lessens the loan-shark evil. Much time is saved to the busy housewife by having all the places in which she must shop under one roof.

As a rule, the goods sold in a commissary are of better quality than those to be found in the small competing store. This is made possible by the mining companies buying larger quantities of merchandise each month, thus securing a fresh supply. The small store does not keep perishable merchandise because the profit is small or the business is entirely unremunerative. Thus bread, meats, vegetables, fruits, ice, pure candy, fish and fresh eggs are only purchasable at the commissary.

Of course, some of the companies are near farming districts or towns, and the men can buy elsewhere and do not have to rely on the commissary for such articles. Some of the mining villages are so placed that unless the commissary supplies these articles, the men must do without them. It would be a surprise to some of our city friends to know that the company-store customers often have peaches, watermelons, canteloupes and other fruits and vegetables before they do.

A 30- or 40-Per-Cent. Saving

Commissaries pay no rent, do no advertising, should have no losses on bad credits and have small delivery charges, all of which cost usually from 8 to 10 per cent. of the gross profit. They are thus enabled to sell goods of the same quality at lower prices than competing stores having the same freight rates. These advantages have made the company store so successful that unsuccessful competitors have been great agitators against the commissaries.

The employer gets many benefits from his store. It enables him to become acquainted with the men and by giving them a square deal he breaks down the old idea that the mine owner has no interest in his employees other than the profit he can make out of their labor. The store prices can be made one of the attractions of the town.

How the Commissary Helps the Operator

The garnishment of the goods of the employees would swamp the companies if they did not have their own commissaries to provide the necessaries of life. A garnisheed man is always on the move. He appears to get the habit, and many railroads discharge the chronic garnishee because he cannot be relied on.

Coal should be sold at a profit, and the commissary should not be regarded as the main profit maker. The Federal census report for 1909 shows that the Alabama mines made only 1.5 per cent. on the capital invested. This is a ridiculous return for a business which is so short-lived and hazardous. The same report showed a net profit on other lines of business of from 8 to 15 per cent. It must be remembered that this report did not include any allowance for depreciation on mines or equipment. On the other hand, store profits and house rents were not included in the mine balance. This clearly shows where the profit was made, if any, and I do not regard such methods of obtaining a surplus necessary or desirable.

Salesmanship Is Necessary in Commissaries

The goods in a store should be prominently displayed. Counter show-cases are silent salesmen and big earners. Several trips a day are often saved by having goods in full view, and in rush hours customers may see and select their goods while the clerk is waiting on others. This tends to save the clerk's time.

Do not let your goods get shopworn. Sun, flies, dust and excessive handling consume much profit, as no one wants shopworn goods. Fresh goods are the best sellers, with the result that you are less liable to have odd sizes and old patterns in your stock. Have a clearance sale at least every season, as it does not pay to carry over the majority of season goods. This is particularly important in the shoe department, as styles change and our men are quick to learn which are the latest.

Do not allow the traveling salesman to do your buying. Remember his is the selling end, and his knowledge of the wants of one mining town may not fit another. There are some who are not averse to selling all the store manager will buy.

Padded Inventories

Commissary managers are only human; if the management requires a certain per cent. of profit on each year's business, it is only natural for him to prefer to inventory old stock at full value, than to sell below cost, thus making a poorer showing. Often a new manager finds himself saddled with a quantity of outofdate or spoiled merchandise. If he cleans up this, his first year's earnings may possibly show no profit; yet the owner is the gainer by such bargain sales as this old stock decreases in value rapidly after the first year.

I have known some articles to be kept in stock and on the inventory as many as ten years, at the original cost; when, as a matter of fact, much could hardly be given away. The only remedies which occur to me for these conditions are to have the date of purchase put opposite doubtful articles on inventory, or, better still, to have personal inspection by a competent higher official.

How to Increase Business

Do not look so much at the per cent. of earnings as compared to sales, but lay more stress on the total net profit. Very often a reduction in price will increase the volume of trade, so that there is a greater profit on the year's business. This is the method followed by the department stores. Too many of the goods we sell are staples, and only small profits can be made on them. Consequently a good business man would consider the introduction of other lines of merchandise on which there are larger profits.

Do not ask your superintendents, mine foremen or office force to solicit business. Have it distinctly understood that there is no compulsion to trade in your store. A man's place in the mine must not be dependent, either directly or indirectly, on his trade. It is the better way to encourage salesmanship by keeping separate records of each clerk's sales, and by paying him accordingly. By this method the good men do not have to average with the lazy clerk, and you can weed out the latter. Cash registers both save honest clerks from suspicion and protect the owners from their dishonest salesmen.

Educate your customers, by your prices, to buy in bulk, not for each meal. Do not substitute, and do not let the houses from which you buy foist substitutions upon you. One of the hardest things we had to do was to break our wholesale men from shipping the wrong brand and more merchandise than was ordered.

Let your competitors handle articles for which you have few calls, such as odd-sized shoes. Much money can be tied up in this class of merchandise. Let us all keep open to new ideas and search for new devices which will lessen labor and legitimately increase profits.

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The New Ohio Law

A new law goes into operation in Ohio, Sept. 1, to which we have made reference editorially, in another column. The law makes some sweeping changes in the operation and control of seven state departments.

That the provisions of this enactment are drastic, in many respects, is shown by the following brief synopsis of the powers and authority it confers on the commission, as taken from Sec. 22 of the act; namely:

(1) To appoint advisors, who shall without compensation assist the commission in the execution of its duties. To retain and assign to their duties any or all officers, subordinates and clerks employed in the several departments absorbed by the commission.

(2) On and after the first day of September, 1913, to administer and enforce the general laws of the state relating to mines, manufacturing, mechanical, electrical, art and laundry establishments, child labor, employment of minors, etc., going through the entire list of industrial employment.

(3) To investigate, ascertain and, on and after the first day of September, 1913, to declare and prescribe what hours of labor, safety devices, safeguards and means or methods of protection are best adapted to render the employees of every employment safe and to protect their welfare, etc.; and (4) to fix reasonable standards and prescribe, modify and enforce reasonable orders for their adoption; and (5) to fix and order such reasonable standards for the construction, repair and maintenance of places of employment as shall render them safe; and (6) to investigate, ascertain and determine such reasonable classifications of persons, employments and places of employment as shall be necessary to carry out the purposes of this act.

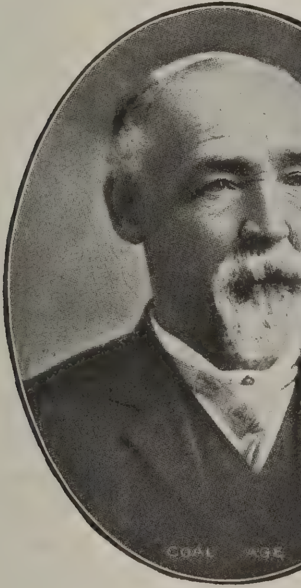
(8) To do all in its power to promote the voluntary arbitration, mediation and conciliation of disputes between employers and employees, etc. (9) To establish and conduct free employment agencies; and to do all in its power to bring together employers seeking employees and working people seeking employment, etc. (10) To collect, collate and publish all statistical information relating to employees, employers, employments and places of employment, etc. (11) To examine and license persons who desire to act as steam engineers, * * * to operate steam boilers, * * * to act as inspectors of steam boilers * * * and to renew or revoke such licenses.

In addition to other specifications, the act provides, for the neglect or refusal of any person to obey any lawful order of the commission or to conform to the requirements of the act, a fine, for such violation, failure or refusal, of not less than $50 or more than $1000, for the first offense; and not less than $100 or more than $5000, for a subsequent offense.

In this connection, we note that a petition has just been filed with the secretary of state, at Columbus, asking for the submission to popular vote, of an amendment providing for a smaller general assembly. The petition proposes to reduce the House membership from 123 to 50, and that of the Senate from 33 to 22, basing the representation entirely upon population. This is the first attempt to amend the Ohio constitution by the initiative and referendum.

Loss to the Coal Industry

Richard Newsam, familiarly known to the mining fraternity throughout the United States as "Uncle Dick," died at his home, Peoria, Ill., early Tuesday morning, Aug. 5. Although Mr. Newsam had been failing in health for somewhat more than a year, it was not but a week previous to his death that his illness became serious. Blessed with a rugged constitution, he had for some time successfully fought the disease that caused his death.



Richard Newsam

Richard Newsam was born Nov. 11, 1843, in Chorley, Lancashire, England. He went to work in the mines when a mere lad. Possessed of a natural genius but limited education, he was essentially a self-made man. He was married in Hindley, Lancashire, England, May 20, 1866, to Miss Frances Wolstenholme. He rose rapidly to the position of superintendent of the mine where he was employed. His ambition early led him to this country, and he arrived in Peoria County, Ill., Sept. 28, 1869. He at once engaged in coal mining, at Kingston Mines, assuming charge of the Lowry mine, as superintendent. Five years later, 1874, Mr. Newsam, with his brother Frank, leased the mine and, later, acquired interests in 16 other mining properties in the same county, thereby becoming the largest coal operator in that section.

Mr. Newsam was indefatigable, and applied himself so diligently that, in spite of his limited education, he became recognized as a leading authority in all coal-mining matters, in his state. He was appointed a member of the State Mining Board, by Gov. Tanner, in 1897, and held that position, being elected as president of the board, until the fall of 1912, when, owing to declining health, he was compelled to resign both this position and that of manager of the state Mine-Rescue Station, which position he had held for nearly a year.

Mr. Newsam spent much energy, time and money in the effort to better the condition of mine workers, and his efforts in that direction had often received recognition in the press. He was appointed by Gov. Deneen to take charge of the rescue work at the time of the Cherry Mine disaster, in the fall of 1909. Immediately following that disaster, he presented recommendations that met with the hearty approval of the governor, and resulted in the early establishment of three mine-rescue stations in the state, at La Salle, Springfield and Benton, respectively.

Mr. Newsam was a thirty-second degree Mason, having joined that fraternity as a member of the Phœnix Lodge, at Mapleton, and later transferring to the Temple Lodge, at Peoria. He was a member of the Peoria Consistory, also the Nobles of the Mystic Shrine. Though the best years of his life were spent in this country, Mr. Newsam never lost the love of his native land, and once each year made a trip to his old home in England. He had crossed the ocean 47 times, returning from his last trip only six weeks previous to his death. He had 13 children, of whom six are still living. He is also survived by two brothers, John and Thomas, who were associated with him in the coal business, and a married sister, Mrs. Martha Harris, Hanna City. Mr. Newsam was buried Friday, at Kingston Mines, which had been his home up to April, 1900.

Telephones for Oklahoma Mines

The Oklahoma Coal Operators' Association, through its representative, Carl Scholz, president of the Coal Valley Mining Company, has awarded a contract for 800 Western Electric mine telephones, with complete wiring and installing material. This is the largest order ever placed at any one time for such equipment.

The various mines, whose operators are members of the association, will be furnished with sufficient telephone equipment to properly safeguard the lives of the miners at work underground. Telephones will be installed in the shotfirers' refuge holes, in entries and shafts, so that constant communication with the offices at the surface will be possible and accidents can be reported promptly, proper aid being sent to the danger point at once. The shotfirers will report their progress according to a prearranged schedule and failure to report from any one refuge hole on schedule time will serve as an indication of a possible accident.

The installation of the large quantity of mine telephones is made primarily as a result of a law enacted a short time ago by the legislature of Oklahoma making it compulsory for operators to equip their mines with telephones. It will, however, undoubtedly be instrumental in increasing the efficiency of supervision as well as safeguarding the lives of the workers.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 9—Mining men everywhere urge safety lamps; inspectors have advocated their use; former mining laws have read, where gas has been discovered, safety lamps shall be used exclusively; records of explosions have been quoted to prove that the use of mixed lights was the primary cause of the explosion; professional and scientific men have declared, with one voice, that the exclusive use of safety lamps affords a great deal more safety than where mixed lights are employed.

During the past three years, while "Safety First" has been the slogan throughout the United States, the bituminous mine law of Pennsylvania has been changed and the standard lowered, from the highest degree of safety secured under the old law, to the questionable safety that the present law affords, by authorizing the manager or foreman, with the inspector's approval, to employ either open lights or safety lamps. It is quite certain that such discretionary power will be used more or less, according to the cry for coal. This is undoubtedly a step backward instead of forward.

In respect to lamps for general work, it seems to me that the safety lamp offers 100 per cent. of efficiency in respect to safety, where the use of the open light materially reduces that percentage. This statement should, of course, be modified according to the amount of gas generated in mines.

It is a fact worthy of note that legislation in some states is increasing the safety of the mines, while in other states the direct reverse is true. This is a serious mistake, and cannot fail to reflect discredit on much mine legislation of the present day. In my opinion, it is an error to replace a law by which the highest percentage of efficiency is obtained in respect to safety, by a law which makes the safety of a mine depend on the judgment of one or two men, or the truthfulness and trustworthiness with which mine workers will obey the mine regulations. To permit the use of open lights, in a portion of a mine requiring the use of safeties in certain other portions or districts, is like courting danger, to see how far one can approach the danger line and still be safe.

For the sake of illustration, suppose a mine is working exclusively with safety lamps; and, after a considerable period, no gas having been discovered, the foreman, with the authority of the mine inspector, discards the safeties and installs open lights throughout the whole mine. After a time, a gas feeder or a clay vein is cut, and gas is generated in quantities not expected or previously known in that section. As a result, an explosion occurs, which the press states was caused by striking "an unexpected pocket of gas"; and this is the reason given for the sacrifice of some 50 to 100 lives. To the public, the accident, which was unforeseen, was unavoidable; whereas, the disaster would never have occurred if the mine had continued to work on safety lamps exclusively. The mine was in a section not devoid of gas, and the risk assumed was too great.

An experience of 27 years in bituminous coal mines, in many positions of greater or less importance, has convinced me that the use of mixed lights is a pernicious practice. It is true the miner is willing to work, and generally prefers to work, with an open light; but the average miner has not the intelligence of the average foreman, and, as a result, the miner assumes many unwarranted risks. In a district where gas is known to exist, there is no certainty of a mine being exempt from its appearance in the workings at any time, although a long period may elapse in which no gas is discovered. The mine may develop gas in dangerous quantities, with little warning.

The use of open lights in one section and safety lamps in another section of the same mine is similar to permitting the use of pipes and open lights in the offices of a powder factory, within the same inclosure as the mill itself. There are no explosive ingredients in quantity in the office, but safety lies in the exclusion from the office and the mill of these elements of danger. The open-light section of a mine bears the same relation to the safety-lamp section that the office bears to the mill, it being often necessary for employees to pass from the one into the other.

In my opinion, safety lamps should be used in most mines whether these are classed as gaseous or nongaseous. By adopting this practice, we follow the slogan "Safety First." The old proverb, "An ounce of prevention is worth a pound of cure," may well be applied in respect to the safety of mine operations.

I have had charge of several safety-lamp mines, and cannot agree with the statement that the constant and exclusive use of safety lamps curtails the output of the mine. On the Monongahela River, in the Pittsburgh seam, the miners produce as much coal per man in the safety-lamp mines as they do in the open-light mines. Likewise, in the Connellsville region, where the coal is coked and mined in a different manner, the miners produce as many bushels of coal per man, in the safety-lamp mines as they do in the open-light mines, and the same is true in the soft-coal regions of central Pennsylvania.

As far as I have observed, the constant use of safety lamps does not impair the eyesight of miners; and in the safety-lamp mines the air is clearer, there being less smoke from inferior oil. Judging from my own experience, I fail to see where there is any excuse for the use of mixed lights in mining if we have proper regard for safety.

R. Z. VIRGIN, Supt.
West Virginia-Pittsburg Coal Co.

Colliers, W. Va.

Letter No. 10—After all that has been written and said with reference to safety in mining operations, the conservation of mining property, and the protection of human life, it is surprising that a number of men, whose position and influence give to their opinions greater weight than is attached to the opinions of men of lesser rank, continue to justify the practice of using mixed lights in gaseous mines, claiming that this, in their opinion, is consistent with safety. Although this practice is sanctioned by law in this state, it is not, in my opinion, an evidence of good judgment; nor do I see how the management of a mine operated in this manner can claim that the safety of their employees is their first consideration.

Referring to the last letter on this subject, written by Joseph Northover, Coal Age, Aug. 9, p. 209, it is my opinion that, while the mine he describes might be operated under the conditions stated, to do so would be flirting with a danger that might entail much suffering, loss of life and property. After a practical experience of 29 years, in the three principal coal-producing states, I have failed to find conditions where I would deem the use of mixed lights, in a gaseous mine, to be consistent with safety. In a field where no gas has been known to exist, mines can be worked with open lights with safety; but, from Mr. Northover's description, I understand he is in a gaseous field where, in my opinion, gas may be expected at any point of the development. While no gas has been discovered on the east side of the mine he describes, there is no assurance that this condition will continue for any length of time.

Besides this, there is another question to be considered before we can be assured of absolute safety in operating a mine with mixed lights. Each mine foreman knows that there is always a possibility of his orders and instructions being disobeyed; or, at least, they may not be carried out, through neglect or carelessness. As long as this possibility exists, my advice is to keep open lights out of a mine operating in a gaseous field. Use open lights only in districts where gas is unknown.

The enforced use of safety lamps throughout a mine where gas is generated in certain portions of the mine, is mentioned as a burden to both the miner and the operator alike. I want to say that if enforcing safety and removing one of the many dangers attending mining operations is a burden, it is right to impose that burden. It would be a far greater burden if disaster and loss should result from any failure to make the mine safe. After using the safety lamp for 20 years, I have failed to find a cleaner and healthier light.

The U. S. Steel Corporation have adopted for their slogan, "Safety the First Consideration," and other companies are carrying out the same principle. Loyalty to this motto will not permit the adoption of a practice that is doubtful, in respect to safety. Such a practice will ultimately become obsolete.

J. W. T.
Brier Hill Coke Co.

Brier Hill, Penn.

The Liquor Problem in Mining

Referring to the remarks of "Subscriber," on this subject, Coal Age, July 26, p. 134, it is unfortunate that he would confine the discussion of the subject to "men in charge of mines." It frequently happens that men who have had the largest experience with this evil are those holding inferior positions to that of the mine foreman or superintendent. The shotlighter or the fireboss, who travels a certain section of the mine three or four times a day, is more liable to be better acquainted with the weaknesses of men, in his particular section of the mine, than is the foreman himself, who may possibly visit each working place once or twice a week. The foreman is very much further removed from the men socially than is the fireboss and has not the opportunity to know the habits of the men and to what extent they exercise self-control.

This correspondent also states that "the drink habit has increased with the advance in wages, if not in proportion to the same." This assertion does not conform to the facts and figures given, from time to time, by government reports, commission reports and the daily-press reports, all of which agree that we, as a people and nation, are gradually becoming more sober. There is no reason to suppose that miners are any exception to this rule. The improvement in the West and particularly in the mining camps, is evident to any careful observer. There are perhaps a few camps that form an exception to this rule, but they do not materially affect the general results.

If, then, "Subscriber" is wrong in his premise that the drink habit is on the increase among miners, he is naturally wrong in his conclusion that this is the result of increased wages or earnings. As a matter of fact, wages have not increased, but have materially decreased in the last decade. I mean by wages, in this sense, the net earnings of the miner, as represented by the food, clothing, shelter, etc., he is able to provide for himself and his family. While it may be true that higher wages are now paid for certain classes of work than formerly, the increased cost of living overbalances the advance in wages received. The average miner, today, expends more labor for the same pay than a decade ago.

In my opinion the liquor problem, in mining, cannot be solved either by the black-list or the certificate plan. A more sane treatment of miners is to deal with them as men in need of education. They must be shown that liquor is incompatible with their best interests. The movement now being made by many of the large coal companies, to provide better housings, more sanitary mining camps, and clean, healthy recreations, is doing much to overcome the evils of the drink habit among their men. I am convinced that these efforts will eventually bring good results in the line of sobriety and clean living, and will pay interest on the capital invested.

W. H. Moore.

Nanaimo, B. C., Canada.

A Hoisting Problem

Since the publication of our answer to the inquiry of John Nelson, Coal Age, July 19, p. 99, asking how to arrange the ropes in a double-compartment hoist to overcome difficulty of one rope being five and one-half in. short and the other 3 in. long, we have received three letters from correspondents, which, for lack of space, we summarize as follows:

It is a common occurrence, in mine hoisting where wooden drums are used, for the ropes to wear unevenly on the two sides of the drum; and this may be Mr. Nelson's difficulty. Assuming such is the case, when No. 1 cage is on the bottom No. 2 is hanging 5½ in. over the "stops" or "wings," at the upper landing; and, again, when No. 2 cage is on the bottom No. 1 is hanging 3 in. below the stops, at the upper landing. In this case it will do no good to lengthen or shorten either rope. For example, to lengthen No. 2 rope 5½ in., so that that cage will hang at the upper landing when No. 1 is on the bottom, would remedy the trouble only for that position of the cages. Then, when No. 2 cage is on the bottom No. 1 cage will be 8½ in. below the top.

The only way that this difficulty can be remedied is by rebuilding the winding drum, by putting on new lagging, so as to make the diameter of the drums equal on each side. Or, the difficulty may be overcome by covering the grooves with one or two thicknesses of canvas, on the side of the drum where the rope is long; or by cutting the grooves a little deeper into the lagging on the other side of the drum, using for this purpose a half-round chisel.

[The letters, of which the above is a summary, were received from Roy Hoswell, hoisting engineer, Toluca, Ill.; Harry L. Packington, hoisting engineer, Granville, Ill.; and A. Q. Davis, Uniontown, Penn. We are glad to have attention drawn to conditions such as described, which occur in daily mining practice. The answer given in reply to the inquiry of Mr. Nelson assumed a perfect condition of the winding drum, or an equal diameter throughout the length of the drum, in which case it would be necessary to lengthen the short rope 2½ in. in order to overcome the difficulty.

In case the winding drum is worn, as mentioned by correspondents, the actual lift may be different for the two cages, for the same number of turns of the drum. For example, while No. 1 cage, referred to above, ascends the length of the shaft except 3 in., No. 2 cage falls the length of the cage plus 5½ in., making the ratio of winding for the two cages 100 ft. — 3 in.) : (100 + 5½ in.). In this case, as stated, no lengthening or shortening of the ropes will equalize the winding.—Ed.]

Waste of Coal

A short time since, I noticed an article on "Waste of Mine Timber," Coal Age, July 5, p. 26. I have recently observed a similar waste of coal, in the conveyors carrying slate to the dump, and in the condemned coal returned to the breaker, to be cleaned. I believe this waste of coal occurs in most of the breakers in the anthracite region and, with proper attention, could be largely avoided.

In many cases, I have noticed a considerable percentage of pure coal free from slate and, again, coal that has not been separated from the slate. This coal is absolutely lost, being thrown out on the dump. Following the condemned coal that is returned to the breaker I have noticed that the men often throw out as much coal as slate. From my observations, there is no small percentage of coal lost, in this manner, which could be prevented by a closer supervision of the work.

In many cases, much coal, time and labor could be saved by recrushing this coal and passing it again through the breaker. This is done in some breakers, but not to the extent that it should in all breakers. There is less waste in the treatment of the smaller grades of coal than in larger sizes.

MINER.

Scranton, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

PHYSICAL PROPERTIES OF GASES

Density of Gases—The term "density" refers to the amount of matter in a given volume or space. The commonly adopted measure of density is the ratio of the weight of a body to its volume or the space it occupies, as expressed by the following formula

$$Density = \frac{weight}{volume}$$

In a general sense, the term density has thus come to mean the weight per unit volume. For example, the density of water is commonly understood to mean its weight per cubic foot (62.4283 lb., max. dens., 4° C.). In this sense, the density of a gas is its weight per cubic foot; but this is not its common significance, in mining practice, in relation to gases.

The term has, besides, a relative meaning and is sometimes called "relative density." In this sense, it means much the same as specific gravity or relative weight. Thus, the density of a gas is the ratio of the weight of a given volume of the gas to the weight of the same volume of another gas taken as a standard, both gases being measured at the same temperature and pressure.

Hydrogen the Standard for Density—Since hydrogen is the lightest gas known, it is a convenient base or standard of comparison and its density is taken as unity or 1.

Relation of Density to Molecular Weight—The molecular weight of hydrogen is 2 and its density is therefore one-half its molecular weight. But since the density of all gases is proportional to the weight of the gas, volume for volume, it follows that:

The density of any gas referred to hydrogen as unity is one-half of its molecular weight.

For example, to find the density of water vapor (H_2O), first calculate the molecular weight of the vapor; thus,

$$\begin{aligned} \text{Water vapor } (H_2O);\ H_2 &= 2 \times 1 = 2 \\ O &= 1 \times 16 = 16 \\ \text{Molecular wt.} &= 18 \end{aligned}$$

The density of water vapor is then 18 ÷ 2 = 9; that is to say, water vapor is nine times as heavy as hydrogen, volume for volume.

Difference Between Density and Specific Gravity—In a general sense, these two terms are used synonomously. The term density, in a more restricted sense, relates to the quantity of matter in a given volume or, in other words, to the mass per unit volume; while specific gravity relates to the relative weights of different substances, per unit volume, referred to a certain fixed standard as unity. Since density is referred to hydrogen and specific gravity to air, as unity, air being 14.4 times as heavy as hydrogen, at the same temperature and pressure,

$$Density = 14.4 \times sp.gr.$$
$$Sp.gr. = density \div 14.4$$

The Coal Age Pocket Book

Specific Gravity of Mixtures of Gases—When different volumes of gases of different densities are uniformly mixed the density of the mixture is determined by dividing the combined weight of the mixed gases by the total volume of the mixture, which will give the unit weight or the weight per unit of volume of the mixture.

The actual weights of the gases may not be known, but only the volume of each gas and its density or specific gravity. In that case, multiply the density of each gas by its volume, add the products together and divide the sum by the total volume of the mixture; the quotient obtained will be the required density of the mixture.

Or, in like manner, multiply the specific gravity of each gas by its volume, and divide the sum of these products by the total volume of the mixture, and the quotient obtained will be the specific gravity of the mixture.

Calculation—For illustration, let it be required to calculate the specific gravity of flashdamp, which has a theoretical composition of 1658 volumes of methane (CH_4) to each 1000 volumes of carbon dioxide (CO_2). The process is as follows:

	Volume	Sp. gr.	Relative wt. (air = 1)
Methane,	1658 ×	0.559 =	926.8
Carbon dioxide,	1000 ×	1.529 =	1529.0
	2658		2455.8

The specific gravity of the flashdamp is then calculated, in accordance with the above rule, as follows:

$$Sp.gr. = \frac{relative\ wt.\ (air = 1)}{relative\ total\ vol.} = \frac{2455.8}{2658} = 0.924\ nearly$$

Calculation Based on the Law of Diffusion of Gases—If two gases diffuse into each other, directly, without being diluted with air, the volumes of the gases are inversely proportional to the square roots of their densities or specific gravities. This law makes it possible to calculate the density or specific gravity of such an undiluted mixture of two gases directly from their densities or specific gravities, without reference to their relative volumes. This is accomplished by means of the formula

$$D = \frac{a\sqrt{b} + b\sqrt{a}}{\sqrt{a} + \sqrt{b}}$$

in which D = density or specific gravity of the mixture; a and b = the corresponding densities or specific gravities of the two gases, respectively.

Calculation—For illustration, let it be required to calculate the specific gravity of flashdamp (undiluted mixture of methane and carbon dioxide) directly from the specific gravities of these gases: methane = 0.559 and carbon dioxide = 1.529. The process is as follows:

$$Sp.gr. = \frac{0.559\sqrt{1.529} + 1.529\sqrt{0.559}}{\sqrt{0.559} + \sqrt{1.529}} = 0.924$$

EXAMINATION QUESTIONS

West Virginia Examination

(*Continued from last issue*)

Ques.—If this were a gaseous mine, how would you prevent accumulation of gas in the gobs when pillars are drawn?

Ans.—As the pillars are drawn, all timbers should be pulled, and care should be taken to cause a fall of roof, so as to practically close each place, as the work proceeds. Any void places remaining open must be thoroughly ventilated by a sufficient scale of air; otherwise, the place must be closed by an airtight stopping.

Ques.—The scale of this map is 1 in. = 200 ft. (a) How many tons of coal can be produced from the mine, assuming the coal to be 6 ft. thick and all grades favorable to the loaded cars? (b) What quantity of air will be required to properly ventilate this mine? (c) How many men will be required to produce this tonnage? Explain fully. (d) Where would you build your permanent stoppings and overcasts?

Ans.—(a) The development shown on the map should yield, say 1000 tons per day. (b) There should be a circulation of 125,000 cu.ft. of air in this mine.

(*c*) To insure an output of 1000 tons per day will require about 200 miners, working single with a helper; or, say from 250 to 300 miners working double.

(d) The permanent overcasts and stoppings are indicated on the map by their proper symbols.

Ques.—Describe a good system of ventilation for a seam of coal 5 ft. in thickness, with a large acreage and soft, friable roof; the mine liberating some explosive gas and the production of coal being 3000 tons per day.

Ans.—The four-entry system should be used for the main slopes or entries, while the cross-entries are driven on the double-entry system. The mine should be ventilated on the exhaust system, the two central entries of the main roads being used as intake airways and haulage roads, while the two entries flanking these are made the return airways for their respective sides of the mine.

Rooms are opened to the rise side only of each pair of cross-entries; and the mine is divided, preferably, into separate panels, working, say from 50 to 60 men in each panel. This is accomplished by driving cross-headings between the consecutive pairs of cross-entries, as the work progresses. Each panel is supplied with its own separate ventilating current, by building an overcast at the mouth of each pair of cross-entries, early in its development. The return air from each panel is conducted at once into the main-return airway, while the coal is hauled through the crosscut near the mouth of each pair of cross-entries and taken out on the intake air to the main-haulage road.

The main-haulage roads should be driven 10 ft. wide, one being used for the loaded cars and the other for the empties. To provide an output of 3000 tons a day will require from 10 to 12 panels, each producing from 250 to 300 tons. Each panel should be ventilated by a current of 12,000 to 15,000 cu.ft. per min., which should be made to sweep all void places in the roof or other parts of the mine.

Ques.—Describe the difference there is in respect to the safety of a dusty mine, in the natural condition of the air entering and traveling through the mine, during the summer and winter months.

Ans.—In the summer season, the outside air has practically the same or a slightly higher temperature than that of the mine, while in the winter season the outside air has always a lower temperature than that of the mine. As a consequence the intake-air current, in the winter time, experiences a rise of temperature shortly after entering the mine. Under these conditions, the intake current is not fully saturated when it reaches the inside workings, but has a capacity to absorb moisture from the dust and coal that accumulate at the working face and on the haulage road.

This drying action of the air current prevails to a greater or less extent in the mines, during the winter season, regardless of whether the outside air is or is not fully saturated with moisture. The outside air may be fully saturated, on a damp cold day, and yet the intake-air current be quite dry, a short time after entering the mine.

Ques.—What, in your opinion, determines the best system of timbering the various roofs in coal mines, for headings and rooms?

Ans.—The nature of the roof, floor and coal, depth, inclination and thickness of the seam, and the method of working adopted must always determine the best system of timbering to be employed, under the particular conditions existing in the mine. In general, it is safe to say that the adoption of a regular system of timbering, designed to meet the particular conditions in a given case, will result in greater efficiency in respect to safety and economy of working, than any irregular or haphazard method. Even under the best conditions of roof and floor, there is danger in leaving the question of timbering the working face, to the judgment of the miner.

Ques.—What precautions should a miner use when undercutting coal?

Ans.—Before starting the work of undercutting the coal, the miner should carefully examine the roof above him. He should consider that there may be a break in the roof over the coal that is not visible, in which case, when the coal is mined (undercut) the full weight of the roof over the opening will be thrown on the unsupported coal face. This is what often happens, and the result is a fall of coal that catches the miner at work. It may take a little time, but a careful miner working under a roof with which he is not fully acquainted, will always set a prop or two in such a manner as to protect himself from any unexpected fall of slate. It is also important to sprag the coal as rapidly as it is mined. The sprags should be set firmly so as to prevent any settlement of the coal during the undercutting.

COAL AND COKE NEWS

Washington, D. C.

Little progress has been made during the past week in further developing the attitude of the administration now in charge of the Government with respect to the coal situation and the method of dealing with it. The action of the Interstate Commerce Commission with regard to the anthracite coal cases still remains in abeyance, although it is supposed that the delay is now nearly at an end and that final decisions in these cases will shortly be handed down.

The inactivity of legislative leaders with respect to attempting any investigation of coal conditions as they have been requested from many sources to do, is believed to mean that they are awaiting the action of the administration with respect to the anthracite cases in order that they may guide themselves somewhat by the outcome of the commission's findings in that regard. If it should appear that the rates on anthracite coal are too high at present and call for reduction, and if such reduction should be directly ordered and should go into effect, it is believed that little more could be done by the Government under existing conditions, looking toward the actual control of the situation in the anthracite fields.

It is probable that after the decisions have been handed down by the Interstate Commerce Commission in these cases, the whole subject will be taken up afresh and will be worked over to see whether there is anything further that can be reasonably attempted beyond the removal of the tariff provided for in the pending measure and the cut in freight rates supposed to be likely to be ordered in the forthcoming decisions.

Coal and the Cost of Pig Iron

One of the most interesting discussions of the past week in connection with the metal schedule now pending in the Senate has dealt with pig iron and the competitive possibilities of the United States in producing pig iron, especially as affected by the cost of coal in connection with the smelting process. Senator Oliver, of Pennsylvania, in this connection has furnished some information that has not heretofore been developed, and that has a bearing upon the coal and pig-iron situation as affected by the proposed rates of duty.

Mr. Oliver's contention is that the so-called "merchant furnaces" cannot live under free trade in pig iron, although he thinks that the greater manufacturers, making tonnage steel, and pouring out of each blast furnace an output running up to 400 or 500 tons a day can struggle along under free trade, despite the fact that the independent manufacturers cannot. He goes on to argue that new competition in iron and coal is to be expected from China and in that connection offered the following testimony:

> I have a friend who a little more than a year ago visited China and while there he went to visit a steel works at Han Yang and this is what he said about it: "They have enormous deposits of iron ore, very much higher in iron than ore we now use and running from 62% to 65% iron. This ore is almost free from sulphur and is low in phosphorus. They have an abundance of excellent coking coal, which can be mined at very low cost, because they have the cheapest labor in the world.
>
> "To one who has never visited China this may appear as an exaggeration, but it is a fact. I believe it is possible to produce pig iron and finished steel more cheaply in China than in any other country in the world. . . . . The Chinese coal miner is paid 7c. for a day of 12 hours; in addition he receives his found from his employer, but this consists of only about one cent's worth of rice and meal. Coal at the pit's mouth is 35c. per ton. It is transported to the river or railroad by collies, the lowest class of Chinese labor. The coolie is paid 1c. for carrying on his back a 400-lb. load of coal in some instances a distance of more than a mile from the mine to the export station. These coolies work only every other week. . . . . It costs a Chinese workman only about 90c. a month to live."

HARRISBURG, PENN.

Members of the new Pennsylvania Public Service Commission met with Governor Tener on Aug. 4 for the purpose of organization. The members arranged to dispose of accumulated business, and stated that one or more commissioners will be in Harrisburg every day and meetings will be held twice a month.

One of the first opinions to be handed down by the commission, was, that no demurrage should be charged on any cars which, by reason of the frozen condition of the cargo, were incapable of being unloaded within the free period after delivery and which were unloaded within that period after the condition of the coal admitted of that being done.

The opinion is the result of a complaint filed against the Pennsylvania R.R. Co. by the Terminal Coal Co., of Philadelphia. The complainant was asked to pay a demurrage of $52, but this was protested on the ground that the frozen condition of the coal was the only cause for the delay in unloading and that this condition was beyond control.

The commission found that the coal was so frozen when the cars were constructively delivered as to prevent the prompt unloading of the latter and that the actual unloading was accomplished as rapidly as the condition of the coal would permit.

On Aug. 19, after a hearing, the commission will take steps to promptly fix the telephone rates throughout the state. The three members of the old Railroad Commission are familiar with the situation and the idea is for the representatives of the telephone interests to present their objections to the tentative rates so that the new members will have the necessary data. Shortly after this hearing the schedule will be adopted.

On Aug. 20 a hearing will be held before this commission in the matter of the complaints of the manufacturers' association of York and Lancaster concerning the rate on bituminous coal from the Clearfield District.

No date has been set for a hearing of the complaints on anthracite coal to Philadelphia.

A Recent Report

In a recent report made to the United States Government by Prof. Emery R. Johnston, of the University of Pennsylvania, it is interesting to note that the influence of the Panama Canal on the American trade is a matter of lively interest to coal operators and land owners of Pennsylvania. It is conceded that the opening of the canal in 1914 will greatly enlarge the American coal trade and reflect a substantial measure of prosperity into the business, and, furthermore, that it will strengthen the value of coal in the state, especially coal which has the advantage of cheap rates to vessel ports.

Perhaps no coal in the country is more favorably situated in this respect than the Pittsburgh coal lying along the Ohio River and its navigable tributaries. Large bodies of fine Pittsburgh steam coal exist in the Panhandle of West Virginia, of which a great deal is held by capitalists of some of the western counties of Pennsylvania. These lands are destined to come into this market. The coal can be shipped all the way by water. From the pit mouth or the river tipples it can be loaded in barges and boated to New Orleans and the Gulf, where it may be transferred to ocean-going vessels for points on the Pacific Coast.

PENNSYLVANIA

Anthracite

Ashley, Penn.—It is expected that the Ashley planes of the Central Railroad of New Jersey, which have been closed down for repairs the past month or more, will resume operations by Aug. 16.

Pottsville—The inquest to determine the cause of the disaster, which killed 20 men at Tower City on Saturday, Aug. 2, will be held at Pottsville on Tuesday, Aug. 19. Many state mine inspectors and mining officials will attend, as well as representatives of the U. S. Bureau of Mines.

The bodies of the two firebosses have not as yet been found, and it is feared that they are buried under tons of débris.

For five minutes on the afternoon of Aug. 6, while the funeral of John Lorenz, a district superintendent in the employ of the Philadelphia & Reading Coal & Iron Co., was proceeding to the cemetery, the wheels in every one of the Reading's 40 operations were stopped and 30,000 employees stood in silence, thus paying tribute to the memory of the departed superintendent and the other 18 men who met death at the same time.

Pittston—Seven West Pittston boys were recently arrested on the charge of stealing rides on coal trains on the Bloomsburg division of the Lackawanna R.R. The arrests were made on complaint to the Lackawanna officials that these boys had hurled chunks of coal through the windows of the engine house placing in jeopardy the life of engineer John Davis and the men he might be raising from the mine.

Tamaqua—Among the sales recently recorded in this region was a piece of coal land in the Owl Creek Valley, from Fink & Co. to the Eastern Pennsylvania Coal Co. The land which was transferred is in dispute and litigation is now pending to determine the ownership. About six years ago Fink & Co. secured a lease on the ground but never did any development work until about a year ago. In the meantime other parties secured an option on the property, and were surprised when making an investigation to find that it was being developed.

Wilkes-Barre—In blasting away rock for the foundation of the new office building for the Lehigh Valley Coal Co. a vein of coal was encountered and miners were called in to properly deal with it. Several tons have already been removed, but sufficient quantity will not be encountered to pay for the extra expense of employing mine workers instead of laborers. The encountering of the coal in the excavating work will not greatly retard progress on the building.

Bituminous

Johnstown—The Penn Public Service Co. has signed a contract with the Loyalhanna Coal & Coke Co. to furnish power to its new mines at Cairnbrook, Somerset County. There are two new openings at Cairnbrook which will shortly be put in operation.

The Penn Public Service Co., which is rapidly completing high-power lines through this section of the state, is dickering with a number of large coal operators to furnish them with power, especially in Indiana, Cambria and Somerset Counties.

St. Marys—The Allegheny River Coal Co. has just discovered a new 8½-ft. bed in mine No. 5, near Furnace Run, in Armstrong County.

Osceola Mills—The Shoemaker Coal Co., of Philadelphia, has bought the Monarch shaft of the Osceola Coal Co., here, and will increase the capacity at once. The White-Dugan Co., near here, is opening a new slope at No. 1 mine to increase capacity.

Monongahela—The coal operators in this district are complaining of the scarcity of miners and as a result the mines are losing about 15 per cent. of their capacity. These conditions are depressing to the operators as there is at present a strong demand for Pittsburgh coal, and many of the larger companies have been compelled to buy coal in order to fill their contracts.

Sykesville—On the evening of Aug. 6, the men employed at the Cascade Co.'s shaft at Sykesville, held a meeting and decided to strike for the adjustment of conditions prevailing at that operation. This decision will affect 200 men.

WEST VIRGINIA

Bluefield—Six hundred miners are affected by the wage agreement signed Aug. 6, between representatives of the United Mine Workers of America and the Wyatt Coal Co., the Coalburg Colliery Co. and the Dry Branch Coal Co., operating mines on lower Cabin Creek. The price per net ton has been fixed at 30c., an increase of 3c. over the amount paid at other mines in the same field. The agreement is to expire Apr. 1, 915.

The mines in the Pocahontas field and some in the Thacker and Red Jacket field will adopt a semi-monthly pay day effective not later than Oct. 1. It is also reported that a nine-hour work day will be adopted at a number of operations. At some operations the semi-monthly pay will begin Sept. 1, and it is expected that the Norfolk & Western R.R. will also adopt the bi-weekly pay day.

Charleston—On Aug. 6, an agreement was reached between representatives of the United Mine Workers of America and of the Laing, and Dickinson Mines on Cabin Creek, by which these operations are to work under the recent agreement. Since May 1, these mines have been working under the proposition suggested by Governor Hatfield.

Mine inspector Mitchell has during the past few weeks been prosecuting a number of the miners in his district for violating the state laws. Most of these violations occurred in the mines of the Pocahontas Consolidated Collieries Co., and the fines imposed ranged from $10 to $20.

ALABAMA

Birmingham—The Maryland Coal Co. has begun dumping coal at its new mines at Sipsey, Ala., and expect within 0 days to have the output up to 600 tons per day and ultimately to reach 1000 tons daily.

KENTUCKY

Frankfort—The Kentucky Railroad Commission has handed down an opinion in which it holds that it is without jurisdiction to give any relief to the coal miners of Ohio and Muhlenberg Counties, Ky., who complained that they were kept idle by reason of the failure of the Illinois Central R.R. to furnish cars to the operators in those counties.

Hazard—The plant of the Hazard-Dean Coal Co. is well under way, and the company hopes to be loading out coal by the beginning of the fall season. A large force of men is engaged in grading the company's track up Messer Branch, and work is about to start on a tipple of the latest design. A large power house, the necessary commissary building and about six miners' houses are next to be built. The company proposes to equip a thousand-ton mine, and is laying its plans accordingly.

McRoberts—The Bank of McRoberts is the newest financial institution in the coal fields. It was incorporated recently with a capital stock of $25,000, the organizers being John E. Buckingham, I. N. Camden, George T. Watson and W. S. Perry.

OHIO

Steubenville—Joseph Specher was killed and Mige Osgan was fatally injured from being struck by a runaway coal car at the Wright Coal Co.'s plant in Bergholz, Aug. 8.

Columbus—Ohio will soon have a mine-rescue car which will cost approximately $10,000. It will be equipped with kitchen and sleeping room for the attendant who will live upon the car. It will be kept on a spur track ready for immediate transportation to the scene of any mine disaster.

Athens—The mine of the Calvin Essex Coal Co. will be in operation in Meigs County on the lands of the Athens and Pomeroy Coal & Land Co. soon. The holding company is composed of Athens men who own 700 acres of land in Salisburg and Rutland Townships, 2½ miles northwest of Pomeroy. The local company has completed the grading of a mile of railroad track to the mine site where the operating company is now grading for a power house and tipple and starting to open up the mine.

INDIANA

Brazil—Crawfordsville and Greencastle capitalists have purchased at receiver's sale the property and leases of the Indiana Coal & Clay Co. at Patricksburg. The price paid was $2870, the financial encumberances of the company, together with unpaid royalties.

ILLINOIS

Witt—The local Peabody Mine No. 12 is temporarily to receive power from Taylorville for the driving of the recently installed electric motors. This is necessary since the Peabody plant at Kincaid, from which current will later be received, has not yet been completed.

Bloomington—A large acreage of oil and gas land has recently been leased in Shelby County, and drilling operations will soon be begun.

OKLAHOMA

Oklahoma City—To protect the thousands of miners working in the coal mines, the last Oklahoma legislature passed a law requiring all such mines to install telephones. These are to be located every 1000 ft. in the mine and connected to the surface. By this arrangement there will never be a man over 500 ft. from a telephone, which in case of an accident or explosion will render communication to the surface quick and certain.

FOREIGN NEWS

Santiago, Chile—An appeal has been made to the Minister of Industry and Public Works by several miners' societies, asking that he use his influence with the coal companies to reduce the working day to nine hours. In some of the mines the men are being worked 12 hours, it is declared. Organizations among Chilean miners are mostly social and cannot be compared with the unions in the United States.

RECENT COAL AND COKE PATENTS

Miners' Drill—T. S. P. Skeen, Sandoval, Ill.; 1,065,005, June 17, 1913. Filed June 20, 1912. Serial No. 704,811.

Gas Producer—L. Moore, Glasgow, Scotland; 1,065,315, June 17, 1913. Filed Jan. 28, 1913. Serial No. 744,774.

Improvements in Crushers—T. J. Sturtevant. Glen Road, Wellesley Farms, Wellesley, Mass.; 29,949 of 1912.

Gas Producer—J. A. Herick, New York, N. Y.; 1,063,540. June 3, 1913. Filed July 10, 1911. Serial No. 637,615.

Smoke Consuming System. E. G. Hatch, New York, N. Y.; 1,064,477. June 10, 1913. Filed March 7, 1911. Serial No. 612,848.

Protective Device for Miners. J. W. Reed, Cedar Grove, W. Va.; 1,064,378. June 10, 1913. Filed Sept. 18, 1912. Serial No. 721,058.

Method of Producing Gas. O. H. Ensign, Los Angeles, Calif.; 1,064,625. June 10, 1913. Filed May 27, 1909. Serial No. 498,764.

Apparatus for Quenching Coke. W. Reubold, Charlottenburg, Germany; 1,065,081. June 17, 1913. Filed June 1, 1912. Serial No. 700,966.

Coal Washer and Ore Concentrator. A. P. Campbell, Asheville, N. C.; 1,065,213. June 17, 1913. Filed June 5, 1912. Serial No. 701,788.

Latch for End Gates of Mining Cars. I. K. Beaver, Wilburton, Penn.; 1,064,278. June 10, 1913. Filed Oct. 7, 1912. Serial No. 724,399.

Gas Producer—J. H. Hirt, assignor to Allis-Chalmers Co., Milwaukee, Wis.; 1,064,905. June 17, 1913. Filed Apr. 29, 1907. Serial No. 370,757.

Pneumatic Feeding Device for Stoping Drills. J. G. Leyner, Denver, Colo.; 1,065,059. June 17, 1913. Filed Oct. 23, 1911. Serial No. 656,267.

Safety Device for Water Gas Apparatus. W. M. Kiley and W. J. Burtle. Grand Rapids, Mich.; 1,065,254. June 17, 1913. Filed Feb. 17, 1912. Serial No. 678,197.

Rock Drill—J. A. Thompson and E. M. Mackie, assignors to Chicago Pneumatic Tool Co., Chicago, Ill.; 1,065,007. June 17, 1913. Filed Nov. 22, 1906. Serial No. 344,568.

Automatic Car Stop with Gaging Apparatus for Mines. J. E. Gable. Cambridge, Ohio, and I. A. Gable, Byesville, Ohio; 1,064,067. June 10, 1913. Filed Aug. 18, 1911. Serial No. 644,-838.

Indicating and Alarm Mechanism for the Movement of Gases in Mines. A. Szabodos and H. Mueller, New Michel, B. C., Canada; 1,064,869. June 17 1913. Filed Jan. 9, 1912. Serial No. 670,256.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines. Safety Electric Switches for Mines. By H. H. Clark. Technical paper 44; 8 pages, 6x9 in.; without illustrations.

Department of the Interior, Bureau of Mines, Bulletin 54. Foundry-Cupola Gases and Temperatures, by A. W. Belden. Twenty-nine pages, 6x9 in., with numerous diagrams, figures and illustrations.

University of Illinois, Bulletin No. 67. Reinforced Concrete Wall Footings and Column Footings. By Arthur N. Talbot; 114 pages, 6x9 in.; with numerous drawings, curves, tables and halftone illustrations.

Geological Survey of Georgia, Bulletin No. 20. Mineral Springs of Georgia. By W. S. McCallie, State Geologist. Cloth-bound volume of 190 pages, 7x10 in., describing briefly the mineral springs of Georgia and giving the chemical analyses of their waters.

TRADE CATALOGS

Lidgerwood Mfg. Co., 96 Liberty St., N. Y. Bulletin No. 12. Lidgerwood Electric Hoists. Twenty pages, 9x12 in., illus. Describes many kinds and styles of hoists adapted to various uses.

The Ingersoll-Rand Co., 11 Broadway, New York. Ingersoll-Rand Products; 140 pages, 6x9 in. Briefly describing and illustrating the products of the Ingersoll-Rand Co. Many valuable tables are included in this publication.

The Biddle Hardware Co., 513-517 Commerce St., Philadelphia, Penn. Monel Metal, 54 pages, 4x7½ in. illustrated. Describes the properties of monel metal and the various forms in which it may be commercially obtained.

The Link-Belt Co., Philadelphia, Chicago, Indianapolis. The Peck Carrier. Book No. 120; 112 pages, 6x9 in., describing the principal possibilities and illustrating various applications of the Peck carrier and its auxiliaries.

The Francke Co., New Brunswick, N. J. Bulletin No. 18, March, 1913. Francke Flexible Couplings; 11 pages, 6x9 in.; with numerous illustrations and tables describing the operation of a flange coupling which is entirely flexible.

Standard Specifications for Horizontal Return-Tubular Boilers. April, 1913; 7 pages, 5x10 in.; giving the principal dimensions and specifications of multi-tubular boilers as adopted by a large number of firms manufacturing this class of machinery.

Henry R. Worthington, 115 Broadway, New York. Worthington Volute Centrifugal Pumps for Low and Moderate Heads. W-202. May, 1913. Sixty-two pages, 6x9 in., with numerous illustrations, drawings and curves, describing the various types and sizes of Worthington volute pumps.

PERSONALS

Charles T. Faulkner, formerly sales agent of the Sterling Coal Co., has opened an office under the name of the Western New York Fuel Co.

J. H. Walker, formerly superintendent of the Sedalia Coal Co., located in the Hocking Valley field, has taken a position with the Pan-American Coal Co. as general superintendent.

Dr. W. R. Crane, professor of mining in the Pennsylvania State College, has just returned from Alaska, where he has spent the past year investigating the coal resources of that territory.

Truman Dodson, superintendent of the Morea Colliery, has been elected president and general manager of the Locust Mountain Coal Co., to succeed Baird Snyder, recently killed in an auto accident.

E. A. Anthony, who has been store manager for the Rex Coal & Coke Co. on Dingess Run for the past 2½ years, has resigned his position and will operate a coal lease for himself on Main Island Creek.

President Wilson has named Henry B. Bidwell, of Muskogee as chairman, Royal J. Allen, of Duncan, and R. L. Kidd, of Poteau, as the Board of Appraisers to evaluate the surface of the segregated mineral land in the Choctaw Nation.

William Mangan, who has been outside foreman at the Prospect Colliery of the Lehigh Valley Coal Co. for a number of years, has resigned his position with the company, to accept a similar position with the O'Boyle Coal Co., at Sugar Notch. John Reidlehuber, of the Centralia Colliery of the same company, has been appointed to succeed Mr. Mangan.

Thomas R. Jones, of Wilkes-Barre, has been appointed division superintendent of the Lehigh Valley Coal Co.'s Delano Division with headquarters at Mahanoy City. He fills the position made vacant by the resignation of Mr. William Underwood. Mr. Jones was formerly district superintendent for the Lehigh Valley Co. in the Hazleton region, and was for many years general manager of the Warrior Run Coal Co., at Warrior Run.

OBITUARY

Geo. A. Shirey died at his home in Bluefield, W. Va., Aug. 7. Mr. Shirey was favorably known throughout the entire Pocahontas coalfield. He is survived by a wife and six daughters.

E. A. Humphries, a prominent coal and coke operator, died suddenly at his Scottdale home recently of heart trouble, aggravated by the intense heat. At the time of his death he was 69 years of age.

Geo. Dana, a pioneer coal operator of West Virginia, died recently at his home in Washington, D. C., at the age of 80 years. Mr. Dana began operating coal mines on Campbells Creek about the close of the civil war, and retired from active business several years ago, since residing in Washington. He is survived by a wife and two brothers.

Richard Newsam, one of the best known coal-mining men in the Middle West, died at his home, 208 Bigelow St., Peoria, Ill., on Aug. 4. after a lingering illness of a year. Mr. Newsam was instrumental in bringing about the establishment of the mine-rescue stations in Illinois, and had held many important offices pertaining to coal mining since 1897.

CONSTRUCTION NEWS

St. Lambert, Que.—The Grand Trunk Ry. has recently warded a contract for a 600-ton capacity coaling station at t. Lambert to the Roberts & Schaefer Co., of Chicago.

Virden, Ill.—Work has been begun on the foundations of ie steel tipple for the Royal Colliery Co., and the work of recting the new tipple will be pushed rapidly. The old tructure was destroyed by fire on May 26 last.

St. David, Ill.—The Roberts & Schaefer Co. have received contract from the Big Creek Colliery Co. for a new minig plant at St. David. It will occupy the site of the one estroyed by fire on Aug. 5.

New Castle, Penn.—Work will begin soon to reopen the 'rank McInnis and Cartis Brown coal bank in the Brown's ddition, which has been closed for some time. The mine has een leased by George Main and his son Emmet of this city.

Newport, Ind.—Haughee & Dunsford, who have been sinkig a shaft on the Wimset farm, near Newport, have passed hrough a bed of good coal nearly 6 ft. in thickness. They re now driving entries and expect to begin taking the coal ut in a short time.

Huntington, W. Va.—There appears to be a well authencated rumor that a railroad will be built in the near future hrough the Guyan Valley at least as far as Pineville. Such road would develop a practically virgin territory rich in oth coal and lumber.

Louisville Junction, Colo.—The National Fuel Co., of Dener, Colo., has recently awarded a contract to the Roberts & chaefer Co., of Chicago, for a Marcus patent picking-table creen and steel tipple for installation at the Monarch mine t Louisville Junction.

Columbus, Ohio—The Norfolk & Western R.R. Co. is buildig five new side tracks which are more than a mile long, xtending from Livingston Ave. to English Hill. The new 'acks will increase the facilities of the Columbus yards and ermit a large storage of coal.

Wilkes-Barre, Penn.—To afford additional power for genral purposes, a new 450-hp. Stirling boiler is being erected at he Exeter Colliery of the Lehigh Valley Coal Co. It is exected that this installation will be complete in about one ıonth. The new boiler replaces two smaller low-pressure oilers which have been removed.

Maynard, Ohio—The Troll Coal Mining Co., with mines at lainesville, is making some costly and highly important imrovements at its mine. When completed a total of 300 hp. 'ill have been added to the power equipment of the proprty, while many new houses will have been erected for the se of the company's employees.

Monongahela, Penn.—At a meeting of the directors of the 'ittsburgh Coal Co., it was decided to rebuild the saw and laning mill, which was destroyed by fire on the morning of uly 30. Plans for the erection of the plant have been comleted and work will be begun shortly although a scarcity f laborers may cause some delay.

Duquoin, Ill.—The Forester Coal & Coke Co., of Duquoin, as placed an order with the Roberts & Shaefer Co., of hicago, for the building of a 300-ton modern coaling staion to coal locomotives on the Illinois Central R.R. This tation will be built alongside of the steel tipple for which ie same company contracted about six weeks ago with the ame concern.

NEW INCORPORATIONS

Springfield, Ill.—The Elly Coal Co., of Girard, has been inorporated with a capital of $2,000,000. The incorporators are: lbert Salzenstein, H. C. Hamilton, and B. D. Terry.

Birmingham, Ala.—The Alabama Land & Coal Co. has been ıcorporated with a capital of $80,000. J. E. Seay is president, . S. Shannon, vice-president and G. H. Peck, secretary.

Little Rock, Ark.—The McDougal Coal Co. has been incororated at Bonanza, with a capital stock of $9000. The inorporators are: L. P. McDougal, J. T. Gray, and others.

Edgewater, Wash.—The Hamilton Creek Coal Mining & 'evoloping Co. has been incorporated with a capital stock f $100,000, by E. L. Largey, Edgewater, M. M. Aldrich, Portınd, et al.

Charleston, W. Va.—The Ridgwood Smokeless Coal Co. has removed its principal office from Fayetteville, Fayette County, to Vaughn, Nicholas Co., and changed its name to the Ridgway Coal Co.

Harrisburg, Penn.—The Auxiliary Coal Mining Co., of Pittsburgh, has been incorporated with a capital of $15,000. The incorporators are: Jacob Swires and H. H. Homer, of Phillipsburg, and H. M. Fair, of Altoona.

Des Moines, Ia.—The Central Iowa Fuel Co. has been incorporated with an authorized capital stock of $100,000. The principal offices will be in Chariton, Lucas County, in the state of Iowa, and the purpose of the company is to mine coal and other minerals. The incorporators are A. E. Hollinsworth, Joseph Norwood, J. H. Balir, D. M. Ritten, and W. L. Read, all of Des Moines.

Charleston, W. Va.—Another coal company has been chartered to do business in West Virginia under the name of the Black Fork Coal Co., which will have offices in Fairmont, Marion Co., and chief works in Webster County. The authorized capital stock is $200,000, and the incorporators are E. E. Frame, Fairmont, J. C. Lewis, Grafton, J. S. Beatty, Manington, J. M. Ritchie and H. W. Showalter, of Fairmont.

Louisville, Ky.—The organization of the Continental Coal Corporation of Kentucky, which will take over the Kentucky retail business of the Continental Coal Corporation of Tennessee, was completed on Aug. 7. The capital stock of the new concern is $50,000, and the debt is limited to $200,000. H. L. Corey, of Chattanooga, was chosen president; F. B. Martin was selected vice-president, and S. O. Le Seur was made general manager.

INDUSTRIAL NEWS

Philadelphia, Penn.—The Hirsch Electric Mine Lamp Co. has moved its factory to the corner of 12th and Wood Sts., where its manufacturing facilities are greatly increased. Through mistake this notice was printed in our last issue under the heading of Pittsburgh, Penn.

Springfield, Mass.—The Witherbee Igniter Co. has just received word from the Bureau of Mines that its portable electric mine lamp has been approved for use as a cap lamp in gaseous mines. These lamps are much more convenient and give a better light than the ordinary safety lamp.

Jefferson City, Mo.—The Chicago & Alton R.R. Co. has been authorized by the State Utility Commission to issue $861,000 of betterment bonds, based under a general mortgage of July 1, 1912. The bonds are to pay for improvements made during the months of March, April, May and June.

Bluefield, W. Va.—The Solvay Colliery Co., at Marytown, on Aug. 1, concluded the purchase of and made the first payment on the mining lease and property of the Spring Coal Co., of Springton. It is the purpose of the purchaser to use the coal from this development in the manufacture of coke in byproduct ovens.

Scranton, Penn.—F. H. Emery & Co., manufacturers of the Emery patent slate pickers are contemplating the purchase of the old Allis-Chalmers plant at the corner of 10th Ave. and Vine St. Additional facilities have been made necessary by the large number of orders which the picker company has been receiving recently.

Scranton, Penn.—A well authenticated rumor states that a plant will be started soon for the manufacture of a new and improved slate picker. This will be based upon the invention and patents of Charles Farrar, of Dunmore. It is possible also that the new factory will build a complete line of coal-cleaning machinery. The name of the company has not yet been decided.

Lorain, Ohio—During the month of July the Baltimore & Ohio R.R. dumped 600,000 tons of coal over its docks at Lorain. This coal was mined in West Virginia, Ohio, and Pennsylvania, and was destined to shipment across the Lakes to Canada and the Northwest. Should the coal business continue at this rate, and the traffic officers believe that it will, it is expected that this year will establish a new record for any season of lake navigation. The prospects are that the coal tonnage will reach 3,500,000 tons.

Chicago, Ill.—Forty locomotives of the Chicago & Northwestern, and the Chicago, Burlington & Quincy R.R., are now engaged in a test of lignite as fuel. The present cost of coal in western Nebraska, Colorado, Wyoming and the Dakotas is from $5 to $6 per ton. Lignite, on the other hand, can be bought for $1.75 or less. If the present test demonstrates the practicability of lignite for fuel, there will be an enormous saving in the coal bills of the railroads.

COAL TRADE REVIEWS

GENERAL REVIEW

Heavy demand for soft coal still persists, but not so aggressively as before. Tendency is toward further advances. Supply and demand well balanced for the time being. Lake tonnages heavy. Anthracite quiet, but steady, with an excellent undertone.

The constructive element in the trade has suffered a slight check during the week. Buying is more scattered, and there is an absence of the aggressive support that has charactrized the recent market. No important, in fact hardly any, recession in prices has occurred, and the situation simply appears to be one of backing and filling pending further developments. Quotations are not weak, and any concessions offered find ready buyers. The natural tendency is upward and a further advance will occur immediately if any of the several expected favorable conditions materialize.

Anthracite has developed a new strength, partially because of the small shipments last month and the rigid curtailment in production, but probably more particularly because of the near approach of the consuming season. The market seems capable of absorbing the limited production, which is much curtailed and concessions on the regular company's circular are infrequent. There is an excellent undertone to the anthracite trade indicative of a marked activity this fall.

The advance in quotations on the West Virginia grades for shipment into the West, has diverted a greater tonnage of these fuels into the Eastern market, and there is already some talk of an easier situation in September. It is thus barely possible there may be a temporary slump in the spot market to the $2.85 price on West Virginia coal, with possibly further opportunities for contracting at that figure also.

As a whole, however, the supply and demand are well balanced and the Pennsylvania grades have moved up another notch. Operators generally are worried about the heavy demand on contracts, and they would find it difficult to take advantage of any spot business. The car and labor supply continues to be the limiting factor in the Pittsburgh district; these are both fair so that production is close to the previous high records. The pressure is particularly heavy for Lake shipments. It is fortunate that the consumers are well covered as there is not much free coal, and it would be difficult to place any contracts which involve shipments prior to Dec. 1. The movement is tending to slow up which would indicate a limited car supply, or a heavier shipment of other freight.

The demand in Ohio continues as insistent as ever, and the movement is keeping up as good as could be expected. The car situation is the only disturbing factor. The domestic demand is strong, the steam consumption heavy, and the outlook excellent over the future. The loading at Hampton Roads is showing a marked improvement, the dumping being heavy, with large shipments in both the Coastwise and foreign trade; some coal is even accumulating on the piers. The heavy demand from the Northwest continues unabated, both the railroad and industrial consumption are large, and the car supply inadequate.

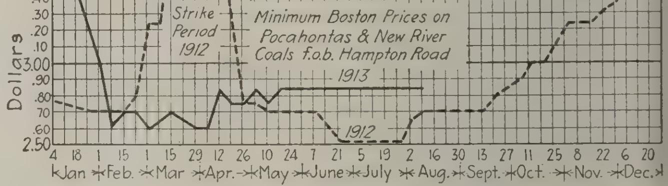
A perceptible slowing up is notable in the Southern market. As a result there is considerable coal on track, and the market is showing a tendency to ease. The car shortage is becoming steadily worse in the Middlewest, it being ascribed there to the absence of any relaxation of the market during the summer. The demand is insistent, the consumption heavy, while price increases have already been recorded, and will probably be followed by others. There is a particular improvement in the demand for the Western grades.

BOSTON, MASS.

A slackening demand from the West due to advance in prices on the Pocahontas and New River grades. An easier market is looked for in early September. Pennsylvania coals firm and sales are only being made for delivery this month and next. Anthracite orders coming in better than was anticipated.

Bituminous—The output of the West Virginia districts is somewhat exceeding expectations, at least for early August, and already there is talk of an easier market when Septmber comes in. The loading at Hampton Roads shows marked improvement and few boats are now detained more than the two or three days usual in normal times. Another feature is the advance in prices for Western shipment, resulting in a slackened demand from that quarter. If this particular phase continues for a month or so and output is kept up to the present market there is small question about there being a plentiful supply of Pocahontas and New River during the early fall, for the tide-water trade. This does not mean the $2.85 f.o.b. price is at all likely to break, but simply that spot coal will probably sell down to that figure, and for a time there will be opportunity for additional purchases on the contract basis.

Meanwhile there is sufficient call for coal as it comes down, although almost exclusively on old obligations. It is, however, a market that shows demand and supply pretty well balanced. Buyers coastwise will be much interested in developments with regard to the trade West. It is being remarked that if the new scale of prices holds in that territory and the usual volume of coal moves that way in September, then by October New England may look for higher prices on West Virginia fuel.



The Pennsylvania situation shows notable firmness, with no weak spots anywhere. Certain coals have been marked up another 5@10c. only this week, and an adequate demand is still forthcoming. Prices all-rail are firm, and operators are wary of selling for deferred delivery; $1.60 has been paid for certain Moshannon coals within a short time, and when such a price can be realized for Clearfield output, it cannot be said the market is lacking in strength.

Anthracite—Orders are being filed for August coal in surprisingly good number. Dealers are still holding to the policy of carrying full stocks and are taking on cargoes as fast as retail deliveries will permit. There is perplexity over the varying policies of the anthracite companies with regard to charging the Pennsylvania tax.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New Rive
Mines*	$1.15@1.55	$1.35@1.70	$1.67@1.77	
Philadelphia*	2.40@2.80	2.60@2.95	2.92@3.02	
New York*	2.70@3.10	2.90@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.0
Boston†				3.98@4.1
Providence†				3.85@4.0

*F.o.b. †On cars.

NEW YORK

Slight tendency to ease up on the low-grade bituminous coals, but the market is well supported. Railroad and industrial consumption continues heavy. Hard coal dull, but has an excellent undertone indicative of a good latent strength.

Bituminous—There was a slight tendency to ease up in the soft-coal market during the past week, but it did not extend beyond the low grades. Even the most conservative interests in the trade are agreed that there is little probability of the market developing any weakness until navigation closes on the lakes, at least. Even then the winter's demand will be up to the maximum. Railroads are particularly good buyers, while the general steam consumption seems to be large in all directions in spite of the unfavorable reports regarding business conditions generally. The oldest members of the local trade state that they have never known the bituminous trade to be in a stronger position at this period of the year. Not only is the demand heavy on practically all grades, but the business aspects of the trade are also excellent, collections being promptly made. The car supply is short on occasions, but considering the heavy shipments the situation cannot be considered bad as yet. There are no weak spots in the market which are liable to develop to serious proportions. We continue to quote the local market on the following basis:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—Hard coal has not experienced any material change during the week, and still continues comparatively quiet, but with a strong undertone that indicates an exceedingly active market this fall. It is stated that the supplies on hand are far below normal, some companies having no stocks at all with the possible exception of a few odd lots of the steam grades.

Some cutting in the circular is being noticed, but on the whole prices are well maintained. Stove still continues in the strongest demand, while egg and pea are being stocked freely. There is plenty of cars due to the mining being restricted from two to four days a week. Indications are that the demand this fall will be far in excess of the productive capacity of the mines.

We continue quoting the New York market on the following basis:

		Individual	
	Circular	Lehigh	Scranton
Broken	$4.70	$4.45@4.85	$4.50@4.90
Egg	4.95	4.95@5.10	5.05@5.15
Stove	4.95	5.10@5.20	5.15
Chestnut	5.15	5.25@5.35	5.40
Pea	3.50	3.30@3.45	3.35@3.50
Buckwheat	2.75	2.15@2.45	2.55@2.75
Rice	2.25	1.70@1.95	2.25
Barley	1.75	1.30@1.70	1.75

PHILADELPHIA, PENN.

Anthracite trade showing little or no improvement, although there seems to be a fair demand from the New England market. Curtailed mining still continues. Local market dull. The bituminous situation still continues to improve, the market absorbing the entire production, with little or no spot coal for sale.

The anthracite coal industry shows little or no improvement over last week. Under the curtailed operating, quite a quantity of the steam sizes and chestnut coal are going into stock, notably chestnut, for which the demand seems to have dropped off very materially. The market seems to be capable of handling broken, egg and stove, however, although orders are not coming in as freely as desired. The New England business from tidewater still continues fairly good. The large fleets of barges sailing from this port are kept busy with cargoes, and there is quite a tonnage moving in this direction.

The retail trade is preparing itself for the fall. The month of August is essentially furbishing time; repairs, additions, and the little odd jobs around a coal yard that cannot be looked after when the demand is on, are cleaned up, so as to handle the business in the fall, and from present indications it is going to be active when it does get started.

Sundry complaints are heard here and there about the Pennsylvania state tax, and with many of the companies absorbing it others charging it are having their hands full explaining why. This is probably having the effect of diverting considerable business from its usual channels. The absorption of this tax is being used by many to stimulate business. It is reported, although this cannot be vouched for, that September first may see all operators either charging the tax as a separate item, or including it in the price of the coal; in other words, advancing all sizes to a price that will include the tax which would bviously be a less irritating way of handling the matter.

The bituminous business needs hardly any comment. The same favorable conditions continue to prevail, and quotations of less than $1.25 for any kind of coal are few and far between. The soft-coal operator is doing probably better than ever before at this season.

BALTIMORE, MD.

Bituminous coals growing scarce in Pennsylvania. All large companies practically covered by contracts. Strike in one region and a general shortage of cars is also having an effect.

Soft-coal men here are well pleased with the general strength of the market. The Lakes are still taking large quantities of coal, in fact to such an extent that the West Virginia gas product is being held at a full dollar all along the line; the better grade Pennsylvanias are already out of the market entirely or fast approaching that state. In not a few sections mines are entirely sold out on contract, and the producers are worrying how to meet the heavy call on contracts, in the face of the growing car shortage. Even if there was enough coal produced to warrant entering the outside market, these companies would find it impossible to seize the opportunity. Others with some coal to sell are fast closing it out, for the most part at $1.25 or better for even ordinary grades.

Locally the situation is fairly brisk, and while there is no shortage of fuel at tide there is also no surplus reported. Shipments over the piers continue heavy on contract. The foreign movement is keeping up also, and while July with a total of nearly 83,000 tons falls back of the previous month by more than 20,000 tons, it still maintained the average so far this year.

The anthracite trade is beginning to improve. Dealers here are receiving inquiries, and the hard-coal business will be under way in another six weeks.

The influence of the coming hurricane season on southern charters is already being felt. Offerings have been a little less free for the southward coastwise haul, especially by sailing vessels. Tampa is now being quoted up to $1.30; Savannah is calling from $1.05@1.10, and Galveston hauls demand from $1.40@1.50, which are considerably in excess of figures several weeks ago.

PITTSBURGH, PENN.

Mines working up to capacity, with practically no free coal. Contracts hard to make for shipment before Dec. 1. Sufficient Connellsville furnace coke has been taken at the full $2.50 price to meet uncovered August requirements. Foundry coke slightly advanced.

Bituminous—Mines continue to work up to the limit made by the supply of labor and cars, both of which are moderately satisfactory, resulting in production at close to the very best record. The pressure is particularly for lake coal, although shipments on contract are heavy. There is hardly any free coal, but this is not inconveniencing consumers as they are well covered by contracts against which they are getting fair deliveries, so there is not much demand for prompt lots. Few operators are in position to take on fresh contracts, at least for shipment prior to Dec. 1, when the lake shipping season will have closed. Slack is bringing good prices, usually the full circular figure. We continue to quote as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The furnace coke price of $2.50 is very well maintained. Practically all the August coke required by furnaces in operation and not covered by longer term contracts, or otherwise, has now been purchased, at the full price, and the sales for August may be estimated at close to 150,000 tons, or about the same tonnage as was taken for July. In two cases September coke was taken as well as August, involving some 15,000 or 20,000 tons for September, and in one instance a contract was made for 2500 tons monthly, August, September and October. In other cases the buying has been for August only.

Several additional furnaces have blown out lately and production will require further curtailment to keep it in line with consumption, but thus far no spot or prompt coke has been pressing the market. Foundry coke has stiffened slightly, practically all of the few sellers at below $3 having withdrawn such prices, making the market quotable at $3. We now quote as follows: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $3; contract foundry, $3 per ton at ovens.

For the first time in many weeks the "Connellsville Courier" reports shipments of coke at considerably less than production, the figures for the week ended Aug. 2 being: Production, 385,065 tons, a decrease of 8268 tons: shipments, 366,053 tons, a decrease of 27,581 tons. Shipments fell 19,012 tons below production, but it is represented that the surplus was probably by the producer-consumer class, the merchant ovens having no surplus to press on the market.

BUFFALO, N. Y.

Bituminous prices still have an upward tendency, with some new high-priced contracts reported. Consumers not disturbed at an increased slackness in deliveries. Heavy rush of anthracite west by lake.

Bituminous—There is no sign of any easing off in the bituminous trade. During the week contracts for a year have been made here at surprisingly high figures. The more sanguine jobbers are saying that by the middle of October the mine-run price will be $1.50 for any good coal. While this view is not universal, it is agreed that everything now looks like it. Almost all operators have been buying in the open market, to satisfy contracts. Salesmen are doing special jobs, on account of the utter uselessness of sending them on the road to sell coal that could not be delivered. As a rule, the consumer is not disturbed, and is apparently incredulous at what the selling end of the trade tells him. At the same time the rail deliveries are steadily growing slower. The movement is indicative of a very limited motive power, or a material increase of other freight. When a car reaches a siding at a junction point it usually stays there till the shipper hunts it up and goes after the road. The grain crops are now moving and the situation is sure to grow worse from this time on.

Bituminous prices are as strong as formerly, and are quotable as before with an upward tendency, as follows: Pittsburgh lump, $2.90; three-quarter, $2.80; mine-run, $2.65; slack, $2.15, with Allegheny Valley about 15c. lower.

Coke—There is a somewhat increased activity in the coke trade. Some of the pig-iron furnaces in this vicinity that shut down last month, have started up again and others are in prospect of doing so. There is probability of a change in that trade before long, however, on account of the uncertainty of the future of the Connellsville district. Quotations remain on the basis of $2.65 for best Connellsville foundry.

Anthracite—This trade is featureless and nothing expected till there is sign of colder weather. Western shippers are giving almost their entire time to rushing coal forward by lake, and the figures are already far ahead of those of former seasons. To Aug. 1 last season, the shipment was only 1,987,385 tons, which was about the same as the year before, and not exceeded in former seasons as a whole; shipments this season to August are 2,566,206 tons from Buffalo, with every prospect of keeping up the pace. The July shipment of 780,000 tons again broke the monthly record, as has been done once or twice before this season. Lake shipments for the week were 175,000 tons.

COLUMBUS, OHIO

Market steady in every respect. Aug. 1 price list is well maintained. Some car shortage appearing in all the mining districts. Good demand for steam and domestic sizes continues and lake trade is strong.

Strong quotations and steadiness were the chief features of the trade in Ohio during the past week. The demand for all grades continues good and the movement all that could be expected for the time of the year. About the only disturbing factor is the increasing car shortage which had the effect of curtailing the output in all sections of the state. The tone of the market is good and future prospects are considered bright.

Domestic demand is increasing as the fall approaches; many of the larger consumers have placed their orders and dealers are pretty busy making deliveries. Stocks are fair, but with the volume of business being done, orders for immediate shipment are necessary. There is also a considerable trade in domestic sizes for deferred delivery, although there is a disposition to go slow in booking such orders. Threshing is producing quite a good business in all rural sections.

Steam business is also strong and as a result prices show no weakening. Factories are requiring a considerable tonnage to keep going and in many cases their fuel requisitions are being increased. No stocking is being done as yet as purchasing agents believe that prices will not advance materially from this time on. The demand from railroads for fuel is also strong as the freight movement is holding up well. The shipments to the Northwest via the lakes are heavy and no let up of consequence is reported. Lake shipments through the Hocking Valley docks at Toledo so far this season total 1,572,000 tons.

Because of the car shortage, the output during the week was somewhat less than normal. In the eastern Ohio district the shortage of equipment was the most serious and the output is estimated at 75 per cent. of the average. Some shortage was also reported from the Pomeroy Bend and the domestic fields. In the Hocking Valley, a freight wreck of some seriousness had the effect of aggravating the situation.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump.....	$1.70 @ 1.65	....	$1.70 @ 1.65	$1.70 @ 1.65
3-4 inch...........	1.55 @ 1.50	$1.30 @ 1.25	1.45 @ 1.40	1.50 @ 1.40
Nut..............	1.30 @ 1.20	....	1.35 @ 1.30	....
Mine-run..........	1.35 @ 1.25	1.15 @ 1.10	1.30 @ 1.25	1.20 @ 1.25
Nut, pea and slack..	0.70 @ 0.65	....	0.60 @ 0.55	0.65 @ 0.70
Coarse slack........	0.60 @ 0.55	0.75 @ 0.70	0.50 @ 0.45	0.55 @ 0.50

HAMPTON ROADS, VA.

Supply of coal at tidewater normal. Demand good and prices firm. Dumpings for the week heavy and prospects excellent for a record month.

Dumpings at Hampton Roads piers for the week have been heavy. This is particularly true as regards coal moving from Sewalls Point as loadings there have been very heavy. There have been a number of large cargoes moving coastwise and the foreign business has also been good: the shipments have moved to Genoa, Dakar, Valparaiso, St. Lucia, Para and Menos.

Prices for New River and Pocahontas have remained firm, although there is a fair accumulation of coal on all terminals. There has been some demand for Kanawha coal at $2.50 to $2.65, but few sales have been made at the latter figure.

While the dumpings for August may not break the record of previous months at the same time it is predicted by those in position to know that the figures will run considerably over the quantity dumped the same month last year.

LOUISVILLE, KY.

Deficiency in the car supply is causing a shortage which is quite acute on some grades. Demand from the Northwest continues heavy. Industrial and railroad consumption large.

The feature of the local situation is abnormal scarcity of nut and slack at the consuming centers in spite of the rather heavy domestic demand. This is due to the inadequate car supply, for which there is no immediate indication of any improvement. The demand from the Northwest for the prepared grades is still heavy, and most mines are receiving only a fraction of the required equipment for loading. The situation is most acute in the eastern Kentucky field, but applies also to the western district, though probably not so severe.

A heavy demand from the Illinois Central Railroad is tending to further complicate the situation. This road participated in the heavy storing movement, which was general among the railroads some time ago when prices were low, but they still appear to be short and are concentrating their efforts on their own requirements to the detriment of the other freights generally. The industrial consumption is heavy, and there is grave danger of something on the order of a famine developing unless the railroads effect a rapid improvement in the car situation.

The steadily increasing demand for nut and slack of the better grades has put this on a selling basis of 90c., which is more nearly the winter market; the lower grades are quotable at 65 to 75c., with pea and slack strong at 40c. Eastern Kentucky grades continue unchanged at previous quotations, with western Kentucky now quotable at $1.10 for lump, 95c. for nut, and 85c. for mine-run.

BIRMINGHAM, ALA.

A noticeable slowing up in consumption. Coal accumulating on track and dealers are requesting shipments held up.

A pronounced slackening up of orders and requests for delays in shipments on contracts, were the principal items of interest in the coal trade during the current week. As a consequence there is some accumulation on track at various points. Prices have not suffered to any appreciable extent, but unless there is immediate improvement in conditions we may expect lower prices all along the line.

Reports from the state mine inspector's office are to the effect that Alabama mines are now producing coal at the rate of about eighteen million tons per year, which is approximately a 10% increase over the tonnage mined in 1912.

There is no apparent change in the foundry or furnace coke markets.

NEW ORLEANS

Harbor demands heavy. Exports curtailed because of threatening weather at this period of the year. Severe car shortage impending.

Sawmills were among the largest buyers of steam grades during the past week. Most of the mills in this territory use coal as fuel rather than wood, as they are mostly located on rivers where delivery is cheap. Harbor demands were again heavy. With the large crop movement soon to begin and with the prospect of heavier exports than ever before, local dealers are preparing for an unusual demand from shipping interests. The only exports of coal during the week were to Ceiba and Tela, Honduras. Coal shipments to Caribbean points are curtailed as much as possible at this time of year, owing to the hurricane seasons.

While the railroads are still filling orders for cars with reasonable promptness there is plenty of evidence of the approach of an unusually severe car shortage. Alabama stock continues to be moved in as fast as possible. Unusually heavy demands for coal from Texas points is calling for many cars and every effort is being made to get these orders off. No changes in quotations were made during the week.

CHICAGO

Strong demand for smokeless coals and advances in price already made will probably be followed by others. Quotations on screenings have dropped. A scarcity of smokeless lump and egg is reported. The anthracite market is stronger and there is an increasing volume of orders for coke.

Demand for domestic coal, especially the Western variety, is improving steadily. Franklin County operators have advanced their prices to $1.60 a ton, f.o.b. mines, and a large volume of orders are being received at this figure. Carterville operators report a substantial increase in the demand for that coal, and during the next five months it is expected they will be exceptionally busy filling orders. Carterville lump and egg is selling at prices ranging from $1.40 to $1.50 f.o.b. the mines, and higher prices are anticipated.

There has been a marked decrease in the demand for screenings and prices have dropped from 10c. to 15c. a ton; this is attributed chiefly to an oversupply. A scarcity of smokeless lump and egg is reported. The circular price for August on that coal is $2.25, but what little of it appears upon the spot market commands $2.50 and in some instances sales at $2.65 have been recorded. An unusual demand prevails for smokeless mine-run and it is believed in some quarters that there will be a shortage of that fuel within the next four months. This applies not only to the smokeless coals of West Virginia, but also to the low volatile central Pennsylvania grades.

According to a number of dealers, there has been a distinct betterment in the anthracite market and the demand for coke is steadily growing.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$ 2.07	$2.45@2.65	$2.27	
Steam lump	1.87@1.97		2.07	
Egg		2.45@2.65		$4.30@4.55
Mine-run	1.82@1.92	2.30	1.87	3.55@3.65
Screenings	1.42@1.52	1.65@1.85	1.42@1.52	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

DETROIT, MICH.

West Virginia coal in strong demand and market becoming steadily broader. Car shortage quite acute. Prices directly controlled by the supply, which is limited.

Bituminous—The shortage of railroad cars is the main feature of the local situation, and the trade is of the opinion that there will be an unprecedented shortage the coming fall; this is due to the fact that there was no relaxation during the summer, the demand having been insistent and the consumption heavy throughout the entire season. Slack is the only easy department in the trade, and, while there is no surplus, there are at the same time no rush orders.

As a result of the increased buying and the heavy consumption, prices are stronger on all grades. The first of September will probably see gas-coal quotations on the basis of $1.40 to $1.50 for three-quarter lump. The smokeless coals are practically all sold up, and are very firm. The domestic trade is unusually strong, lump and egg having advanced from $1.65 to $1.75 with the supply short; dealers who have failed to purchase their requirements of this grade will be in a serious situation when the fall demand opens up. The Pocahontas domestic coals are particularly scarce, lump and egg now being quotable at $2.25, while it is freely predicted that they will advance to $2.50 or $2.75 in September.

The local market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.75	....	$1.60	....	....	$2.25	$2.25
Egg	1.75	....	1.60	....	....	2.25	2.25
Steam lump	1.50	....	....	....	....	....	....
¾-in. lump	1.35	$1.35	1.25	$1.25	$1.25	....	....
Mine-run	1.20	1.20	1.20	1.20	1.20	1.50	....
Slack	1.00	1.00	0.65	0.65	0.65	....	....

Anthracite—The local anthracite market is steady with prices firm, due probably to the prospective car shortage. The local demand is in excess of the arrivals and premiums of 25c. have been asked in a few cases on egg and stove.

ST. LOUIS, MO.

Steam trade weakening and indications are it will continue. Domestic market stronger, and coal actually scarce. Car shortage reported on practically all roads. This will have a tendency to enliven the market.

The warm weather has not affected the rising market, as far as domestic sizes are concerned; as a matter of fact, coal has been in demand during the past week from the high-grade fields, with a decided shortage. The screenings market continues to drop, Carterville now being quoted at about 30c., with Standard grades at 25@30c. By the first or fifteenth of September, Carterville screenings will be down to about 15@25c., and the Standard operators will be lucky if they do not have to pay the railroad companies to dispose of their screenings; the market is absolutely demoralized, and will likely continue so until about November. Of course, this means a sharp advance in screened sizes, and all mines are from one to two weeks behind on the shipments of lump and egg.

The car shortage is getting serious on practically all the roads in the high-grade fields, and indications are that it will make itself felt to a greater extent within the next 30 days than ever before. The Standard market is coming into its own, as far as the screened sizes are concerned, but steam coal is going backward.

Anthracite is moving slowly, with more coke on the market than there is call for. Very little smokeless is coming in and there is not likely to be any if the outside market continues to soar, as St. Louis will not pay the price.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.95@1.00
3-in. lump	....	....	$1.25	....
6-in. lump	$1.40 @ 1.60	....	1.30	1.20
Lump and egg	....	$2.10	1.40	....
No. 1 nut	1.20 @ 1.30	....	1.05	0.87½
Screenings	0.65	....	....	0.80
Mine-run	1.50	....	....	0.75
No. 1 washed nut	1.35	....	....	....
No. 2 washed nut	1.20	....	....	....
No. 3 washed nut	1.20	....	....	....
No. 4 washed nut	1.10	....	....	....
No. 5 washed nut	0.85	....	....	....

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for July and the first seven months, of the years 1912-13, in long tons:

	July		7 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading	902,763	1,217,892	7,761,147	19.24	6,479,227	20.01
Lehigh Valley	1,011,987	1,144,678	7,604,118	18.85	5,857,344	18.09
Cent. R.R. N. J.	775.550	865,618	5,351,214	13.27	4,237,708	13.08
Del. Lack. & West	871,677	883,312	5,661,037	14.03	4,600,896	14.21
Del. & Hudson	589,589	687,843	4,094,128	10.15	3,261,055	10.07
Pennsylvania	439,912	545,655	3,607,018	9.94	2,900,546	8.96
Erie	683,161	708,568	4,762,953	11.81	3,876,540	11.91
Ont. & Western	213,213	231,587	1,498,091	3.71	1,169,246	3.70
Total	5,487,852	6,265,153	40,339,706	100,00	32,382,132	100.00

Stocks at Tide on July 31 were 537,404 tons, an increase of 4375 tons. Stocks on same date of previous years were:

1907.	1908.	1909	1910	1911	1912	1913
645,030	886,653	1,006,195	896,064	826,396	380,088	537,404

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to Aug. 1 were 1,425,554 tons as compared with 505,225 tons for the same period last year.

Bituminous Shipments for the same periods were: 7,986,881 for the current year as compared with 5,981,229 in 1912, making gross of 9.412,435 for 1913 and 6,486,454 in 1912.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Aug. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	124	144	20
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	1,024	300	**724**
Ohio; Indiana; Michigan; Western Pennsylvania	340	1,263	923
West Virginia, Virginia, North & South Carolina	709	1,612	903
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	150	425	275
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,556	135	**1,421**
Montana, Wyoming, Nebraska	202	0	**202**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,486	25	**2,461**
Texas, Louisiana, New Mexico	195	53	**142**
Oregon, Idaho, California, Arizona	2,024	72	**1,952**
Canadian Lines	0	0	0
Totals	8,810	4,029	**4,781**

*__Bold face__ type indicate a surplus.

FOREIGN MARKETS

GREAT BRITAIN

Aug. 1.—In view of the nearness of the August holidays, business is very quiet and prices are unchanged as follows:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$4.08@4.20
Best seconds	4.56@4.68	Seconds	3.96@4.02
Seconds	4.32@4.50	Best Cardiff smalls	2.46@2.52
Best dry coals	4.32@4.56	Seconds	2.34@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

British Exports—The following is a comparative statement of British exports for June and the first six months of the last three years, in long tons:

	June		6 Months		
	1912	1913	1911	1912	1913
Anthracite	189,973	218,814	1,169,675	974,193	1,407,090
Steam	3,928,199	4,397,791	22,985,294	18,720,167	26,034,247
Gas	1,161,590	986,510	5,074,073	4,487,837	5,510,405
Household	154,856	144,792	713,568	640,455	855,375
Other sorts	322,026	258,503	1,551,349	1,350,671	1,719,118
Total	5,756,644	6,006,410	31,493,959	26,173,323	35,526,235
Coke	51,139	75,336	462,559	388,108	499,670
Manufactured fuel	108,649	185,162	851,867	635,283	1,022,232
Grand total	5,916,432	6,266,908	32,808,385	27,196,714	37,048,137
Bunker coal	1,561,215	1,721,016	....	8,125,897	10,087,037

FRANCE

French imports and exports for the first five months of this year and last year were as follows:

	Imports		Exports	
	1913	1912	1913	1912
Coal	7,543,700	5,708,100	583,299	929,194
Coke	1,389,800	1,086,500	97,021	67,618
Briquettes	439,900	447,900	74,091	87,662

BELGIUM

The following are the Belgium imports and exports for the six months of the current year:

	Exports		Imports	
	1912 Tons	1913 Tons	1912 Tons	1913 Tons
Coal	2,451,753	2,400,839	3,884,851	4,482,544
Coke	463,406	520,291	454,372	610,361
Briquettes	338,828	282,969	201,295	236,557

EGYPT

Coal imports into Egypt for the year of 1912 amounted to 7,783,490 tons, as compared with 6,486,214 tons in 1911. The principal shippers were England, which furnished 89%, the United States with 6%, and Germany with 4%.

SPANISH IMPORTS

Coal imports into Spain for the five months to May 31 of the current year were 1,161,841 metric tons, as compared with 883,372 tons for the same period last year. Coke imports for this period of the current year were 156,495 tons as compared with 169,516 tons for the same period last year.

COAL FREIGHT DECISIONS

Suspension Docket No. 196—Switching Charges at Chicago (Chicago, Milwaukee & St. Paul Ry.).

1. Coal consigned to stations on the Chicago, Milwaukee & St. Paul Railway in Chicago is delivered to that carrier at Galewood, a station on its rails within the switching limits of Chicago. Heretofore the Chicago, Milwaukee & St. Paul has received for its service from Galewood $4 per car out of the joint rate from the mines, plus 10c. per ton on all excess over a given weight from the shipper. It now demands 20c. per ton. The carriers to Chicago contend that they cannot afford to absorb the additional amount over the present $4 per car and accordingly filed tariffs in cancellation of the joint rates, leaving the shipper to pay the Chicago rate plus the 20c. per ton now demanded by the Milwaukee, minus, however, the $4 per car which the carriers from the mines are willing to continue to absorb. **Held:** That the resulting advance in the rate to the shipper is not justified and the proposed tariffs should be canceled.
2. Switching conditions in Chicago leading up to the establishment of the present basis of charges and absorptions in the Chicago switching district, as published in the Lowrey traiff, discussed. **Opinion No. 2314.**

I. C. C. No. 3538—Consolidation Coal Co. (of Maryland) vs. Baltimore & Ohio R.R.

Allegation that unreasonable charges result from the initial carrier's failure to furnish cars of the capacity ordered by shipper not sustained. **Opinion No. 2318.**

I. C. C. No. 4480—Shoal Creek Coal Co. vs. Toledo, St. Louis & Western R.R.

Advances in rates on bituminous coal from Panama, Ill., mines to Burlington, Fort Madison, and Keokuk, Iowa, not justified by defendants. **Opinion No. 2319.**

I. C. C. No. 3854—Coke Producers Association (Connellsville) vs. Baltimore & Ohio R.R.

Rates on coke in carloads from the Connellsville producing region of Pennsylvania to various destinations are attacked as unreasonable per se, unjustly discriminatory, and unduly preferential; **Held:**

1. That the rates to Youngstown, Canton, Cleveland and Toledo, Ohio; North Cornwall, Robesonia, Reading and Philadelphia, Penn.; Baltimore, Md.; and Newark, N. J., are unreasonable per se.
2. That the present relationship of rates as between the Connellsville district and the Fairmont district in West Virginia is not unduly discriminatory against Connellsville or unduly preferential to Fairmont and must be maintained.
3. That participation by defendants in through rates from West Virginia and Tennessee fields, which yield lower earnings per ton-mile than their rates from the Connellsville field, is, under the conditions of competition between carriers which defendants cannot control, neither unduly discriminatory nor unduly preferential. **Opinion No. 2324.**

I. C. C. No. 3998—Memphis (Tenn.) Freight Bureau vs. Louisville & Nashville R.R.

Rates of $1.10 per ton on coal from western Kentucky and Alabama mines not found to be unreasonable. Complaint dismissied. **Opinion No. 2229.**

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 9:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	82	82	82	87	80
American Coal Products Pref.	105	101	101	109¼	105
Colorado Fuel & Iron	32½	30¼	31¾	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com.	52½	49	51	52½	47¼
Island Creek Coal Pref.	82	82	82	82	80
Pittsburgh Coal	19⅝	18½	19	24⅜	14½
Pittsburgh Coal Pref.	85½	82⅛	84¾	95	73
Pond Creek	22	20	21¼	23¾	16½
Reading	161	158	158¼	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	88¼	88¼	88¼	95	84
Virginia Iron, Coal & Coke	40	40	40	54	37¼

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	98	95½	July '13	93⅝	99⅛
Colo. F. & I. gen. 6s	103	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	82	Sale	82	83	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	85⅞	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	80¼	82½	80⅛	80¼	73	80¼
Tenn. Coal gen. 5s	99	99½	99¼	99¼	99¼	103
Birm. Div. 1st consol. 6s	101	102	101	April '13	101	103
Tenn. Div. 1st g 6s	101	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	103	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92⅛	93	92	92⅛	92	98

No Important Dividends were announced during the week.

Rocky Mountain Fuel Co. (Denver)—This company, reincorporated in Wyoming, has arranged to increase its capital stock from $8,000,000 to $10,000,000 preparatory to making an issue of $10,000,000 new bonds, of which $4,000,000 will be reserved to retire the $4,000,000 5% bonds of 1911, and the remainder will be used for extensions and additions, as required.

American Coal Products Co.—This concern was incorporated under the laws of New Jersey, Feb. 6, 1903, and owns and operates, through its subsidiaries, some forty plants for the manufacture of coal products, which are scattered in 37 cities of the United States and Canada. The company owns all the stock of the United Coke & Gas Co. and nearly all of the stock of the Barrett Manufacturing Co.; also has an interest in the United Coke & Gas Co., which took over the by-product, coke ovens and other patents comprising the Otto, Hoffman and United Otto system of construction.

Texas & Pacific Coal Co.—This concern owns 60,000 acres of coal land in Texas and on Apr. 20, 1910, stockholders voted to increase authorized stock from $2,500,000 to $3,500,000, but to June, 1912, no new stock had been issued. The company has been declaring dividends at about the rate of 1½% per quarter, regularly.

The Alabama Consolidated Coal & Iron Co.—The reorganization plans of this company provides for an assessment of $30 per share on preferred and $15 on the common. It is also proposed to issue $1,000,000 of 6% 20-year bonds of which $550,000 will be sold which, together with the assessment, will be used for paying off the indebtedness of $1,150,000; the new capitalization will be $7,869,000 as against $6,969,000 as at present.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

Volume 4, No. 8
Issued Every Saturday
Hill Publishing Company

NEW YORK, AUGUST 23, 1913

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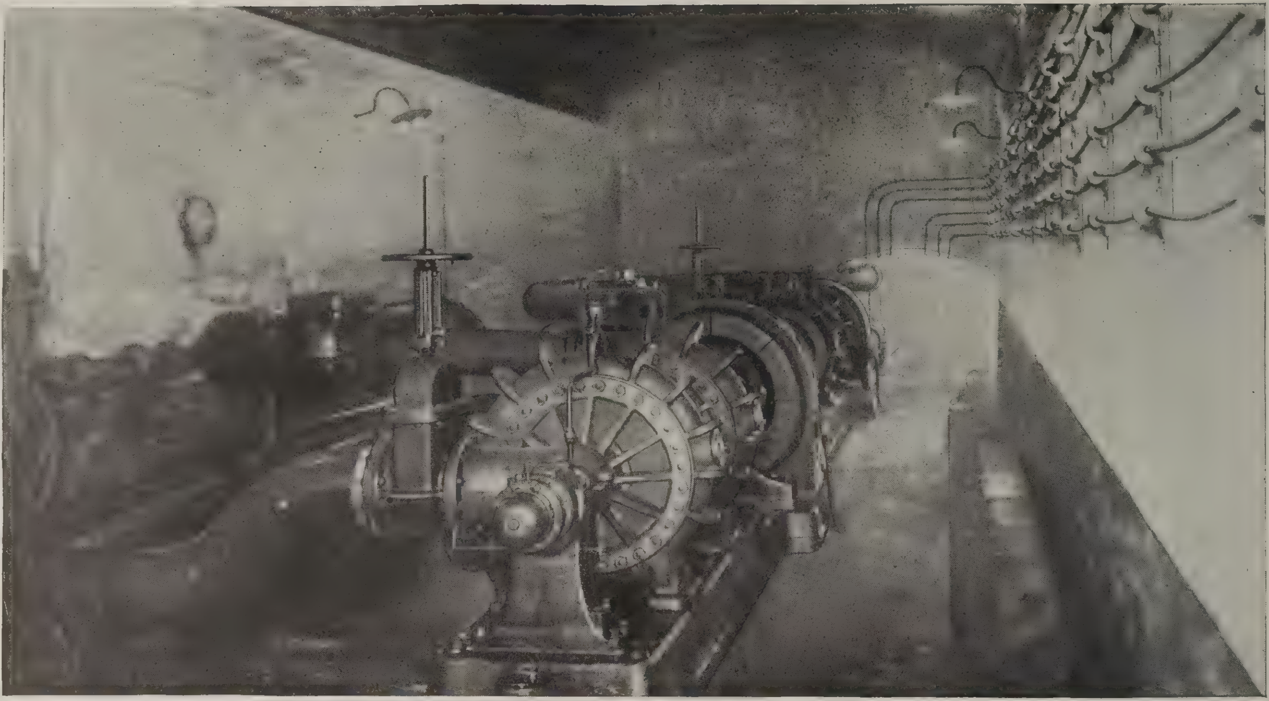
Pittsburgh Coal Co's loading machine on the Erie Railroad tracks at Cleveland, O. This is a typical apparatus for loading bituminous coal on the lakes

COAL AGE



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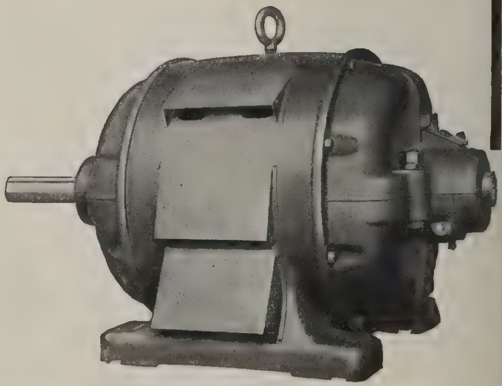

Motor with Drip-Proof Covers

COAL AGE

FLOYD W. PARSONS, *Editor.*

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None sent free regularly, no returns from news companies, no back numbers

The Value Of A Trademark

The Weekly Ad-Talk Page

Many times advertising salesmen have had their prospective customers say, "Not yet! I believe that my machine is one of the best on earth for its purpose. It's the result of years of thought and work, but it has just one defect, a slight one, but until that's eliminated I won't advertise.

"I could sell many of them through your paper—but they wouldn't stay sold.

"I couldn't get a single repeat order nor an order through the recommendation of a user; and you know as well as I do that my advertising would prove a failure unless my goods made good.

"In brief, I can't afford to put my trademark on this machine and advertise it because it has not yet reached the *standard* which our trademark represents."

There's an illuminating point in those remarks for every buyer.

When a manufacturer adopts and advertises a trademark he guards it jealously. For him it possesses a living, breathing personality—an individuality. It is *himself*—his aims, his objects, his ideals.

He knows that, properly advertised and lived up to, that trademark becomes the most valuable asset in his business.

He knows that, once well known and established, the "good-will" represented by that trademark will bring a greater price than his factory, his equipment, his office furniture, the office cat and the office boy combined.

If you doubt that, try to buy the right to do business as jewellers and silversmiths under the name of Tiffany & Co.

Their enormous stock of precious stones, their objects of silver and gold are not worth one part of the value of the simple firm name.

When a manufacturer trademarks a machine he sets upon it the seal of his belief in it.

Then he spends thousands to advertise it with the belief that the *repeat orders* will pay him for his advertising investment. He knows the machine from A to Izzard—how it will work under all manner of conditions.

This development work is costly to him, but he knows it is necessary.

So he tries it out, works over it, experiments in all directions until he knows it is right.

Then he advertises.

Under these circumstances is it to be wondered at that goods continuously advertised are *reliable*?

Or can there be any doubt that it *pays* to read advertisements and buy advertised goods?

A trademark is not necessarily a picture nor a "slogan," nor does it necessarily, in the sense we refer to it, have to bear the word "Trademark."

It may be just the name of the firm.

Honest firms are not putting their name onto dishonest goods.

And dishonest firms are not doing much advertising. They can't.

Suppose, for instance, that a concern advertising in Coal Age were, through some oversight on the part of their advertising writer, to make a technical misstatement in their advertisement.

How long would it take the well informed readers to discover the error and flood the editorial department with letters?

We know because it has happened.

And advertisers know it, too. None of them is looking for such unfavorable publicity.

The "white light that beats upon a throne" isn't a circumstance to the flooding brilliancy surrounding advertised goods.

It is your measure of protection when you go into the market to buy.

COAL AGE

Vol. 4 NEW YORK, AUGUST 23, 1913 No. 8

"There lived an old woman in Gath
Who threw her child out with the bath."

A nonsense jingle say you—satire say we.

For example:

You are one of the fellows who honor the scriptural injunction "Love thy neighbor as thyself." If your "buddie" goes broke, your purse is open to him, if he gets sick your time is at his disposal, if he meets with an accident in the mine you are willing to risk your life, if need be, to aid in his rescue, if he should die you take the lead toward giving him proper burial and his family may lean on you for advice and assistance at any time.

But—. Time and again you've been warned not to do certain things, you've been told that to do so is criminal carelessness; to make the thing more impressive, if possible, you've been told that 80 percent. of all accidents in mines are due to negligence and the greater percentage at that to the carelessness of others than the ones who are the victims. And yet in spite of all these facts, you become so self centered at times (like the woman from Gath), and so anxious to finish certain work that you throw caution to the winds and shortcut your tasks in spite of the danger to yourself and to others. Even if your own son be in the pit, you do not for a moment allow that fact to influence you.

Here's a paradox in human nature: Men willingly give hours of time to relieving distress, but often refuse minutes toward preventing it. Why? Probably because they do not realize what is required.

We've reached a point in safety-first campaigns where little more progress can be hoped for until some one hits on an effective way of making coal workers realize that the man who deliberately risks his own life is as much of an enemy to mankind as the one who is willing to commit murder.

If you cannot see satire written all over the "Gath" jingle, it's because you do not realize that it is possible for parents to become so self centered that they can forget their own children. The lesson of the satire is wasted because you refuse to see anything but the child and you insist that every mother loves her offspring. In fact, you take the same position that the average man takes when we load him down with "don'ts." He seems to think that we are trying to persuade him to love his neighbor and he resents this because he is positive that he does love his neighbor.

Let's carry the jingle illustration a little further. Suppose some "well meaning society lady" learning about the mother from Gath should swallow the jingle whole and decide to make a trip into Gath to educate the mothers of that country as to the sinfulness of throwing children out with the bath water. Would she be showered with gratitude? We think not.

Much well intended effort has been wasted on the miner. Let's not hold that against him. Nor should we despair. Surely men who are capable of the heroism displayed after most mine explosions will not balk at a few rules of discipline unless they are approached on the blind side.

IDEAS AND SUGGESTIONS

The Salaried Man

By Josiah Keely*

The word "hustle" has been worked overtime in describing American methods of doing things. For a long time the coal business was "hustled." Then "efficiency" came in for a large share of attention, and is still used in a vague sort of way to describe intelligent hustling. But in spite of improved machinery, new methods, and highly organized corps of officials, many people look back to the early days when the output was greater and the cost less.

You ask operators the reasons and they will tell you that other industries have attracted their good miners, that labor unions have taken away the individual efforts of their workmen, that there is a shortage of labor, that the quality of service has depreciated, and that much of the old time hustle has been absorbed in competition, all of which may be in part true.

Probably little is to be gained by reviewing the past, but the further back we go the nearer together we find the operator and the miner. In fact, we might say that in the beginning the miner was the operator, but the coal industry has developed until the operator is a syndicate and the system of operating is a collection of jobs at one end and a handful of miners at the other, with much lost motion among the holders of company positions.

Stockholders Are Interested in Dividends

The stockholders are naturally more interested in dividends than in coal; the managers are holding their positions by virtue of their ability to produce dividends; the heads of the departments draw salaries in proportion to their influence with various interests; the division superintendents sometimes visit the mines but oftener are more concerned with reports, high-priced experts are employed and are interested in the expertness of their own particular work.

When it comes down to the mine superintendent, he is the coal getter, but delegates his authority variously. He is supposed to be working under instructions—instructions from the heads of departments, instructions from the division superintendents, instructions from the experts, but always instructions. If he goes counter to said instructions and "gets away with it," he is often forgiven and sometimes promoted. If he disobeys and fails to accomplish results, off goes his head. If he follows instructions not wisely but too well, and conditions, or his manner of execution, preclude results, he is straightway marked for the guillotine.

The mine foreman and other job holders manage from day to day as necessity demands, sometimes complaining of breakdowns and lack of material, and sometimes anathematizing the lazy, perverse miners. It is the toiler whose efforts are cumulative that still sometimes manifests the traditional hustle. True, he looks forward to a season of rest when he may enjoy his accumulations, but he rarely feels that he has arrived at that goal.

On the other hand, the job-holder having this same dream of a period of ease, sooner or later imagines that the time has come for him to hold his position by virtue of long service. Your trackboss must at one time have been something more than the average wage earner, and, if his zeal had continued, he might have become assistant to the mine foreman; he may prove not even a good trackboss, he arrived after his first promotion.

The mine foreman has been a good workman, a good under boss, and starts in as a good pit-boss. Why, with this record, should he not get better? He has had a dream of rest, and, although he may be good enough to be retained for years, he has struck his gait as a job-holder and arrived.

The mine superintendent, of all men, must have at one time been a hustler. He has made good somewhere. He has had numerous promotions. He is a man with a record. The powers do not pick up just any sort of a man to experiment with as mine superintendent. He has now what most of his men consider the highest position to be attained. They have heard of the manager, but they see the mine superintendent in all his importance. He sometimes wears a white collar right on working days and calls the men of the main office by their first names. Then, why, in the prime of life, should he not make good and in turn be promoted?

Of course, there is the possibility of his having been overestimated, but the chances are that he has listened too often to the call of the job, has dreamed that dream of rest, and feels that, with family, with influence in the community, and with some association with the men higher up, he has arrived. He straightway sets him out a vineyard, plants a hedge; he takes unto himself horses, cattle and chickens. Feed is convenient, labor is handy, and the company store is well stocked with the necessities of life. He has perhaps served long and faithfully. He rests. True, he has activities; he may run a Sunday school, be a politician, a speculator, or a sport, but so far as the coal industry is concerned, he rests.

It is needless to follow the tendency up through bigger jobs where the vineyards and cows give place to automobiles and fine residences and where the innocent pastimes of peddling official influence and farming out company labor are forgotten in the excitement of big deals and subsidiary organizations.

The Toiler's Dream

Far be it from any of us to disclaim having listened to the call of the job, of having dreamed the toilers' dream, but when we pull apart the fabric of the modern coal syndicate with the job-holders at one end and the miners at the other, we are reminded of that old trick of the fragile woman of the circus, holding in one small hand the end of a pole which a dozen lusty farmer youths are trying to push down to the platform. The only sleight is that she has so arranged their hands on the pole that each is pushing against the other, while she holds the lever end.

---

*District superintendent, Acosta, Penn.

Nor can we make any claim to astuteness in so characterizing one of the weaknesses of the efficiency struggle in our larger coal operations. It may not even be a new way of appealing to job-holders for more ambition, but we believe that while coal is now paying our salaries at a loss over the early days, it might be paying even better incomes and larger dividends, if officials from mine foremen to managers could put off a little further in the future that time of rest and try for one more promotion before listening to the call of the job.

⁂

Some Practical Short Cuts

By Alexander Franklin

State mining laws invariably specify that foremen shall have a certain number of years practical experience in the mines. This is, of course, a desirable provision, but it must be remembered that experience is, after all, but one requisite for a position of responsibility. If the foreman lacks initiative or does not possess a nimble and active mind, capable of devising ways and means for meeting the continual unprecedented emergencies, his experience will count for little.

An instance of this kind came to my attention recently. In making a change in the ventilating system of a mine, it was found necessary to cover an overcast. A job of this kind is often difficult to handle satisfactorily because of the insufficient head room available. In this case the foreman remembered a lot of old discarded pipe which he ordered placed over the opening and covered with a layer of cement. The job proved economical, permanent and satisfactory in every respect, in addition to which, it also solved the problem of finding a disposal for the old pipe. While apparently simple enough in itself, this is, nevertheless, a good example of the effectiveness of a little headwork.

In this same mine another incident occurred showing how important economies can sometimes be effected by a little careful thinking. As is well known, the Pennsylvania mining law requires that no rooms be turned ahead of the ventilation except with the special permission of the inspector. In this case the entrymen laid wooden tracks inside of the last crosscut and these were used until it became necessary to put in a switch at the next breakthrough inside. The wooden track was then torn up and replaced with steel, so that when the machines made their cuttings for the room neck, they stood so high on the new track that it was invariably necessary to pay yardage for taking up the bottom.

The plan was finally evolved of turning the room immediately the entry had been driven far enough to accommodate the new work without crowding. Permission was accordingly obtained from the mine inspector, and the new system tried and found to present advantages.

In the first place the machinemen took a "side swipe" at the room neck while they were unloaded to make the entry cut, thus giving them an additional cutting without making an extra move. The entrymen could also be loading out of the room neck while the machinemen were cutting the entry, which obviated this customary period of idleness. As the cutting was made on the bottom the usual yardage paid for taking this up was eliminated. And finally when the steel track was laid all the switches for the rooms could be located at the same time and this work completed at one operation.

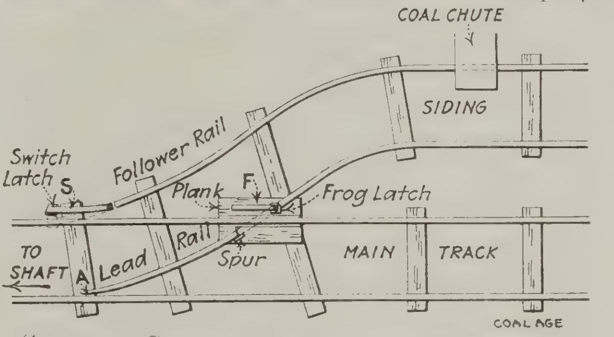
Doubtless many others have had similar experiences as these. The examples cited are simple and embody conditions in the everyday working of a mine. Nevertheless, they show the enormous discrepancy that may occur through the lack of a little headwork.

⁂

To Expedite Loading Cars on Light Pitches

By Ralph W. Mayer*

Much time is often lost by the motorman being required to wait for the loading of cars where the pitch of the seam is so small that the inclination of the loading chute is not sufficient to cause the coal to slide rapidly into the car. In such a case, much time is saved by laying a switch at each chute, as shown in the accompanying figure, so that the empty car can be set out on the switch.



Showing General Arrangement of Switch

In this arrangement, it is advisable to adopt a special form of switch that will leave the main track unbroken. Such a switch is shown in the figure. Instead of a frog there is a frog latch (*F*), which is pivoted on one end by a bolt. When swung into position across the rail of the main track, the other end of the latch is held in position by the spur shown in the figure, and is otherwise secured by a grooved plate spiked to the plank underneath the lead rail. The lead rail has a fixed point, as shown at *A*. The end of the lead rail at the frog latch is elevated sufficiently above the rail of the main track to accommodate the frog latch when laid across that rail.

The switch latch, on the follower rail, is also pivoted on one end by a bolt, as shown at *S*. When in position, this latch is swung over and laid on top of the rail of the main track where it is held in position by a slight projection on its underside.

This arrangement gives a clear main track, and the motorman is not required to wait while the car is being loaded. In most cases, a switchman cuts off the empty car at the switch, without the motor stopping. The miner then runs his loaded car onto the main track and sidetracks the empty car, which he loads at his leisure. The motorman returning gathers up the loaded cars standing on the main track.

⁂

The average annual earnings of all classes of labor in the mines of Germany in the year 1912 amounted to $340. In 1890 the average amounted to only $260, so that in the intervening 22 years, wages have increased a little over 30 per cent.

---

*Roslyn, Wash.

Tertiary Coal Fields of the Rio Grande

By B. L. Miller*

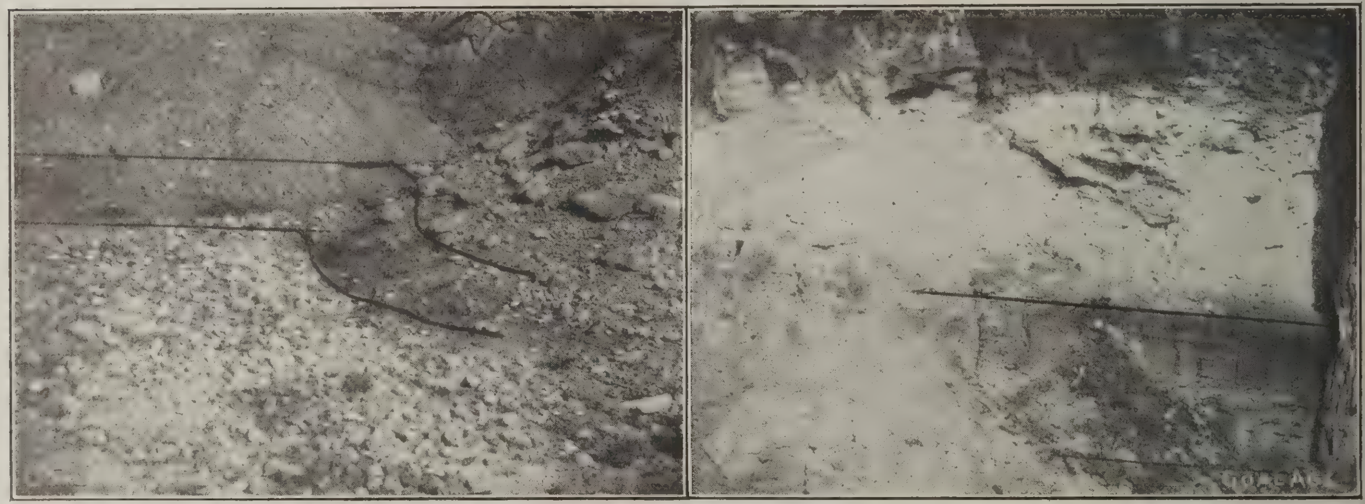
SYNOPSIS—The mines of the Laredo field are extracting at a profit coal which is from 24 to 30 in. thick. Prices of the fuel at the surface are three times those obtained for coal at Pennsylvania mines. The coal is not a lignite but has many points of resemblance to cannel coal.

⁂

The Southwestern portion of the United States and the greater part of Mexico have long been known to be markedly deficient in fuel supplies but until recent years this lack of fuel has been of little consequence. The small supply needed, when the country was occupied only by scattered ranchmen, was furnished by the scanty vegetable growth characteristic of semiarid regions. There were few towns of any considerable size and such as did exist contained no industries demanding large supplies of fuel, while the mild climate did not necessitate much artificial heat in the houses of the residents. Under these conditions the known deposits of coal occurring in these regions received little attention.

With the rapid industrial development which has recently been taking place in the Southwest a change has come and attention is being directed to new sources of fuel supply. Especially is this true in regard to southern Texas. Many new railroads have been built and more are projected and general agriculture is replacing the occupation of ranching which formerly was almost universal. The population is rapidly increasing and new industries of various kinds are being started, all of which require large supplies of fuel.

Fortunately for this district petroleum was discovered in Beaumont, Tex., some years ago and later in several other places in the same state and in Louisiana, while natural gas has also been found, although unfortunately in most places in rather small amounts. But the supplies of petroleum and natural gas from Texas and Louisiana have not kept pace with the increasing demand for fuel and southern Texas has been compelled to obtain large supplies of coal from Oklahoma, Arkansas, Colorado and New Mexico. The transportation charges on account of the long haulage, however, are excessive and would tend to discourage many industries. McAlester, Okla., coal retails in San Antonio at $10 per ton while crude petroleum is gradually advancing in price.



Outcrops of Coal along Espada Creek

Coal of Three Geologic Periods

Despite these conditions, Texas has thus far failed to take advantage of some of her coal deposits, though they appear promising enough. The coal fields of Texas are varied in character and rather widely distributed. They belong to the Carboniferous, Cretaceous and Eocene geologic periods and represent all the gradations between soft brown lignites and a good grade of bituminous coal. The Carboniferous coal fields lie in the north central portion of the state about 150 miles northwest of Austin. The Cretaceous coal deposits are confined to a rather small area in the vicinity of Eagle Pass. Both the Carboniferous and Cretaceous coals are bituminous in character.

The Eocene coal and lignite deposits are extensively developed in a broad belt extending across the state from the southwest corner of Arkansas to the Rio Grande. Except in Webb and Dimmitt counties all these carbonaceous deposits consist of lignite which has been worked in many different locations but not extensively in any one place. The supply is great but its deterioration in shipment has restricted it to local use. In Webb and Dimmitt counties, however, the Eocene contains deposits of a good grade of bituminous coal which possesses many of the characteristics of cannel. Only along the Rio Grande in the former locality has the coal been worked but it has been encountered in some well borings in the latter county. The purpose of this paper is to describe the geology of the Webb County coal deposits.

The Laredo Coal Field

The Webb County coal field borders the Rio Grande River and extends from a point about 15 miles above Laredo for a distance of 35 or more miles. The field is frequently called the "Laredo Coal Field" and a recent map of the United States Geological Survey locates it along the International and Great Northern R.R., extending about 10 miles on either side of Laredo along the river. This is incorrect, as the coal field lies entirely northwest of the location mentioned.

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*Professor of economic and field geology, Lehigh University, South Bethlehem, Penn.

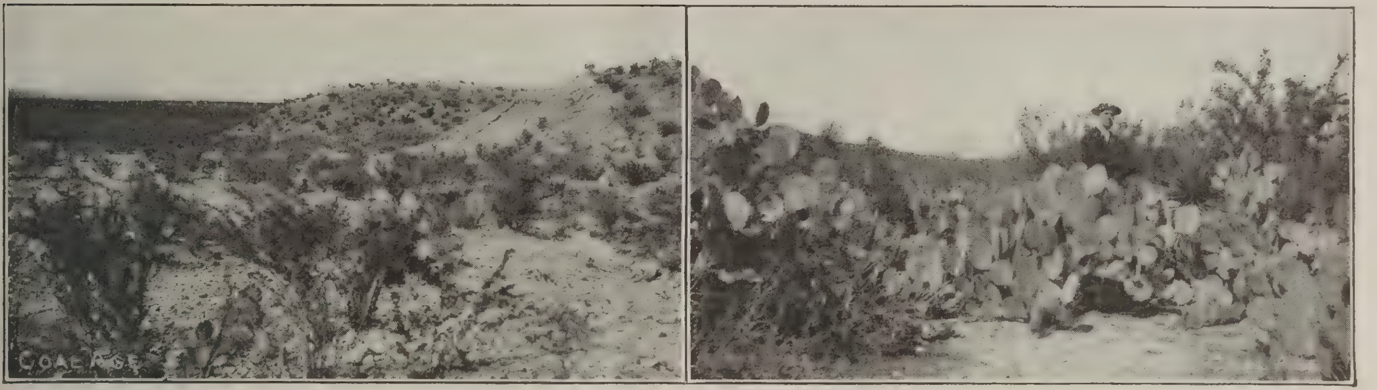
The coal of this region has long been known. It was mentioned in the report of the United States and Mexico Boundary Survey published in 1857 and by early travelers in that region. No use could be made of the coal, however, until a railroad was constructed. About 25 years ago the Rio Grande & Eagle Pass R.R. was built from Laredo into the lower portion of the field and mines have been in operation there ever since. At the present time two companies are operating in the district. The Cannel Coal Co. has mines at San José and Cannel and the Santo Tomas Coal Co. is operating at Minera.

The coal occurs in thin beds which outcrop in many places along the Rio Grande River and the creeks or arroyos that enter the river from the north. The country is semiarid and covered with a moderately heavy growth of cactus, mesquite and various other kinds of thorn-bearing plants. The arroyos that lead into the Rio Grande contain water in pools during most of the year but in order to obtain sufficient water for the cattle in the ranches, reservoirs (called tanks) are formed by the construction of dams across these waterways and the water impounded for use in the dry season.

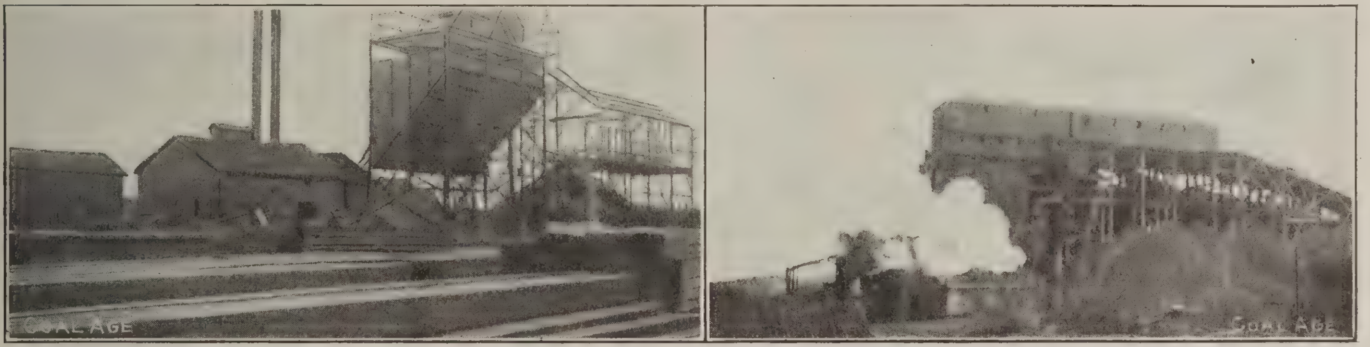
The Rocks Are Not Well Cemented

The principal rock of the region is a shallow-water cross-bedded, gray to buff sandstone that shows ripple-marked surfaces in many places. The grains of quartz are rather loosely cemented together and wind erosion is able to wear away the softer layers in exposed cliffs with ease. The harder layers are responsible for the flat-topped isolated hills that are seen in many places and also explain the rapids in the river. Interbedded with the sandstone layers are numerous beds of drab clay with occasional layers of ironstone and carbonaceous shale and coal. The clay contains much gypsum and on a clay slope crystals of clear selenite are abundant. Clay concretions both large and small are also common.

Limestone of a soft porous character outcrops in a few places several miles back from the river. Over almost the entire region with the exception of the steep slopes and the silt-covered river terraces there is a thin cover of quartz and quartzite pebbles among which are many pieces of petrified wood, jasper and chalcedony.



Typical Scenes in the Laredo Coal Fields



San José Mine of the Cannel Coal Co.

(New steel tipple now being erected at shaft.) (The old wood tipple with slope approach.)

In certain places the Rio Grande is bordered by high bluffs of the Eocene sandstone and clays that are in many places about 100 ft. high. In most places, however, there are two fine-silt terraces bordering the river. One of these rises only about 20 ft. above the water while the other lies at an elevation of about 40 ft. higher. In many places the lower one has been cut away and in some places both are now absent. These silt terraces extend back from the river to a distance of several miles in some places. They have attracted much attention in recent years since it has been found possible to grow a fine quality of Bermuda onions in them by means of irrigation. The water is pumped from the river for the purpose.

The Fuel Produced Is Not Lignite

The coal of the field has frequently been described as a brown coal or lignite. This is certainly not the case, as the coal has a luster and breaks with a glossy conchoidal fracture. It contains much volatile matter and has an oily appearance similar to cannel coal. It also resembles that fuel in the way it burns and it may properly be called semicannel. Dumble likened it to hardened asphaltum.

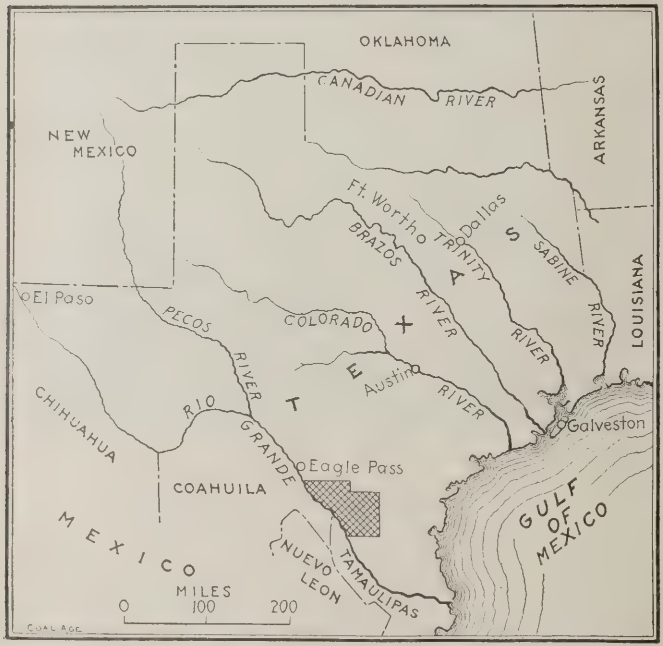
Thin seams of an intensely black glossy material resembling jet that breaks readily into angular fragments are occasionally found within the coal bed. On exposure to the air it weathers slowly and many of the outcrops show coal of a comparatively fresh appearance. It does not crumble readily so that there is little dust produced in the mining or shipping of the fuel.

The U. S. Geological Survey publishes the following analyses, made by S. H. Worrell, of the coal from two of the present working mines:

ANALYSIS OF COALS IN WEBB COUNTY, TEXAS

Proximate analysis, dry				Ultimate analysis, dry					
Moisture	Volatile	Fixed Carbon	Ash	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	B.t.u. dry
2.30	54.00	37.97	8.03	71.04	5.65	10.03	3.00	2.25	12,604
2.80	50.45	38.10	11.45	66.06	5.72	12.18	2.50	2.09	11,740

The coal comes to the surface in the tributary arroyos of the Rio Grande for a distance of about five miles from their mouths. A dip of about 1 deg. to 2 deg. northeastwardly causes the coal beds to disappear from view farther to the northeast. The strike of the coal beds and associated sandstones, while not constant, is approximately parallel to the course of the Rio Grande.



THE STATE OF TEXAS, WITH WEBB COUNTY CROSS-HATCHED

The coal outcrops in a few places on the Mexican side of the boundary and an attempt was made to mine it at one time at a point opposite Minera. Much money was expended in building a railroad from Nuevo Laredo and in equipping a plant but the coal bed was found to dip beneath the river and not to be present on the Mexican side in sufficient quantities to permit operation.

In most places there are several beds of coal, the thicker ones of which are continuous over large areas. The thinner beds are less persistent and in places can be seen to die out by passing into carbonaceous shale. Occasionally thin lenses of shale are also encountered within the coal bed but these are seldom persistent or thick.

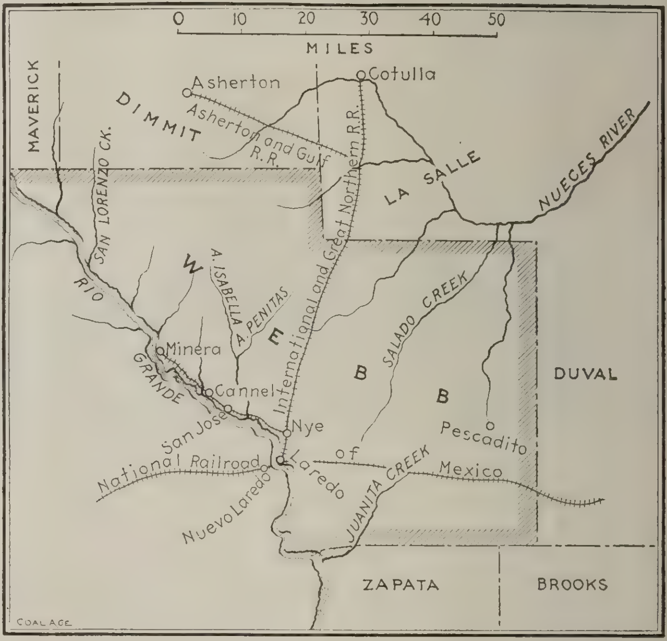
Slickensides in Roof and Small Faults in Coal

The roof of the coal is in most places a clay or clay shale, drab to black in color, and varying from a few inches to a few feet in thickness. Gray sandstone in most cases lies a few feet above the coal bed. The clay does not make a good permanent roof, as it tends to scale off and fall. In the working rooms of the mines few supports are used but considerable timbering is necessary in the entries.

The region has undergone some disturbance as shown by occasional normal faults, which are always small, the throw being seldom more than 1 or 2 ft. The largest fault observed was in the San José mine, and had a throw of about 4 ft. 6 in. In the vicinity of the faults the overlying clay layer shows much slickensiding, which makes the roof fall readily. But even in such places when the coal is blasted down, the roof does not fall with it so that as the coal as mined is unusually free from any adherent impurities.

Thin Coal and High Prices at Tipple

The coal beds are thin in comparison with those of the Eastern fields, and it would seem that they could not be worked with profit. When it is realized, however, that the Rio Grande coal at the mouth of the mine readily sells for three times as much as the best grade of bituminous coal in the coal fields of western Pennsylvania and West Virginia, and that the demand for it exceeds the supply it will readily be seen that the thickness demanded for profitable operation in western Pennsylvania is no criterion for southern Texas. The beds seldom contain more than 30 in. of clean coal, while most of them now worked scarcely exceed 24 in. In all probability beds considerably thinner can be worked with a fair margin of profit.



WEBB COUNTY, TEX., WHERE THE CANNEL COAL FIELD IS LOCATED

The mines at San José, the most easterly portion of the present working field, may be described as being typical of the region. At this point the Cannel Coal Co. is working two beds, one of which lies 70 ft. below the silt-covered bottom on which the town is built and the other lies 90 ft. lower. The upper bed is worked by means of an incline and shaft. A new steel tipple is just now being erected at the latter. This shaft is 216 ft. deep, and when it is completed both beds of coal will be worked from it. The thickness of the upper bed averages about 27 in., and that of the lower one about 24 in. The coal in the two beds is similar, the only essential differences being the presence of fewer faults in the lower bed.

WORKING CONDITIONS

The mine is operated by the room-and-pillar method, but it is planned to work the lower bed by the longwall system. The pillars vary from 40 to 80 ft., nearly all of which coal is recovered on the retreat. The mine is comparatively dry. Gas gives no trouble, and, consequently, little attention has been given to ventilation, with the result that parts of the mine are hot. Many of the miners wear only a cap and overalls while at work.

THE PRIMITIVE COAL-MINING TOWN OF SAN JOSÉ, TEX.

The mine is provided with electric haulage. The coal is hauled up to the top of the tipple where any pieces of slate that may have been included with the coal are picked out by hand as the coal is carried forward by a belt conveyor.

Mexican labor is used in the mines almost exclusively, and, on the whole, is fairly satisfactory.

As stated above, the present working coal mines of the Rio Grande are few in number and located near the eastern side of the coal basin. So far as it can be determined by the outcrops, coal of equally good quality and of approximately equal thickness is believed to underlie a much greater area farther up the river, and it is to be hoped that the working field will be extended so that the fuel situation in south Texas may be relieved.

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The Fuel Resources of North Dakota

The production of lignite coal in North Dakota in 1912, according to E. W. Parker, of the U. S. Geological Survey, amounted to 499,480 short tons, valued at $765,105, compared with 502,628 short tons valued at $720,489 in 1911, this being the maximum output in the history of the state. The decrease of 3148 short tons in 1912 was so small as to possess no significance, while the increase of $44,616 in the value of the product indicates a satisfactory condition of the trade.

On account of its heavy percentage of moisture and rapid disintegration on exposure, lignite does not stand transportation well, and, consequently, its field of usefulness has been thus far limited. Its principal use has been to supply fuel to the settlers on the treeless plans in the western part of the state. For that purpose it has been mined in a crude way in almost every county in the lignite-bearing area. Commercial mines are situated on the lines of railway, and supply the towns of the state with fuel for domestic purposes and for use under steam boilers.

Lignite has, however, been found to be an excellent fuel for the generation of producer gas, and with the development of the manufacturing industries of the state, the extensive deposits of lignite in North Dakota will receive more attention as a source of power. It has been found that one ton of lignite in the gas producer will yield as much horsepower in internal-combustion engines as one ton of the best bituminous coal under boilers. As the gas producer and internal-combustion engine in large units come into more general use in the West as they are rapidly doing in the East, the hundreds of billions of tons of lignite known to underly North Dakota will be found to possess great potentialties in the settlement and economic development of the state.

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Machinery at Panama Exposition

The idea governing the selection of exhibits in the machinery department of the Panama-Pacific International Exposition, which is to open on Feb. 20, 1915, is that they shall represent present-day practice and not be historical in character.

At the St. Louis exposition an extensive series of tests were carried out on gas producers, using lignite coal, and internal-combustion engines using this gas, the results of which were published by the government and were of interest to engineers.

At San Francisco it is intended to show the latest development of the steam turbine which was really the first kind of a steam engine to be invented, having been first built by Hero of Alexandria before the Christian Era.

The Diesel engine is also to be exhibited. This engine uses the heavy fuel oils, such as are produced in California. The power is obtained by injecting the oil into the cylinder after the air has been compressed to such an extent that its temperature has been raised above the ignition temperature of the oil. The thermal efficiency has reached 30 to 32 per cent., which is 2½ to 3 times that of the more economical types of steam engines.

It is hoped that an engine being tried out in England may also be exhibited. This engine gets its power from producer gas made from powdered coal, which is fed by a worm through tubular passages within the cylinder head, being heated at the same time by the exhaust gases.

The authorities of the exposition have been promised an exhibit of the Humphry gas pump, in which the expansive force of the exploded gas in each end of a V-cylinder acts on the water held in the curved part. A pump of a capacity of 50,000,000 gal. daily is now supplying water for London, and one pumping 150,000,000 gal. per day is to be installed in Germany.

SNAP SHOTS IN COAL MINING

General View of the Cokedale Washery, Tipple and Power House, Cokedale, Colorado

Street of 20 Five-Room Houses, with Hot and Cold Water, Bath Room and Electric Lights, Holden, W. Va.

Shows the Commodious Clubhouse of the Continental Coal Corporation, at Straight Creek, Kentucky

Interior of Company Store, Belonging to the Continental Coal Corporation, and Located at Arjay, Kentucky

Showing an Exterior View of the Same Continental Coal Company Store Illustrated on the Left of This Photo

Tipples of the Allegheny River Mining Co.

SYNOPSIS—Only three men are needed on top to operate each tipple though all are equipped with two dumps. The cars are pulled forward by power, and run by gravity to a bumping block. They are freed automatically from the latter one by one and proceed by gravity to the dump, where the coal is discharged and the car passes on to the kickback.

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Three tipples of the Allegheny River Mining Co. in the western Pennsylvania district were equipped last year with mechanical devices for easy and precise delivery of loaded mine cars, one at a time, from the "trip" on the tipple approach, to and onto the "dump."

This work is done by two separate devices of a simple nature, a trip puller at the tipple entrance and an automatic stop and feeder just before the dump. The operation is rapid and economical of labor, and is conducive to safety of man and dump by keeping the cars always under perfect control.

The three mines outfitted in this way are the Chickasaw, near Rimerton; the Seminole, near New Bethlehem; and the Conifer, near a town of the same name, in Jefferson County. The Chickasaw and Seminole tipples were built to use the car-handling system, while at Conifer the equipment was installed in an old tipple, thus proving its adaptability to old as well as new equipment.

The illustrations show only the Chickasaw and Seminole tipples, which are essentially similar in arrangement and equipment. Both are double, with two dumps and corresponding sets of car-handling devices.

THE LOADED TRIP CAR PULLERS

Electric locomotives bring out trips of loaded mine cars and leave them on the double tracks of the tipple approach, Fig. 1. Thence they are drawn slowly forward onto the tipple floor, Fig. 2, by the trip pullers, one for each track. Here the attendant uncouples the cars so that as they pass the pullers they may run forward by gravity to the stops at the dumps.

Each trip puller consists of a strand of steel-bar link chain, of 12-in. pitch, carrying every 10 ft. a roller-supported dog of the knockover type, to engage the car axles. Both are driven from one 25-hp. motor and a main headshaft. Between the motor and the headshaft is a Webster steel-plate friction clutch, operated by a lever conveniently within reach of the attendant. Independent control of each puller is provided by a clutch in its geared drive from the main headshaft.

The pullers are each 19 ft. long on centers of sprocket wheels and are designed to haul trips of 40 cars, delivering them at the rate of four per minute. This gives, for the two tracks and dumps, a capacity of 480 cars per hour.

AUTOMATIC STOPS AT THE DUMPS

The cars released from the pullers run forward toward the dumps, but are checked by spring stops at the feeders. The number of cars held back by the stops may be as many as the space ahead of the pullers will permit. At the Allegheny River tipples, this distance is ample for several wagons.

The forward car is held by the stops while its predecessor is dumped. The dump operator releases the loads one at a time, each loaded car running forward by gravity, bumping the empty ahead off the dump and taking its own place there ready for dumping.

The incoming car depresses two triggers and thereby closes the bumping blocks in time to check and hold the car. The parts remain latched in this position until the car is to be released.

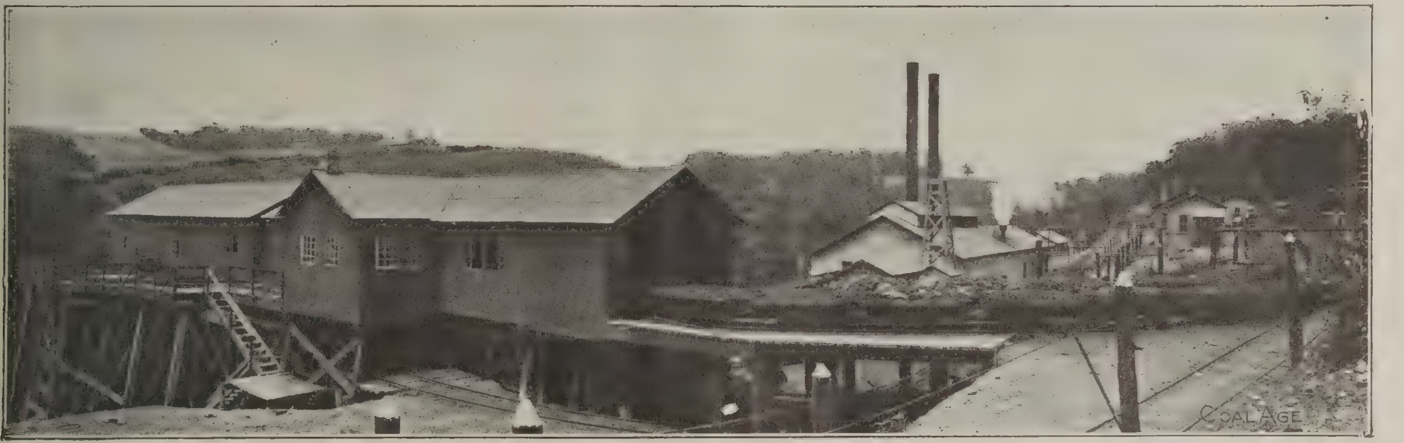

FIG. 1. TRIP ENTERING TIPPLE AND ABOUT TO BE DRAWN FORWARD BY THE TRIP PULLER

This may be done automatically or by the dump operator, by throwing a lever which opens the bumping blocks and raises the triggers. The car is then free to run forward, and the feeder is in form to check the next car.

INCREASED CAPACITY WITH REDUCED LABOR

The savings possible by use of this mechanical equipment are numerous. Actual operation requires only three men for a double tipple, one at the trip puller and one at each dump. At the Conifer mine, the installation of the one trip puller and two car feeders in the old tipple enable the company to operate with five less men than formerly.

By regularity and reliability of car handling the dumping capacity of the tipple is increased and a larger mine output thereby made possible. The feeder protects both the dump and the men from being injured by uncontrolled cars. Car feeders of this type are equally advantageous for caging cars in shaft mines, the operation being substantially the same as on the tipple floor. These feeders are patented by Dempey-Degener Co., Pittsburgh representatives of the Webster Manufacturing Company.

Belt Conveyor for Boiler Fuel

At each of these two new mines there is a Webster feature of interest—the conveyor for delivering slack coal from the tipple to the boiler room for steam fuel.

Slack from the tipple screens is delivered (by an inclined flight conveyor at Chickasaw) to a 14-in. belt conveyor, which extends through a covered runway, to the boiler house. A tripper, traveling an overhead track, may be set to take off the coal at any point and spout it to piles on the floor in front of the boilers.

The arrangement is simple in the extreme, and correspondingly easy of operation. The flight conveyor and the belt are both driven by one motor, which is controlled by the fireman. The coal is fed to the flight conveyor from a bin, kept filled by the tipplemen. Thus the power plant has its full supply always available, and the tipplemen can maintain the supply at convenience.

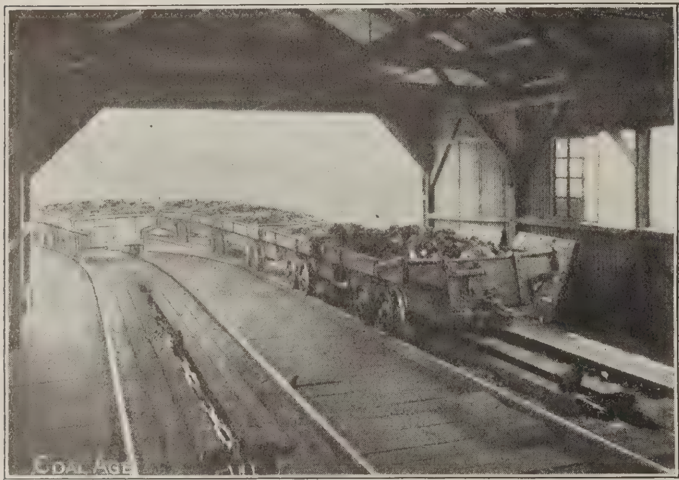

Fig. 2. Two Trip Pullers; One in Action

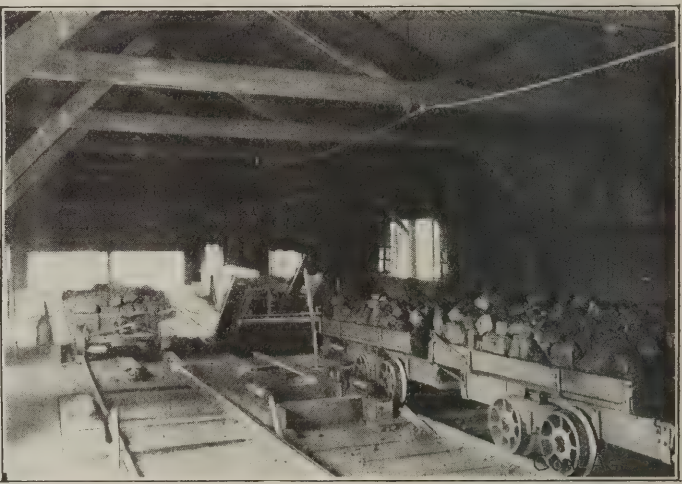

Fig. 3. Bumping Blocks, Car Feeders and Dumps

Large Acreage Restored to Public Domain

Six million acres of withdrawn public land were restored to entry during the months of May and June, upon approval by the Secretary of the Interior of the recommendations of the U. S. Geological Survey. This action was the result of examination and classification of the lands by the survey, those restored either having been found not to be valuable for power sites, reservoirs, coal, phosphate or potash deposits, or having been definitely valued as coal lands and rendered available for purchase under the coal-land law.

The total outstanding withdrawals on July 1 in all the public-land states amounted to 68,609,289 acres, of which more than 58,000,000 are in coal-land withdrawals. These lands are held pending classification by the Geological Survey, and as rapidly as they are found to be mineral bearing, they are either valued and placed on sale, as in the case of coal lands; definitely reserved pending appropriate legislation by congress to provide for their disposition (as in the case with potash or phosphate lands) or held subject to development, under departmental regulations (as in the case of water power or reservoir reservations); or if they are found to be nonmineral in character, they are restored to public interests. This work of valuation and classification is being prosecuted rapidly by the Geological Survey.

Advantages of the Steel Tie

Speaking at the West Virginia Coal Mining Institute, J. C. Evans summarized the advantages of the steel tie as follows:

The cost is less for steel than for wood ties when length of life is considered as well as first cost. It makes possible the use of the jumper rail. The track is kept true to gage, and the rails bend less under the load. As the rail rests on the floor, additional height is provided for the mine cars. No spikes or splice bars are required. The miners rarely object to laying their own track when steel ties are used and so save expense and delay. They are more willing to remove these ties when drawing pillars. When the cars are derailed they are more easily retracked. As a motorman can place enough ties on a car in a few minutes to support the rail in a room from end to end, both time and labor are saved by their use.

When the coal is thin, steel ties pay for themselves by reducing the necessity of taking up bottom or ripping top. No track gage or other tools are required except an axe and in one mine not even this is used. The difficulty of swinging a hammer makes it hard to lay track with wood ties in low coal. The wedges for steel-tie tracks are driven by a horizontal blow and lack of height is no drawback. Fewer ties are required. Steel ties last indefinitely while wood ties are seldom used more than twice. Reports show that the ties have been used six years with the percentage of loss small; practically none were worn out. Steel ties form inventory items, because they can be used again and again. Experienced trackmen are not needed to lay them. Steel ties take less storage room than wood and a miner can carry six at one time without special effort. The track can be laid and lifted in one-fourth of the time required to lay or lift track resting on wood ties.

Official Call for Meeting of the American Mining Congress

To bring about a better coöperation in the production, distribution and use of mineral wealth through discussion and deliberation, the Sixteenth Annual Session of the American Mining Congress is hereby called to meet at Philadelphia, Penn., October 20-24, 1913.

The convention will be composed of the members of the American Mining Congress, specially invited guests and duly accredited delegates appointed under the authority hereby extended for the appointment of delegates, as follows:

The President of United States may appoint ten delegates at large;

The Chief Executive of foreign nations may appoint ten delegates;

Governors of States and territories may each appoint ten delegates;

Mayors of cities and towns, Boards of County Supervisors, Boards of Trade, Chambers of Commerce, Mining Bureaus and Exchanges, Mining Organizations, Scientific Societies, Engineers' Associations and State Mining Schools, may appoint two delegates each.

We respectfully urge the early appointment of delegates on the basis above specified and that the name and postoffice address of each delegate so appointed be forwarded to the Secretary at 1031 Land Title Building, Philadelphia, Penn., at the earliest date possible, in order that such information may be furnished as will enable the delegate to consider in advance the subjects to be discussed and be better prepared to speak with intelligence and effect.

THE AMERICAN MINING CONGRESS.
By order of the Executive Committee.
DAVID W. BRUNTON, President.

JAMES F. CALLBREATH, Secretary.
Philadelphia, Penn., Aug. 15, 1913.

Difficulties of Mine Inspection

A number of instances have recently occurred that emphasize in a peculiar manner some of the difficulties encountered by mine inspectors who attempt to faithfully perform the duties of their office. The pathway is beset by numerous obstacles and pitfalls. The situation is a three-cornered proposition, involving the operator, the miner and the mine inspector, to say nothing of organizers working more for their own selfish ends than to safeguard the lives of miners or to increase the production of coal.

It is recently reported that charges are to be preferred by certain coal operators against State Mine Inspector Thomas H. Shaw, Midland, Ark. It is rumored that certain high officials of District No. 21, U. M. W. A., preferred another candidate than Mr. Shaw; and his recent appointment as state mine inspector has failed to meet with their approval. It is proposed to secure an injunction to restrain the mine inspector from officially exposing the true conditions existing in the mines of the state. We are glad to note that Mr. Shaw will stand by his guns and, as an honest man, invites investigation, depending on his 28 years of mining experience. The better class of miing men fully indorse his administration, believing that it will result in minimizing the loss of life, and increasing the health of the miner, while insuring the greater protection of mining property.

Recently this fearless mine inspector closed three mines and condemned two mining camps, owing to the unsanitary conditions existing therein. The closing of the mines, by order of the mine inspector, resulted in the matter being brought to the attention of the State Board of Health, and a conference was arranged between the state authorities, the operators and the miners. State Labor Commissioner J. C. Clary and Drs. Smith and Myers, respectively state and county health officers, approved the action of the mine inspector; and the conference resulted in a new light being thrown on the operation of mines. It was promptly agreed by the mine officials that the operators will coöperate with Inspector Shaw, and abide by his decision and action in improving conditions in the mines; the sanitation of the camps and water-supply. The meeting was harmonious in every respect, and productive of much good.

Two of the mines closed belonged to the largest companies operating in Arkansas, namely, the Central Coal & Coke Co., operating mines in Arkansas, Kansas, Missouri, Oklahoma and Wyoming; and the Western Coal & Mining Co., operating mines in Arkansas, Kansas, Illinois, Missouri and Oklahoma. The mines closed were shaft mine No. 26, Bonanza, and shaft mine No. 17, Jenny Lind, belonging respectively to the two companies just named; and a slope mine at Hartford, belonging to the Bolen-Darnell Coal Co.

Following are copies of notices sent by Mine Inspector Shaw to the mine operators, firebosses and miners, throughout the state.

TO MINE OPERATORS:

You are hereby notified that two entries must be made in compliance with the Act of Arkansas No. 225, Section 7, which reads as follows:

The owner, agent, lessee or operator of any coal mine in this state, if said mine is worked on the room-and-pillar plan, shall cause such work to be prosecuted in such mine in the following manner, to wit: Two entries parallel with each other must be driven for the ingress and egress of the air, and crosscuts must be made at intervals not to exceed forty feet apart. Where gas exists they shall be driven thirty feet apart or a crosscut be made at any other place ordered by the management. No room shall be turned inside the last crosscut.

Also Section 10, of same Act, which reads as follows:

DUTIES OF FIREBOSS:

In all mines where a fireboss is employed all working places and worked out places adjacent to working places shall be examined when it can be done, at least once a day, by a competent fireboss, whose duty it shall be to enter a report of existing conditions of such working place or worked out place, in a well bound book kept by him for that purpose, and all dangerous places that are marked out, shall be marked on a blackboard furnished by the company before any other employees enter the mine.

Also see Section 11 which provides that nothing but pure lard oil, where oil is used for lighting purposes, shall be used in any underground works in the main upcast, this section shall not apply to rope riders.

All violations of this act will be prosecuted.

TO MINERS:

All drill dust must be removed from the vicinity of shots and crosscut entries and all air courses must be made not less than seven feet wide. I have notified all mine foremen to not pay for such places unless these orders are obeyed.

TO SHOTFIRERS:

Do not fire any shots where a miner leaves drill dust. Refuse to fire shots in any dusty entry until the mine manager has the dust cleaned up and entries sprinkled. Refuse to fire any shots which you consider dangerous. I will stand between you and the company or the miners' organization in the matter of obeying this order.

THOMAS H. SHAW,
State Mine Inspector.

Midland, Ark.

Coal Shipping on the Great Lakes

By John W. Chamberlain*

SYNOPSIS—This article discusses the development of the coal shipping in detail on the different Lakes. Rail fuels are aggressive competitors at Lake Michigan ports but are practically negligible in the Lake Superior markets; the water movement into the Northwest is increasing rapidly.

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Before leaving the subject of coal docks and other loading appliances it might be well to go over the outlay necessary to construct a water trestle, which is essentially the reason for the move to dispense with them. The trestle of the Philadelphia & Reading Coal & Iron Co., at Buffalo, the newest and presumably the most modern of all, required 180,000 cu.yd. of dredging, 38,000 lin. ft. of piling, 2,750,000 ft. board measure, of white pine and 360 tons of spikes, bolts, etc. It was built in 268 working days, is 1805 ft. in length, has 1316 ft. of water frontage, is equipped with 80 pockets of 6000 tons storage capacity and is capable of loading 10,000 tons daily.

The cost of handling is a vital problem and the recent inventions used in the iron trade are also applied in the coal shipping. Where it used to cost 50c. a ton to handle ore by wheelbarrow, the Brown hoist cut the cost down to 18c. and the Hulett clamshell hoist to 5c. a ton. It is doubtful if a further reduction can be effected, though it would be possible to reduce the breakage of coal in handling still further.

The history of the movement of coal differs in each lake. The Canadian government announces that it is preparing to enlarge the Welland Canal connecting Lakes Erie and Ontario to 30 ft. in depth and to provide locks 800 ft. long and 80 ft. wide. This would greatly stimulate the trade between Lake Ontario and the upper lakes. The Erie Barge Canal will also have its influence when completed.

Bituminous at the Lower Lake Ports

Quite an amount of bituminous coal now finds its way to Lake Ontario from the port of Erie, Penn., and the eastern ports of Ohio. At the same time the Pennsylvania Railroad is ambitious to build up the port of Sodus Point on Lake Ontario and appears willing to make rail rates that are competitive with the Erie-Ontario route. Lake traffic is, however, much influenced by the offering of freight both ways for vessels and one drawback to the Lake Ontario trade is the lack of down cargoes.

In the early history of the anthracite trade on Lake Erie there was a good demand at Sandusky, Toledo and Detroit. This trade has now been absorbed by the railroads. Buffalo ships a few thousand tons annually to Port Colborne at the head of the Welland Canal and receives varying, minor amounts from West Virginia through the port of Sandusky. Otherwise the Lake Erie coal traffic, both anthracite and bituminous, is practically all with the upper lakes. Buffalo has no other bituminous lake traffic.

Above Detroit the river ports are only a small factor in the coal trade. Some of them now receive only a cargo or two of anthracite a season, though the bituminous receipts sometimes run up to 50,000 tons. The same is true of the ports on Lake Huron. The Saginaw Bay ports once bought liberally, especially when they were heavy shippers of lumber, but partly on account of the disappearance of the lumber trade and still more since coal is produced in that section, the lake coal trade has fallen off. The port of Alpena, farthest north on Lake Huron, is increasing its traffic somewhat and since it has become the prospective Eastern terminus of a rail-

Freighter "Wm. J. Olcott" Passing out of the "Soo" Locks. Capacity 12,000 Tons, Length 580 Ft., Beam 58 Ft.

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*90 Johnson Park, Buffalo, N. Y.

Conneaut Harbor (Ohio), Showing Traveling-Bridge Storage Tramways in the Background

road to run across to Lake Michigan its importance in the coal and other trades will soon increase materially.

The Georgian Bay ports have never been large receivers of anthracite; a cargo or two a season has been the usual amount. This coal is often considered a luxury on account of the price and many localities, even where freights are low, do not feel able to pay the difference between it and bituminous. On the other hand the need of some fuel other than wood is becoming more pressing every year. Besides this quite a number of the Georgian Bay ports are termini of railroad lines, which, though they may get most of their fuel further east on their routes, are obliged to buy quite an amount of it at the western end. Parry Sound, for instance, received 330,000 tons, Owen Sound, 100,000 tons and Midland, 80,000 tons of bituminous in 1911.

Lake Michigan

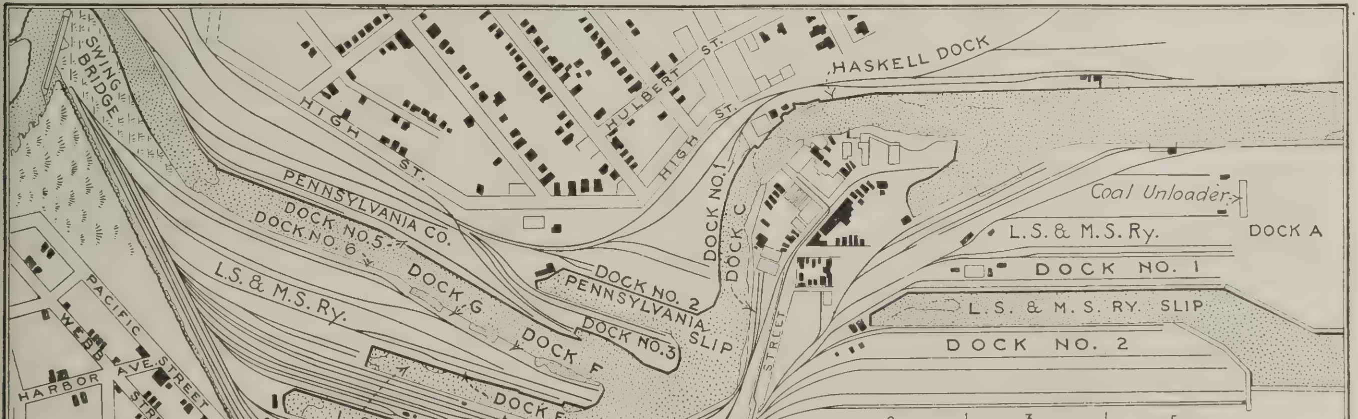
Lake Michigan ports were at one time greatly dependent on the lake fleet for coal and such is still the case with a few of the leading cities, especially if they are distributors Westward to any extent. This distributing territory is not extensive, as anthracite is not sold in much quantity either west or south of Minnesota, while the states west of the Mississippi now mine their own bituminous to a great extent. Still it will be a long time hence, if ever, that Milwaukee or Chicago gives up its coal trade by lake. The freight on anthracite by lake is a trifle, in comparison with the rail freight so that the bituminous mines of Pennsylvania, West Virginia and Ohio are able to compete with the mines of Illinois.

Lake carrying is also rapid and whether considered supplementary to the rail traffic or not it would be practically impossible to supply the territory west of Lake Michigan with coal all-rail. A lake steamer loads 10,000 tons of coal at Buffalo or Ashtabula at the rate of 1000 tons an hour and in three days is unloading it at the same rate on the farther side of Lake Michigan. For the railroads to deliver it at any such rate would be to practically shut off all other traffic on their lines.

The other Lake Michigan ports receive coal in only modest quantities though the aggregate, especially of bituminous, is large. Some of them take nearly half a million tons of soft coal by lake annually, but anthracite receipts are not heavy. Sheboygan, the chief minor port, receives about 250,000 tons of anthracite and 350,000 tons of bituminous by lake, annually. Local changes of late have reduced the lake trade in anthracite at Gladstone and Manitowoc materially. The east-shore ports are mostly supplied all-rail.

Lake Superior

Conditions on Lake Superior, as regards traffic with the lower lakes, are quite different from those in the



COAL AGE

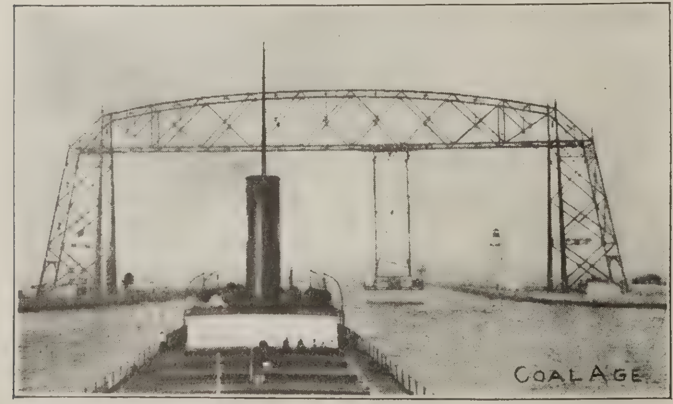
Map of Ashtabula (Ohio) Harbor, One of the Largest Bituminous Loading Ports in the World

Freighter "Mataafa" Steaming up "Soo" River

This boat was wrecked at Duluth, Minn., in November, 1906, and nine men frozen to death. She is still in commission.

other lake districts. Lake Superior trades mainly with Lake Erie and with the Canadian ports from Georgian Bay to Montreal, the latter traffic being mainly in grain and package freight. An enormous amount of iron ore, grain and flour is shipped to Lake Erie, together with quite an amount of lumber, the return freight being mostly coal. As to what this traffic is the reports of the locks at the Sault will tell. The element of rail competition is almost entirely lacking. As a rule, even from the south-shore ports of Lake Superior the rail distances to Lake Erie are fully as great as by water, while from the north-shore ports, rail shipments are entirely prohibitive.

The distance from Chicago, at the head of Lake Michigan, is 540 miles by rail to Buffalo, while it is 880 by water, but the Lake Superior distances favor the water route. So it is imperative that the bulk of business eastward from Lake Superior be done by lake in the summer season. The Lake Erie ports take in all the ore and grain that will be needed till the next shipping season opens and send coal to Lake Superior on the same plan. While the coal is chiefly shipped to Superior and Duluth at the head of Lake Superior, an aggregate of 8,500,000 tons in a season, there is a large and growing trade of the same sort with other ports, particularly with Fort William and Port Arthur, the twin Canadian ports on the north shore, that feed the markets of Winnipeg and the Canadian Northwest. These two ports now receive more than 3,000,000 tons of bituminous and over 450,000 tons of anthracite by lake each season. The future of this traffic is also very bright as the adjoining country is developing rapidly.



Aerial Bridge at the Entrance to Duluth Harbor

There is also a healthy trade in coal by lake to ports on the south shore of Lake Superior, though this does not increase very fast. These south-shore ports received 70,000 tons of anthracite from Buffalo in 1912. The amount of bituminous is more than ten times that of anthracite. As to future trade there it will all depend on the prosperity of that district. The lumber business, which has been heavy for a long time, is falling off, but iron ore is still a great trade and agriculture ought to come in as the timber disappears. Outside territory to be supplied from these ports is not large as compared with those further north and west. There is a peculiar condition in the Portage Lake district, where prosperity and progress depend largely on the continuation of the copper production. The Portage Lake Canal, a short cut to the extreme upper Lake Superior and a saving of the dangerous route around Keweenaw Point, brings much tonnage to the Portage Lake district.

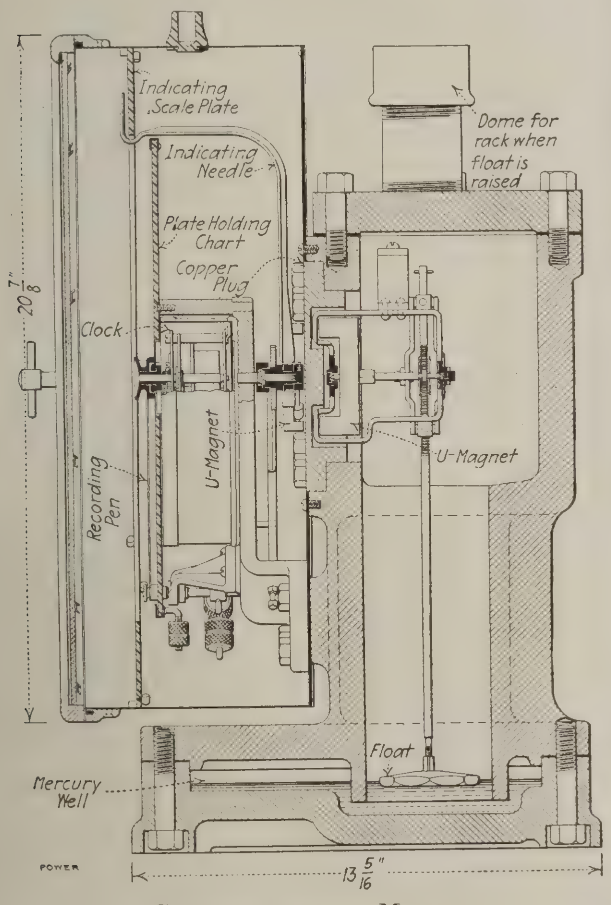
Freighter "Bope" Loading at the Y. & O. Coal Co.'s Dock at Erie, Penn.

(To Be Continued)

POWER DEPARTMENT

An Improved Flow-Meter

In the large power plants of the present day the economical handling of steam, water, air or other fluids depends upon accurate information showing the total volume transmitted and its instantaneous rate of travel during any interval of time. Only within recent years has this subject received careful attention, and as a result the General Electric Co. has developed a flow-meter to prevent the enormous wastes which have been allowed to take place at many plants.



Section through Meter

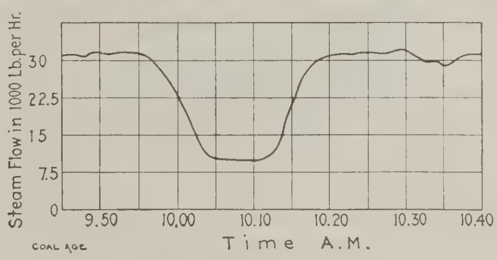
The instrument evolved, as may be seen in the illustrations is designed to meet the requirement of a strong mechanical meter, which can be used not only as a test instrument, but also as a permanent means for the continuous measurement of either liquids, gases or vapors.

The body of this flow-meter consists of an iron casting cored out to form one leg of a U-tube, as a reservoir for mercury, the other leg of the U-tube being formed by a pipe which opens into the reservoir. The pressure on the surface of the mercury varies with the rate of flow of the fluid being measured as will be explained later.

A float rests on the surface of the column of mercury in the body of the meter, and rises and falls with the corresponding changes in its elevation. This float is geared by rack and pinion to a horizontal shaft which carries a permanent horseshoe or U-shaped magnet, whose poles face a copper cap which closes the opening into the meter body. The remaining parts of the meter's mechanism are mounted on the outside of this copper cap.

A smaller magnet of opposite polarity to that within the body of the meter is mounted upon an external shaft whose center line is coincident with that of the internal shaft if same were extended through the copper cover. The two magnets thus face each other upon opposite sides of the copper sheet, and any movement of the larger, induces through the medium of the magnetic flux an equal and similar movement of the smaller, thus transmitting motion to its shaft without the necessity of piercing the wall of the meter body. The external shaft actuated by the smaller or sympathetic magnet moves the indicating needle and the recording pen through suitable mechanism.

The pressure which moves the column of mercury in the U-tube is obtained for pipes two inches and greater in diameter by inserting a modified form of Pitot tube termed a nozzle-plug directly into the pipeline, except in cases where it is desired to increase the flow at the point of metering, under which circumstances a special pipe reducer is provided. This can be done without seriously disturbing this pipeline. The special reducer above referred to is made of brass and has a long throat with rounded entrance terminating in a flange, which is inserted in a joint of the piping and is held in place in the same manner as a gasket. A special nozzle-plug is supplied with this pipe reducer.



Steam-Flow Curve

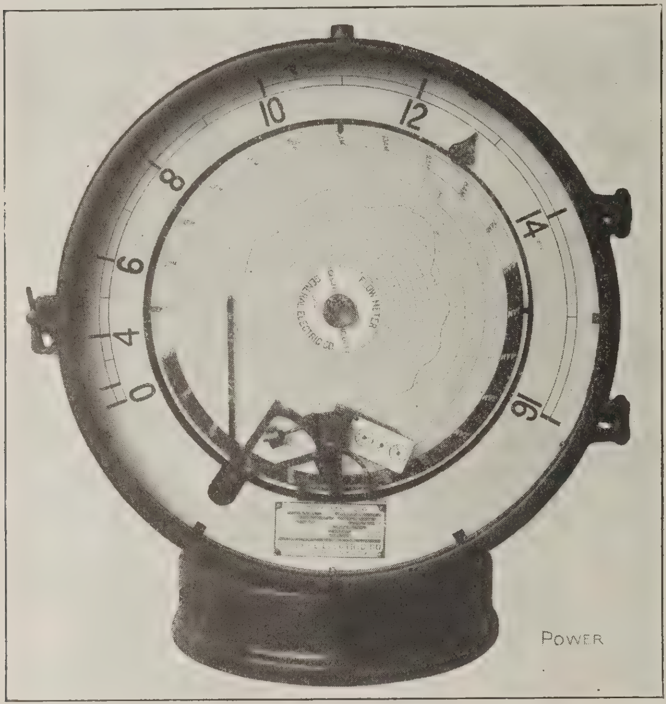
The nozzle-plug contains two separate conduits, each having a set of openings arranged on diametrically opposite sides of the plug. Those apertures upon the side which faces the flow are called leading, while those on the opposite side are called trailing openings.

The flow against the leading openings in the nozzle-plug sets up a pressure in the leading conduit which equals the static pressure plus that due to the velocity head. The flow past the trailing openings causes a suction which lowers the pressure in the trailing conduit to a point which is below the pressure existing in the pipe line. As these two conduits are connected to opposite legs of the U-tube by ¼-in. pipe, the column of mercury is affected by this unbalanced pressure, causing a corresponding movement of the float.

The openings in the nozzle-plug extend across the pipe diametrically so as to make the pressure transmitted to the meter as nearly as possible that due to the mean velocity rather than that at a single point in the pipe.

The chart upon which the pen records are made is rotated by a suitable clock mechanism. The recording pen sweeps the chart radially and the resulting curve shows the rate of flow at any time during the chart cycle.

An integrating device sometimes applied to this meter consists of a stationary flow-rate planimeter driven by the chart paper. The angular position of the planimeter wheel is determined by a cam connected to the shaft of the recording pen and moving with it. The planimeter dials read in arbitrary quantities, which multiplied by a constant furnished with the meter gives the flow in the desired unit. This device is extremely simple and there is practically no danger of its getting out of adjustment.



Meter with Indicating Scale, Recording Chart and Integrating Dial

For pipes which are less than two inches in diameter, an orifice-tube made of brass and tapered internally from both ends so as to form a restricted opening at the middle of the tube is provided. This must be incorporated in the pipe line. One leg of the U-tube is connected with the orifice-tube near its end and the other leg to its middle point where the greater velocity will give a reduced pressure in the pipe leading to the recording instrument.

To meet the requirements of the different classes of service, and the various conditions met with, the meter can be made up in four different ways: First, as a recording or curve-drawing instrument; second, with both indicating scale and recording chart; third, with recording chart and integrating dials; fourth, with indicating scale, recording chart and integrating dials.

Some of the large manufacturers of power have found that flow-meters pay for themselves in a short time. By their use the record of the performance of the apparatus shows whether or not it is operating at its maximum efficiency. Surprising conditions have been brought to light by their use showing at the same time their great practicability.

A flow-meter upon each boiler of a battery operating upon a single header shows exactly what each is doing, and permits adjusting the operation of the units so that each will carry its full share of the load. They also indicate immediately whether the load has increased, or the steaming rate of the boiler's decreased in case the steam pressure begins to drop. Moreover, it is possible from the graphic record to determine whether the method of firing can, or cannot be made more efficient.

In a big plant the use of flow-meters makes it possible to segregate the cost of the steam, water, etc., so that each department may be correctly charged with its legitimate share of these expenses. A study of the feed-water chart will determine the rate at which the feed water should be supplied in order to secure the highest degree of efficiency.

These illustrations of the application of the flow-meter give some idea of the adaptability of the instrument, and the type of service for which it is fitted.

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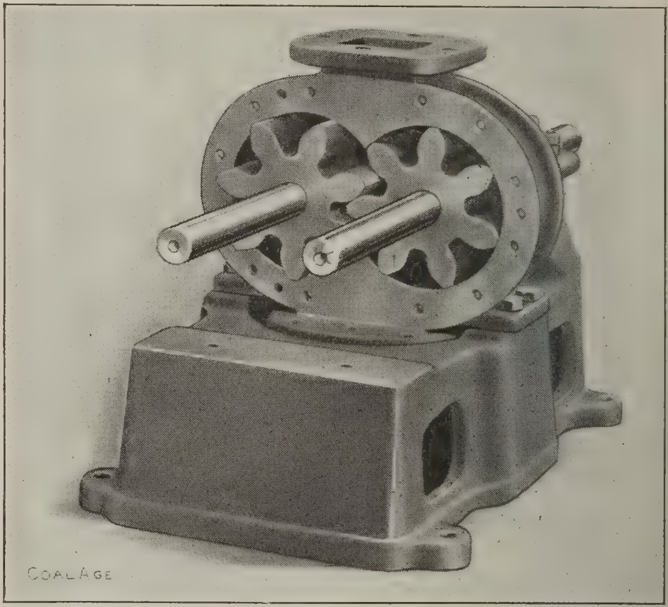
A New Rotary Pump

The Goulds Mfg. Co., of Seneca Falls, N. Y., have recently placed upon the market a new rotary pump of a unique design. Heretofore machines of this type have usually been made with two- to three-lobed cams. These are rotated in their proper relation to each other by external gears placed upon the camshafts.

In the new design, as may be seen from the accompanying illustration, the cams are practically pinions meshing together. They therefore require no external gears to revolve them in their proper inter-relations.



The New Pump with End of Casing Removed

These machines are simple in construction, valveless, and may be either belted or direct connected to any suitable means of driving. They are built to withstand a working pressure of 100 lb. or a head equal to about 230 ft. of water. Water cutting of the cams caused by the rapid expulsion of the liquid entrapped between the teeth of the two gears has been eliminated by means of a bypass opening in the end cover of the machine.

EDITORIALS

The Brookside Explosion

The explosion at the East Brookside colliery, which occurred at 11:30, Aug. 2, proves not to have originated from dynamite. The exploration of the workings revealed that the 175 lb. of dynamite and 75 lb. of carbide stored in the mine had neither of them contributed to the explosion. It was naturally assumed that dynamite was the cause, as the explosion killed immediately all the men where the dynamite was stored and was not so death-dealing in other parts of the mine, but the finding of the explosive intact disproves that assumption. It is said that the bodies of the men were badly burned yet their clothing was not scorched and even loose pieces of paper were not consumed. The punk-like fringe on the timber also was not ignited.

These strange phenomena have given rise to the idea that there were no explosions, properly so termed, and that the men were killed not by flame but by a blast of heated air. At Valleyfield in Scotland, where an outburst of coal occurred, smothering the men, they were found when uncovered to be blistered, apparently by the heat of the escaping gas. A heavy fall of rock might also serve to heat the air in like degree, and in this case the air current was sufficient to sweep the clothes from the bodies of the men. Perhaps the explosion will serve to open in a definite way the problem whether the heat of compression in a mine is ever so severe as to start an explosion of coal dust and air. James Asworth has claimed for several years that it is.

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The Original Sulphur in Coal

For the discussion which follows we define "original" or "intrinsic" sulphur in the coal as the sulphur which was an integral part of the vegetal substances composing the peat bog from which the coal bed is derived. Of course, it is obvious that these terms are only relative, for the sulphur did not *originate* in the peat bog but was in the first place a part of the molten magma. Later, after chemical change, it was dissolved by thermal and surface waters and deposited by them in the depths of lagoons or in the ocean, and finally was drawn into the plant system with the vegetal juices.

We were surprised recently when a mining engineer of ability and no little information declared that "organic" sulphur was the sulphur irreducible by heat and was in the form of calcium sulphate. All other sulphur bodies were in his view additive compounds to the original deposit and probably he conceived that no other sulphur-bearing bodies were present in coal except iron pyrite.

As the word organic is usually restricted to compounds containing carbon and hydrogen, perhaps he should have said "original" sulphur, but in any event it may be pointed out that he took a narrow view of the possibilities of the occurrence of sulphur in coal from vegetal sources.

Nor are most commercial chemists disposed to view the matter in a much larger light, for some appear to believe that the sulphur of the original coal substance is always in the form of a sulphate and few would be disposed to regard pyrite as being merely a much altered outcome of the original vegetal juices. In view of the erroneous speculations now passing muster, perhaps a few suggestions might unsettle errors, even if they did not establish fact.

As we find in the ash of coal the elements, iron, aluminum, calcium, sodium, potassium, magnesium and sulphur, it is not unreasonable to expect that coal may contain or have contained ferric or ferrous sulphates, potash and soda alums, gypsum and magnesium sulphate. All these are more or less soluble in water and may enter with the fluids as plant foods. Barium sulphate is so freely absorbed by some plants in the arid West that the "locoing" of horses is ascribed to the consumption of a weed thus rendered poisonous.

That sulphur enters into the plant organism mainly as sulphates may be conceded readily. Though sulphurous acid has been shown to be inspired by oak leaves in the neighborhood of works producing that gas, probably no measurable sulphur in coal arises from any such source, though some sulphur may have entered the plant economy as a hydrocarbon compound with the vegetal juices yet not as a sulphate.

But we need not necessarily assume that the sulphates entering the vegetal substances are unchanged chemically, nor is it reasonable to infer that, after the vegetal matter has died and been wholly or partially metamorphosed, further changes are impossible. It is true that most of the sulphates are little affected by heat, but they are not so stable when attacked by other methods and under different conditions.

There are plenty of indications that the sulphur is not entirely retained as a sulphate. Otherwise how could we explain the fact that when vegetal matter is heated to the boiling point, the sulphur content is reduced; and how could we find a cause for the evaporation of 0.65 per cent. of sulphur when a certain cannel coal was heated to 212 deg. Fahrenheit?

It has been noted that coals which have been subjected to great heat show less sulphur than those which have been less heated; the anthracites and semibituminous coals of the Appalachian disturbance contain less sulphur than the fuels more remote from that trouble. If the coals had been rich in certain sulphates, the heat could not have reduced their sulphur content without some chemical reaction.

If the sulphur had been pyritic, some might possibly have been reduced almost to the monosulphide form. If this had occurred it is strange that the iron in coal would not be found today in combination with one atom of sulphur, for the monosulphide does not have the power of reabsorbing the atom which it has lost. This leads us to wonder whether the heat which metamorphosed the coal was sufficient to separate sulphur from pyrite and whether at the time of maximum heat any pyrite existed.

These considerations tend to make us believe that at the time when the Appalachian uplift was thrusting most severely, pyrite was largely absent and the sulphur was in combination with carbon and hydrogen and indeed, as we find that the upper coal measures often thicken in the Appalachian folds, we are disposed to think that the uplift must have been started even before these measures were laid down and that the coal was a mere peat, when the pressures were severe.

But we must not be too willing to declare that the sulphates were absent when the uplift occurred, for these bodies are not so permanent in character as is often thought, and conditions favoring their reduction were probably in existence and these actions, made more effective by the heat of uplift, may have been hastened by that action.

According to Hoppe-Seyler, nascent methane has a marked power of acting upon sulphate of lime. He produced such an action by the use of fermenting cellulose. Furthermore, according to Ochsenius, a solution of magnesium sulphate in which hay or straw is kept is turned to a sulphide.

Other changes are, however, possible. Thus it has been urged that in the presence of carbon, the sulphate of calcium will be converted to a sulphide, the oxygen joining with carbon to form carbon dioxide. The sulphur of this sulphide might then combine with the hydrogen of the water and the dioxide mentioned unite with the calcium and the oxygen atom of the water to form hydric sulphide and limestone respectively.

Nor are these all the possibilities, because we know there are bacteria which have a power of extracting sulphur from sulphates. Such are the Beggiatoa alba and Chromatium Okeini. Beijerinck has shown that in the absence of air, sulphates may be reduced at a temperature of 77 to 86 deg. F. in 12 to 14 hr. by these low forms of life. In the absence of air, there would be no oxidizing bacteria to complete the sulphur circle and to form sulphates anew as usually happens today.

The formation of hydrogen sulphide from sulphates, probably by bacterial action, is constantly going on in the Black Sea, and as samples are taken below the surface this enrichment is found to increase continually and in a marked degree.

The main difficulty in the acceptance of a bacterial action as an explanation arises from the fact that sulphur bacteria appear to have been most active in more recent times and the most marked effect of their work is found in the Miocene period, and not as early as the Carboniferous.

Certain it is that the bulk of the sulphur now being mined is stratified in such manner that we cannot believe it was placed where it is by volcanic action. It is probably derived from some body, vital or chemical, which has leached the sulphur from its original place as part of some sulphate, possibly gypsum. As this process has been so general there is no obvious unreasonableness in the assumption that all the sulphur in coal, whether as sulphate, sulphide or hydrocarbon compound, was originally absorbed as sulphate in the plant food.

That pyrite is an impurity derived from the plant tissue is suggested by the fact that it is not found in the clay floor. In fact, the sulphates are not often found in clay nor are the sulphides. But pyrite is probably rarely found in precisely the same position as the sulphate from which it is formed, and its quantity may have been increased by inflows of ferrous and ferric or other sulphates which were converted to pyrite by the action of methane.

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The Bituminous Market in New England

The soft-coal market this year has been an enigma, particularly in New England. When the operators put the 15c. advance on Pocahontas, New River and Georges Creek, coincident with the depression in business circles early in the spring, it seemed like tempting fate, and predictions were made freely that so much coal would be offered that the selling price would be down to the same basis as 1911 and 1912 by the current month.

Obviously these forecasts were wrong. Even with heavier receipts at Boston than ever before, the new high level has been firmly maintained and it is doubtful if a single ton has sold at a concession. The labor trouble in the New River field, and the possibility of an extension into other parts of the state, was no doubt a factor in the situation; but it was not a controlling one as prices continue as firm, the demand as insistent, and the loading at Hampton Roads as slow, even now that the strike has been definitely settled.

There are a number of conditions that point to a deficiency in the local supplies. Water shipments to Boston for the first six months of the current year are some 200,000 tons ahead of those for the same period last year; but the vessel movement last year was abnormally light, the difference being made up by a larger rail tonnage from Pennsylvania and furthermore the average annual increase in the water arrivals during the past few years has run between two and four hundred thousand tons. In addition to this there is the acknowledged fact that a number of the typical contracts are seriously in arrears.

In New England it is felt that the situation hinges entirely on the production and the outlook is regarded as not particularly favorable because of the reports of a poor labor supply. Should the production be seriously crippled by the insufficiency of miners and conditions further aggravated by the anticipated car shortage, there will undoubtedly be a tense situation this winter. Such a contingency will naturally broaden the market for the Pennsylvania grades, there already being a noticeable increase in the shipments out of Philadelphia.

The past history of the trade shows that when the summer market turns the corner in August or earlier and begins to improve, there is small probability of any easing off until the winter is over and the spring cessation appears. Another condition that is already being anticipated in some quarters, is the possibility of another suspension in the bituminous fields next April; should the outlook prove serious, a heavy storing movement on the part of the consumers might be started that would precipitate a runaway market. Even with a large production the winter trade promises to continue firm, although fairly steady, but with any restriction on the output due to a shortage of cars or labor, the situation will be serious.

SOCIOLOGICAL DEPARTMENT

The Woodward-Pettebone First-Aid Meet

Special Correspondence

First-aid teams from seven of the largest collieries of the anthracite field were pitted against each other in contests, held at Harvey's Lake, and 5000 spectators viewed the events. The contests were held under the auspices of the Woodward and Pettebone teams, of the Delaware, Lackawanna & Western R.R. Coal Department, and prizes were awarded in each of the contests.

The Three Judging Physicians, Henry G. Davies and Charles Enzian

Subject Treated for Compound Fracture of Nose and Dislocation of Left Shoulder

Sylvester Method of Artificial Respiration

Rescuing Man Who Touched Live Wire

Treating Scalp Wound, the Captains' Event

The problems presented were not of a difficult nature, but they were such as caused the men to use their wits, though none could be rightly regarded as catch problems. They were such as any first-aid team is apt to be called upon daily to solve in anthracite mines. All the teams showed the benefits of careful training, and while all of them could not be prize winners, each and every team performed its work in a highly creditable manner, and no first-aid team was forced to go home ashamed of its demonstration.

The Pyne colliery team, of Scranton, won the prize for the big event, which was $20. A safety lamp was awarded to the captain. The Pyne team scored 96½ points. The Avondale colliery team was second with 93 points and won $12 as a prize and a safety lamp for the captain. The third prize, $5, was won by the Auchincloss team.

The results of the contest follow:

Full-Team Event—Problem No. 1—Compound fracture of jaw, left side, blood spurting; compound fracture of right collarbone and a lacerated wound of left elbow.

Problem No. 2—Burns of head, face, chest and arms, and an incised wound of heel of left foot.

Pyne colliery	96 1-2	Bliss colliery	90 1-2
Avondale colliery	93	Truesdale colliery	90 1-2
Auchincloss colliery	91 1-2	Bellevue colliery	90 1-2
Raub colliery	91 1-2	Forty Fort colliery	87

Captains' Event—Problem—Large scalp wound (Capeline roller bandage). Lacerated wound of left shoulder (spica).

William Hill, Bliss colliery	100	H. R. Kettle, Avondale colliery	90
William L. James, Truesdale colliery	95	Philip Williams, Forty Fort colliery	90
J. M. Jones, Bellevue colliery	93	William Griffiths, Pyne colliery	88
James H. Jenkins, Auchincloss colliery	91	Nicholas Cook, Raub colliery	88

Two-Man Event—Problem—Compound fracture of nose, dislocation of left shoulder.

Auchincloss team—James Jenkins and John H. Keating, 100. Time, 3:47.

Raub—Nicholas Cook and William Rowett, 100. Time, 7:45.

Forty Fort—Philip Williams and Walter Jones, 100. Time, 11:45.

Truesdale—D. J. Williams and W. L. James, 100. Time, 11:45.

Biss—William Jones and William Hill, 95.

Bellevue—Thomas Robson and Edmond Davis, 95.

Avondale—W. R. Williams and John Driscoll, 90.

Pyne—Albert Rose and Philip Watkins, 88.

One-Man Event—Problem—Rescue man who has taken hold of live wire; carry 50 ft., perform artificial respiration and dress for burns.

Pyne—Albert Reese, 100
Bellevue—William Williams, 95; Time 8:54
Forty Fort—William Cutts, 95; Time 11:25
Truesdale—John Traber, 95; Time 13:2
Auchincloss—J. H. Keating, 93.
Bliss—W. J. Hill, 92.
Raub—Martin Inman, 90.
Avondale—Ezra Griffith, 90.

THE OFFICIALS AND JUDGES AT THE WOODWARD-PETTEBONE MEET

One-Man Event—Problem—Wound in palm, severe bleeding, also wound of right eye.

Truesdale—E. J. Williams	100	Forty Fort—John Kasperin	92
Bliss—John Grosil	97	Avondale—Frank Maday	90
Raub—William Roderick	95	Pyne—Thomas Llewellyn	87
Auchincloss—William Bailey	95		

The following members comprised the different teams:

Bliss—W. J. Hill, William Jones, Isaac Edwards, Oliver Parfet, Thomas Thomas, John Grosil.

Truesdale—W. L. James, Arnold Menge, Joseph Stinson, D. I. Williams, John Traber, E. J. Williams.

Bellevue—J. M. Jones, Edmond Davis, William Williams, Martin Ratchford, Thomas Robson, John Mulhern.

Auchincloss—J. H. Jenkins, J. H. Keating, Thomas Wren, Thomas Chamberlain, Ire Angle, William Bailey.

Avondale—H. R. Kettle, John Driscoll, W. R. Williams, Ezra Griffith, Daniel Thomas, Frank Haday.

Pyne—William Griffith, Albert Rose, Philip Watkins, Jenkin Davis, Thomas Davis, Thomas Llewellyn.

Forty Fort—Philip Williams, Frank Romanshusky, Walter Jones, Andrew Tebust, William Cutts, John Kasperin.

Raub—Nicholas Cook, William Rowett, Martin Inman, John McGroarty, Leo Smith, William Roderick.

The prizes were awarded by Henry G. Davis, superintendent of the Wyoming Division of the Delaware, Lackawanna & Western R.R. Co., Coal Department. Charles Enzian, of the Federal Bureau of Mines, was master of events. The judges were: Drs. J. A. Samuel, Charles L. Shafer and A. B. Smith.

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The H. C. Frick Coke Co.'s Picture Show

The stereoptican show which has been prepared by the H. C. Frick Coke Co. of Pennsylvania, a subsidiary of the United States Steel Corporation, was recently shown at Vivian, W. Va., to twelve or fifteen hundred interested spectators. After the show had been given at the mines in and around Gary, it was turned over to Lawson Blenkinsopp, state mine inspector of the 11th district, for use at other points in his district.

The idea was conceived by Thomas Lynch, president of the United States Coal & Coke Co., and of all the other subsidiary coal companies of the United States Steel Corporation but one. The coal mines under his jurisdiction together produce more than half as much coal as the great state of West Virginia, and notwithstanding the fact that this coal is mined largely from shaft and slope mines, some of which are deep and gaseous, the number of men killed per million tons of coal mined is much below that of the state of West Virginia, the United States, or any other mining section. After Mr. Lynch had decided what scope he wished to cover with these pictures, he turned the matter over to W. H. Clingerman, general superintendent, J. P. K. Miller, chief engineer, and Austin King, chief mine inspector, all of the H. C. Frick Coke Co., for development. Mr. King was given full charge of the work and spent the better part of a year in taking thousands of pictures of various accidents as they happened, sham accidents, and conditions where accidents had occurred previous to the time he began this work.

After the pictures to be shown were selected, they were exhibited at all the mines, some 60 in number, of the H. C Frick Coke Co., located in Westmoreland and Fayette Counties, Penn., including the towns of Connellsville, Scottdale, Mt. Pleasant and Uniontown. They were also shown at the mines of the National Mining Co. in Allegheny County, Penn. in Pittsburgh for the benefit of the Coal Mining Institute of America; at the mines of the United States Coal & Coke Co., and at Vivian and Welch, W. Va. They are to be taken to Indiana and Illinois to be exhibited at the mines of the Steel Corporation in those states, after which they will be rearranged with some moving pictures that are now being made in the mines of the United States Coal & Coke Co with the assistance of that corporation. Photographers from the Government Bureau of Mines are doing this work.

A number of views are also shown of special features of the United States Steel Corporation work, including trained nurses taking care of the sick; the first-aid team which won first prize at the International Red Cross Convention at Washington; swimming pools and play grounds for the children, etc.

A reel of comic moving pictures entitled, "That College Life," and a film showing the results of disregarding safety devices are also exhibited. A number of panoramic views were shown at Vivian, W. Va., of the various plants of the United States Coal & Coke Co. at Gary, as well as a reel of moving pictures of the parade, first-aid contests and various athletic exercises on the Fourth of July.

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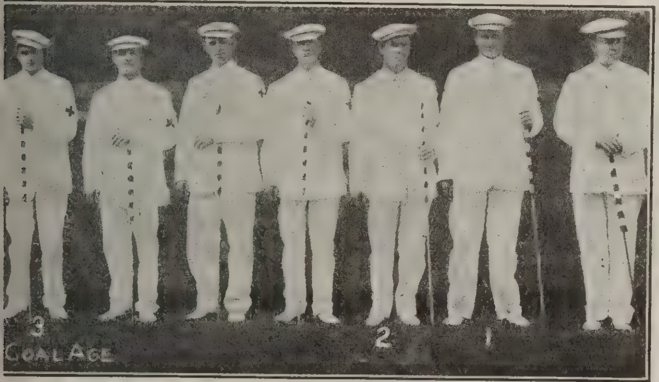
The First-Aid Prizes, 1912

The William Howard Taft Fund was established by an anonymous friend of the Red Cross and its intention is to provide prizes for first-aid work on railroads. The awards are $50 for the first prize, $25 for the second, $1 for the third and $10 for the fourth.

The Red Cross Society has itself offered similar prize for meritorious first-aid work in all industries but railroading, limited to students of classes organized under Red Cross auspices. As recorded in our news department recently, three men in the Cary team of the Continental Coal Corporation were recipients each of one-third of the first prize. Through the favor of W. L. Moss, the general manager, we are able to show a picture of the team, with the first-aid prize winners carefully ndicated.

From the affidavit of Fred D. Haston, M. D., of Arjay, Ky., we obtained the following details: Thad Idol, an mployee of the Continental Coal Corporation, at Cary, Ky., was injured in the mines at that place on Oct. 29, 1912, about 3 p.m. by a small mine car leaving the track nd running over his left leg about three inches above the nkle, producing a fracture of the fibula with considerble contusion of the skin and neighboring structures. The pain was intense, so much so that the patient remarked that the few moments while the first-aid men were reaching him seemed like as many hours. Probly a space of 10 min. elapsed between the time of the njury and the application of the first-aid dressing, which as performed by W. T. Caton, Luster Lock and Ed. uncan, all of the Cary team, and holders of first-aid iplomas from the Continental Coal Corporation as a relt of the contest of Aug. 24, 1912. They also had reived certificates from the American Red Cross Society.



he Cary First-Aid Team of the Continental Coal Corporation

(1) W. T. Caton, (2) Ed. Duncan, (3) Lester Lock. These ree each received one-third of the prize paid by the Amerin National Red Cross for the best example of first-aid work tually done during the year 1912.

Instant relief was given the victim by the proficient d prompt work of the first-aid men. Thad Idol testied that he felt no more pain after his leg was dressed. wo hours later, the injury was inspected at the miners' spital, to which the victim was removed and Drs. Hasn and B. E. Gianini, the latter of Straight Creek, deared it to be the most nearly perfect first-aid dressing er applied in that mining district.

The second prize was won by Edmund Williams, of e Berwind-White Coal Mining Co. He treated a severe se of Pott's fracture, which is a breakage of the lower rt of the fibula, accompanied with injury to the ankle int, so that the foot is dislocated outward. The accint occurred at Eureka No. 39, on Feb. 26, 1912. Dr. W. Hawes, of the B.-W. C. M. Co., was attending suron.

The two other prizes went to men who were not emoyed at coal mines.

G. B. Markle Co.'s First-Aid Contest

Special Correspondence

The first annual first-aid contest of the G. B. Markle Co. was held at Drifton, on Aug. 8. The corps participating were Highland No. 2, Inside, Jeddo No. 7, Inside, Jeddo No. 4, Inside, and Highland No. 5, Outside. The contest consisted of four events, as follows:

Event No. 1. A man falls, fractures his nose and receives a bad laceration on the right side of the head, 2 in. above the temple.

Event No. 2. Fracture of the middle of the left forearm.

Event No. 3. A man is rescued from a gas explosion and turned over to the first-aid team to be treated for a badly burned head, neck and shoulders.

Event No. 4. A man receives a compound fracture of the left leg, 4 in. above the knee; the artery is cut also. Patient to be transported on stretcher after being treated.

The ratings in detail were as follows:

Event No.	Jeddo No. 4 Inside	Highland No. 5 Outside	Jeddo No. 7 Inside	Highland No. 2 Inside
1	98	98	96	98
2	98	89	93	95
3	95	100	98	93
4	98	100	98	98
Average,	97¼	96¾	96¼	96

Each corps was started with a credit of 100 per cent. and penalized in accord with the recommendation of the National Mine Safety Association; in fact the whole contest was conducted as nearly as possible along the lines suggested by that body.

The general rules governing the contest were as follows: 1. All teams will contest each event simultaneously, and the captain of each team will announce to the judges the moment his men have finished the work on the patient. No work will be allowed after such announcement. 2. There will be no penalty for slowness in work unless same is sufficient to cause further injury to the patient. 3. No coaching or aid from anyone not in competition is allowed. 4. The following penalties will be imposed:

	Per Cent.
For not doing most important thing first	2
For captain's failure to command men properly	2
For slowness in work	2
For failure to cover wound completely	2
For wrong artificial respiration	2
For loose splint	2
For not padding splints properly	2
For loose bandage	2
For bandage too tight	2
For "granny knot"	2
For awkward handling of patient on stretcher	2
For lack of neatness	2
For assistance lent by patient	3
For tourniquet too tight	3
For failure to stop bleeding	5
For not treating shock	5
For failure to be aseptic	10

The members of the competing corps were as follows:

Jeddo No. 4 Inside:
Henry Klose (captain)
Andrew Kushner,
Hugh McMonigal,
Edward McMonigal,
Joe Lynott,
Josepn Makuta (patient)

Highland No. 5 Outside:
Donald Beverage (captain)
Mike Leback,
Mike Klupz,
Charles Dennion,
Mannus McLaughlin,
Con. Gaffney,
John Soltas (patient)

Jeddo No. 7 Inside:
James Gildea (captain)
James Mulhall,
James O'Donnell,
Ben Bittner,
John Spitzner,
Thomas Thomas (patient)

Highland No. 2 Inside:
Daniel Bradley (captain)
Patrick Quinn,
Geo. Zeisloft,
John Contina,
John Gallagher.
Walter Cherekowskie (patient)

The judges were: Dr. T. H. Mays, of Drifton; Charles Enzian, of the U. S. Bureau of Mines, and Atherton Bowen, of the Lehigh Valley Coal Co.

Previous to the contest A. B. Jessup, general manager of the G. B. Markle Co. gave a short address, concluding with an introduction of the judges. Mr. Enzian then gave a talk in which he gave an outline of what was expected of a first-aid man and a first-aid corps. Following the contest Dr. Mays talked on the surgical questions raised by the problems in the contest, and Mr. Bowen commented on the team work and discipline.

G. B. Markle concluded the program by awarding the prize, a handsome loving cup, to the Jeddo No. 4 Inside Corps. In his remarks he congratulated all the teams and expressed much gratification on account of the excellent work in the contest and said that, although among the last to take up this work in a systematic way, ample facilities would be furnished and he confidently expected that such a state of efficiency would be reached that their position as compared with the other corps in the coal fields would be among the first.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 11—This subject has not been discussed as thoroughly as I had hoped. Each week I have waited anxiously for some new arguments that would alter my opinion. But thus far, I have failed to see any reason advanced that would warrant the use of mixed lights in a mine generating gas. In my opinion, if gas has been discovered in any portion of a mine, there is no certainty that the danger can be confined to that one district and in this case, safety lamps should be employed throughout the mine.

No one will deny, of course, that there is a certain disadvantage in working with a safety lamp, but the annoyance is more imaginary than real and should not be considered when the question of safety is at stake. It seems to me the time has come when we should consider how far we can keep away from danger—not how near we can ride to the edge of a precipice without falling over.

The recent Cincinnati mine explosion, Apr. 23, has taught us a lesson in reference to the use of mixed lights in a mine operating in a gaseous field. This mine was examined by the mine inspector six weeks previous to the explosion and reported to be free from gas. By the explosion, 96 lives were sacrificed. As stated in Coal Age, May 3, p. 679, the use of mixed lights in the Cincinnati mine and other mines in the Pittsburgh district is naturally revived by this disaster, which emphasizes the danger of the use of open lights in any part of a mine where safeties are required in certain districts or places. Numerous other disasters could be mentioned that prove the same rule.

In some cases, recently, electric lamps have been tried and used in place of safety lamps. While these lights can be used on the intake airway where it is unnecessary to test for gas, in my opinion, they cannot be employed generally in the regular work at the face, because they give no indication of the presence of gas.

The argument has been advanced against the use of the safety lamp; namely, that it affects the eyesight. This may be true in some cases but is not my experience. During the 30 years I have worked in the mines, I have used the safety lamp a good portion of the time; and I can still read the finest print without glasses.

Another argument that has been advanced is that a man cannot do as much work with a safety lamp as with an open light. While I have no statistics to prove that this statement is not true, my experience is that the safety lamp gives enough light for digging coal and performing any other work required in the mine. The point that appeals to me is that if coal can be mined to pay, in one district, with a safety lamp, it can be done all through the mine.

The cry "Safety first," it seems to me, is wholly inconsistent with advocating the use of mixed lights in mining. The inconsistency is more apparent than ever when it is considered that thousands of dollars are spent each year to ascertain and test the safest methods to be employed in mining coal. Thousands more are spent for inspectors to examine and see that the safety devices in use are efficient and in good condition. At the same time, we find many operators, for the sake of saving another dollar, endeavor to see how little they can do and still comply with the law. They do not consider that in saving one dollar they may lose a thousand.

Thomas Hogarth.

Heilwood, Penn.

Letter No. 12—I do not consider that the use of mixed lights is dangerous, in coal mining, provided proper care is exercised to safeguard the practice in the mines, and provided the workings are well ventilated. With proper mine regulations strictly enforced, no accident should occur.

The miners at the working face require a good light, which the safety lamp does not afford. For this reason, the use of the safety lamp, at the coal face, should be avoided wherever this is possible. Provide a good air current well conducted to the face and use open lights wherever and whenever this is practicable, is my theory.

In my opinion, a mine operated entirely under locked safety lamps has as many chances of an explosion as one where mixed lights are permitted. They are both generating explosive gas and the same care and vigilance that make one mine safe will make the other safe also. What is needed is a good system of ventilation whereby an ample air current is circulated throughout the entire mine and so conducted that it will sweep the working face in every room or chamber. By this means the gases generated will be rendered harmless, and it will be impossible for any gas to accumulate in dangerous quantity.

It is important also to examine every part of the mine daily and often, where gas is generated. Whenever a shot is fired, the place should be examined for gas before the workmen are allowed to return to their work. In order to prevent the short-circuiting of the air by a door being left open, a check door should be provided wherever this is necessary, and an attendant should be on hand constantly when men and cars are passing.

R. J. Pickett.

Shelburn, Ind.

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The Mine Air after an Explosion

In reading different articles relating to mine explosions, I have often been surprised at the statements of some of our best mining men that seem to indicate a doubt or misbelief, on their part, that any firedamp could remain or be present after a mine explosion.

On several occasions, I have made tests of the mine air following an explosion of gas; and, in many cases, have been able to detect the presence of firedamp in considerable quantity. An instance of this kind occurred some months ago in a thoroughly equipped and well ventilated mine, near Pittsburgh, where an explosion of gas occurred by which two miners and a fireboss were badly burned. One hour after the accident, I accompanied the mine inspector of the district and the officials of the company to the scene of the explosion to ascertain, if possible, its cause and effect.

The miners had been pulling entry stumps. They were using the Wolf safety lamp. While changing cars they had neglected to close the door on the entry, thereby short-circuiting the air at that point, which caused the gas accumulated above the falls to descend to where the men were working. Just at that time, the fireboss, making his rounds, closed the door and proceeded at once to where the men were working. Taking one of their lamps, he started to show them the gas that he knew *was* present, when the lamp exploded with the results mentioned.

Although we were there and made the test for gas only an hour after the explosion occurred, we were able to find a sufficient body of firedamp to produce again the same results. This firedamp had accumulated after the explosion, which showed that the previous inflammation had not been sufficient to consume all the gas. There was, in this case, a considerable amount of unburned gas, which only required an addition of fresh air to produce a second explosion if ignited. In any case, such ignition might occur from a fire trail started by the first explosion.

JOHN E. AMBROSE.

New Durham, N. J.

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The Liquor Problem in Mining

I was interested in reading the letter of "Mine Superintendent," on this subject, COAL AGE, Aug. 9, p. 186. Many have experienced the same difficulty that he has described, in eliciting assistance from those in authority. As far as the law is concerned, it is apparently a case of "work out your own salvation." At the request of the writer, on one occasion, the district attorney employed two detectives for the surveillance of a place in the effort to suppress the drink traffic. The result was the inebriation of these minions of the law.

A few years ago, the writer having been appointed to take charge of a large and important operation, paid a visit to the place, unknown to any one. Although it was the Sabbath, drunken miners, in every state of inebriation, were to be seen lounging about and sleeping or singing ribald songs in their own language. On many porches, kegs were on tap while glasses were clanked in drinking health. The scene was disgraceful and, to avoid insult, the sober, intelligent few kept themselves indoors.

The outlook was discouraging and I determined, then and there, to hit the cause hard, from the start. My information, on assuming charge, was that the mines were never worked to full capacity until the Thursday following each pay day. Monday was known as "blue Monday" and Tuesday was little better, with a slight improvement Wednesday; but Thursday the conditions were again normal. The general superintendent gave me his unqualified support and a fighting campaign was determined. The mine foremen were ordered to make out lists of those addicted to the drink habit. The clerks furnished a list of boarding-house keepers, giving the number of boarders and their names and nationality.

The next move was to notify the drivers of all beer wagons to remove the empty kegs from the streets at once. This order was ignored and the company, after waiting patiently a few days, sent the company wagons to collect every keg found in the street and these were, later, used to generate steam. The loss of the kegs brought a strenuous protest from the brewers; but they were informed that due notice and time had been given for the removal of the kegs from the streets and that, in future, these unsightly objects would not be tolerated. The brewery companies promised and, for a time, kept the kegs off the street; but the old conditions soon returned. Again the company wagons gathered up the kegs and this time dumped them into an inaccessible ravine. This last act brought instant relief and the streets of the village were thereafter wonderfully improved.

The next move was the completion of a fence that had been partially built some time since, inclosing the camp. Gates were provided, chained and locked, keys being given to the company drivers only. This necessitated the beer wagons driving over a hill in order to reach the camp. It was explained by the coal company that the streets were practically the playground of the children and, unless the brewery companies contributed toward the maintenance of these roads, they would be prohibited from using them. It is needless to say that this proposition was scorned.

Later, rumor had it that a professional pugilist had been employed by the brewery companies to visit the mine, pick a quarrel with the one responsible for their troubles, and if necessary alter the contour of his features. Deeming it wise to be prepared for an onslaught of this nature, there was in evidence, on the appearance of this party, something that protruded from the hip pocket of the superintendent to which the visitor gave respectful attention. The interview sought was brief, the party in question professing business that demanded his immediate attention.

The advantage thus far gained was followed up by employing a bright boy, who, while pretending to play about the streets, made note of the number of kegs delivered at each house. By comparing these notes with those of the foremen, it was shown that the men who lost the most time from work were those who boarded or lived where the most beer was delivered. These men were called, one by one, to the office and given to understand that, while there was no objection to their drinking in moderation, biweekly sprees and undue loss of time would not be tolerated. Some profited by the advice; but the remainder, failing to comply, there were soon 15 vacant houses, which were quickly filled again by men who were disposed to work and to obey the rules of the company.

The rules were printed in the different languages and posted at the mine. They required that any one desiring to be absent from his place must notify the mine foreman before doing so; and any one remaining idle the day after pay day could not return to work without a written permit from the superintendent. A few of the men adopted the scheme of going to their place and returning in a short time; but these were reported by the foremen as absent and their turns were stopped the following day. In a short time, "blue Monday" was a thing of the past—"an unpleasant memory." The output on that day equaled that of any other day in the month, and the output of the mine became so steady that, during the two years that followed, there was a difference of only 2000 tons in the annual production of the mines—0.4 per cent. Affairs at the mine took on a new aspect and the men actually became proud of their record for steadiness. The change took six months.

The desire on the part of many progressive companies to make life more attractive to their employees is producing good results. It is true, it is not always appreciated by those benefited. The bath tubs may be used for brooders or coal bins, and sewers as a depository for old clothes, tin cans, etc.; but time will eradicate even this misuse of privileges.

There is one point remaining to be considered. Observation has shown that "dry sections" commonly consume more beer than "wet sections." Where saloons are removed from the vicinity of the mine the last vestige of control is taken away from the mine officials. By the exercise of a half-concealed threat, it is possible to force a saloonkeeper to use his influence toward preventing the loss of time by his patrons, which operates against the interest of the saloonkeeper in preventing the steady operation of the mine.

CHARLTON DIXON.

Pittsburgh, Penn.

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The Anthracite Industry

In the articles by "Special Correspondent," COAL AGE, Aug. 9, p. 186, defending the so called "anthracite coal trust," I see no explanation of the two leading facts of my own experience as a user of anthracite coal in a residence furnace; namely, the price and quality of the anthracite coal furnished by coal operators, to the Chicago market, today.

The price of anthracite coal in Chicago, is throughout the year higher than it was before the big strike, and the quality of such coal to be purchased from the best companies in Chicago is much inferior to what it was when there was real competition in quality and price.

The large proportion of stone and slate, in the best coal I could find, has driven me to substitute coke, briquettes, or anything else that will not produce such a large percentage of waste and require so much time, every night, to dig the refuse out of the fire. I would like to ask "Special Correspondent" if the rapacity of the "trust" is not responsible for maintaining the present high prices and working off a poor quality of coal on the consumer. If this is not the case, will he kindly explain the responsible cause.

E. G. EWART,
Link-Belt Co.

Chicago, Ill.

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Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Diffusion of Air and Gases—If the molecules of all matter are assumed to be in a constant state of vibration, it naturally follows that the vibratory movement or force will vary with the density of the matter. In the case of fluids—air, gas, or liquid—the molecules are free to move among themselves, which is not true of solids, whose molecules, normally, hold fixed relations to each other.

If the densities of two fluids are equal, the vibratory force is equal in each fluid; and, at the plane of contact of the two fluid bodies, action and reaction are equal between the vibrating molecules and there is no tendency of these fluids to mix. The laws governing the mixture of liquids is not as simple as in the case of gases, owing chiefly to numerous physical properties of liquids that modify and retard the diffusive action. While the diffusion of gases into each other and into air is extremely rapid, the diffusion of liquids is often very slow and in some cases does not take place at all because of the counteracting forces.

Gases of different densities diffuse into each other and into air. The action is extremely rapid and conforms very closely to certain well defined laws. The diffusion of mine gases into the mine air and into the air current is an important feature of mine ventilation.

Experiment—The diffusion of air and gases has been shown to take place through certain substances with practically the same rapidity as when they are in direct contact. The diffusion of hydrogen into air is well shown by the following simple experiment. A glass tube, say 18 or 20 in. long, 1-in. bore, is closed at one end with a plug of plaster. The tube is first filled with the gas and the open end then immersed beneath the surface of a basin of mercury. At once the mercury is observed to rise slowly in the tube to take the place of the hydrogen that has passed out through the plug and escaped into the air. Investigation shows, however, that while hydrogen has passed out of the tube, some air has pased into the tube, as there remains in the tube a mixture of hydrogen and air.

Law of Diffusion of Air and Gases—By a similar experiment, showing the diffusion of hydrogen into oxygen, Graham found that for every volume of oxygen that passed into the hydrogen, four volumes of the hydrogen passed into the oxygen, the ratio thus being 4:1, in this case. But, calling the density of hydrogen unity or 1, that of oxygen is 16 and $\sqrt{16} = 4$. This and other similar experiments, all confirming the first, led Graham to observe the following law.

Graham's Law—The velocity or rate of diffusion of air and gases is inversely as the square roots of their densities or specific gravities.

This law is simply expressed by the following formulas:

$$\textit{Rel. vel. of diffusion (gas : hydrogen)} = \frac{1}{\sqrt{\textit{density of gas}}}$$

$$\textit{Rel. vel. of diffusion (gas : air)} = \frac{1}{\sqrt{\textit{sp.gr. of gas}}}$$

The Coal Age Pocket Book

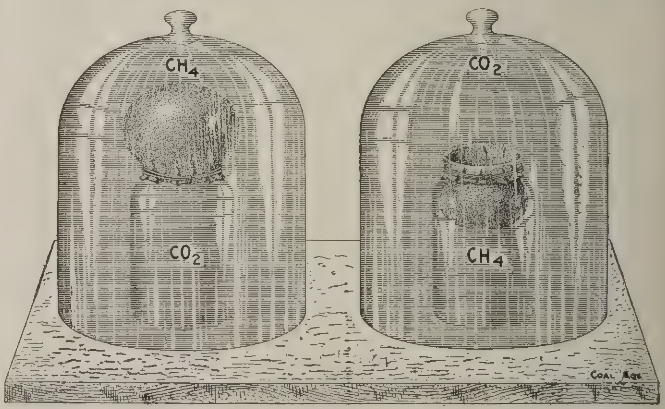
Illustration of Graham's Law—The relative velocities or rates of diffusion of different gases (hydrogen = 1) are calculated from their respective densities referred to hydrogen as unity; thus,

$$\text{Methane } (CH_4)\text{; density, 8;}\quad \textit{Rel. vel.} = \frac{1}{\sqrt{8}} = \frac{1}{2.828} = 0.354 \quad (H = 1)$$

In like manner, the relative velocities or ratio of diffusion of different gases (air = 1) are calculated from their respective specific gravities, referred to air as unity; thus;

$$\left.\begin{array}{ll} \text{Carbon dioxide } (CO_2)\text{; sp.gr., 1.529;} & v = \dfrac{1}{\sqrt{1.529}} = 0.808 \\ \text{Methane } (CH_4)\text{; sp.gr., 0.559;} & v = \dfrac{1}{\sqrt{0.559}} = 1.337 \end{array}\right\} (\text{Air} = 1)$$

Experiment Showing Effect of Diffusion—An interesting experiment, showing the relative increase or decrease of the volume of gas contained in a vessel owing to diffusion, is illustrated in the accompanying figure. The velocity of diffusion of methane being greater than that of carbon dioxide, when the latter is contained in the inner jar and the former in the outer bell-jar the bladder is expanded, because the methane passing into the small jar is greater in volume than the carbon dioxide passing out. Again, the bladder is depressed when the gases change places.



SHOWING EXPANSIVE EFFECT DUE TO DIFFUSION

INQUIRIES OF GENERAL INTEREST

The Calculation of Relative Humidity

Referring to the description of the humidity chart, and the calculation of the relative humidity of air, COAL AGE, July 12, p. 62, I want to ask if you will kindly give the authority for the constants 88 and 30 used in that calculation as I am working along these lines.

L. L. A. MORAN.

Pittsburgh, Penn.

The formula given in this calculation is the Apjohn formula used by Prof. Alexander Buchan, Secretary Royal Meteorological Society, London.

The use of the wet- and dry-bulb hygrometer (psychrometer) depends on the principles that: 1. The relative humidity of the atmosphere is the ratio of the pressure of the water vapor in the air at the time of the experiment, to the pressure of the water vapor at the point of saturation, for the temperature of the air or the dry-bulb thermometer. 2. The actual pressure of the water vapor at the time of the experiment is equal to the water-vapor pressure at the point of saturation (dew point), for the temperature of the wet-bulb thermometer. The water-vapor pressure at the point of saturation is given in psychrometer tables.*

In the use of the psychrometer, if the dew point were known or the temperature at which the weight of vapor present in the air would produce saturation, the vapor pressure corresponding to that temperature, as given by the tables, divided by the vapor pressure for the temperature of the dry bulb would give the relative humidity.

The psychrometer makes it possible to *calculate* the dew-point temperature from the difference of the readings of the wet and dry bulbs, if the barometric pressure is known. To do this, the barometric pressure is multiplied by the difference in the readings of the wet- and dry-bulb thermometers and that product again multiplied by a constant c. The resulting product subtracted from the saturated water-vapor pressure, corresponding to the wet-bulb temperature, as taken from the tables, gives the dew-point pressure, which is the actual pressure of the vapor in the air at the time of the experiment. This actual vapor pressure divided by the saturated vapor pressure for the temperature of the dry bulb, gives the relative humidity of the air expressed decimally. The constant c, varies with the wet-bulb temperature, and has been determined, by a large number of experiments, as calculated by the formula.

$$c = 0.000367(1 + 0.00064\ t_w)$$

Referring to the formula given on p. 62, the constant 30 is practically the normal barometric pressure at sea level, and the constant 88 has been determined by experiment, for temperatures above 32 deg. F. The value of this constant is 96, for temperatures below 32 deg. F. Because the range of ordinary temperatures is comparatively slight, it is possible, with almost inappreciable error, to simplify the calculation by the use of the constants 88 and 30. That these constants practically agree with the formula given above for determining the constant c is shown by a simple calculation. Thus, substituting in that formula, the value $t_w = 50°$ F.,

$$c = 0.000367\ (1 + 0.00064 \times 50) = 0.000379$$

Also,
$$\frac{1}{30 \times 88} = 0.000379$$

The formula of Dr. Apjohn is based on the theory that the heat absorbed by the water converted into vapor is taken from the air immediately surrounding the wet bulb and which becomes saturated therewith. The heat thus lost by the air causes the fall of temperature, which is the difference between the wet- and dry-bulb readings. The calculation thus involves the latent heat of the vapor at the wet-bulb temperature, the specific heat of the air, the specific gravity of the vapor, the fall of temperature, which factors when properly assembled determine the ratio of the actual vapor pressure at the time of observation to the total pressure. The formula, partially rational, is corrected by an empirical constant.

Ventilation

Kindly give the best and simplest method of calculating the coefficient of friction in mine ventilation, and explain the solution of the following problem:

In a gangway 5x8 ft., 4000 ft. long, the anemometer reading indicates a velocity of 200 ft. per min. Find the volume of air passing in cubic feet per minute; the pressure producing circulation, in pounds per square foot; the water gage corresponding to this pressure; and the horsepower on the air.

A SUBSCRIBER.

The coefficient of friction, in mine ventilation; or, as it is more properly called, the *unit resistance,* is not calculated, but determined by experiment. It has been found that, under ordinary mining conditions, this unit resistance, or the resistance offered by 1 sq.ft. of rubbing surface to an air current having a velocity of 1 ft. per min. is 0.00000002, which is the Atkinson value abbreviated. The Fairley coefficient, which is often used in mining calculations, is one-half of the Atkinson coefficient, or 0.00000001.

The rubbing surface, area, quantity, pressure, water gage and horsepower are then calculated as follows:

$$s = 2\ (5 + 8) \times 4000 = 104{,}000\ sq.ft.$$

$$a = 5 \times 8 = 40\ sq.ft.$$

$$q = av = 40 \times 200 = 8000\ cu.ft.\ per\ min.$$

$$p = \frac{ksv^2}{a} = \frac{0.00000002 \times 104{,}000 \times 200^2}{40}$$
$$= 2.08\ lb.\ per\ sq.ft.$$

$$w.g. = \frac{2.08}{5.2} = 0.4\ in.$$

$$H = \frac{qp}{33{,}000} = \frac{8000 \times 2.08}{33{,}000} = 0.5+\ hp.$$

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*Bulletin No. 235, U. S. Department of Agriculture, Washington, D. C.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—Find the power of the engine required to operate an endless-rope haulage, for an output of 800 tons of coal per day of eight hours. The mine cars hold 1500 lb., and weigh 900 lb., each. The haulage road is 3000 ft. long and practically level. Assume a speed of 6 miles per hour, or, say 500 ft. per minute.

Ans.—The required output of coal is (800 × 2000) ÷ (8 × 60) = 3333+ lb. per min. Allowing no time lost in delays and assuming a coefficient of rolling friction for the cars and ropes, $f = 0.025$, the effective horsepower may be calculated by the formula

$$H = \frac{fl}{33{,}000}\left[O\left(1 + \frac{2\,w_c}{w}\right) + 2\,w_r v\right]$$

Substituting in this formula the following values: $f = 0.025$; $l = 3000$ ft.; $O = 3333$ lb. per min.; w (coal) = 1500 lb.; w_c (car) = 900 lb.; w_r (rope) = 1.58 lb. per ft.; $v = 500$ ft. per min.,

$$H = \frac{0.025 \times 3000}{33{,}000}\left[3333\left(1 + \frac{2 \times 900}{1500}\right) + 2 \times 1.58 \times 500\right]$$

$$= 20+\ hp.$$

Ques.—The timbering or lining of a hoisting shaft shows signs of collapse. State how you would temporarily secure it, and describe what measures you would adopt in renewing the timber.

Ans.—In order to temporarily secure the bulging timbers on the face of the shaft, extra cross-buntons should be inserted wherever these will not interfere with the hoisting operations; or, if necessary, hoisting must cease until the shaft can be repaired.

The work of renewing timbers in a shaft should be started at the top and proceed downward. Only such timbers should be taken out at one time as are necessary to permit the insertion of the new timbers. The latter should be of sufficient thickness to give the required strength to support the strata. The new timbers should be lagged or packed as tightly as possible behind, so as to give the required support to the strata. Permanent cross-buntons should be inserted at regular intervals, and the work should be done in a substantial manner. Suitable provision should be made, as may be required, to drain the space behind the timbers and conduct the water to the foot of the shaft.

Ques.—Name the principal gases found in coal mines that are chemical mixtures and also those that commonly form a mechanical mixture in the mine.

Ans.—Methane, or marsh gas (CH_4), is a chemical compound, the molecule consisting of one atom of carbon and four atoms of hydrogen; olefiant gas (C_2H_4), consisting of two atoms of carbon and four of hydrogen; carbon monoxide (CO), consisting of one atom of carbon and one atom of oxygen; carbon dioxide (CO_2), consisting of one atom of carbon and two atoms of oxygen; and hydrogen sulphide (H_2S), consisting of two atoms of hydrogen and one atom of sulphur. All of these gases, as they occur in mines, are more or less mixed with air, in varying quantities, forming mechanical mixtures of air and gas. Air itself is a mechanical mixture, consisting of, practically, four parts, by volume, of nitrogen and one part, by volume, of oxygen.

Firedamp is a mechanical mixture, consisting of methane or marsh gas and air, in explosive proportions, together with varying quantities of other gases, which more or less modify the character of the firedamp. These other gases may or may not be present in the firedamp. Afterdamp is a mechanical mixture, consisting principally of nitrogen and carbon dioxide, together with varying quantities of unburned marsh gas, carbon monoxide and water vapor. Blackdamp is a mechanical mixture consisting, chiefly, of carbon dioxide and nitrogen, in varying proportions. Whitedamp is another name for carbon monoxide as it is found in the mines mixed more or less with air.

Ques.—In a nongaseous mine, where would you locate the main-haulage road, on the intake or the return airway, and why?

Ans.—While the main-intake airway should be made the haulage road in a gaseous mine, to avoid the danger of the ignition of the gas in the return-air current by the lamps of the drivers, it is more practicable, in a nongaseous mine, to make the return airway the haulage road. The reason is that, by so doing, a blower fan can be used and the mine ventilated under a pressure greater than that of the atmosphere. The gases generated in abandoned workings are then driven back and escape by any crevice or break to the surface. The mine is thus kept freer from gas than under the exhaust system.

In the use of the blowing system of ventilation, it is necessary to make the return airway the haulage road, in order to avoid the use of doors at the shaft or slope bottom. For the same reason, in the use of the exhaust system, it is necessary to make the main intake the haulage road.

Ques.—If the percentage of gas in the main return of two air splits is 2.5 per cent., and there is 0.75 per cent. of gas in one of these splits, what is the percentage of gas in the other split; there being 20,000 cu.ft. of air passing in the former and 30,000 cu.ft. of air in the latter?

Ans.—The total volume of air passing in the main-return airway coming from these two splits is 20,000 + 30,000 = 50,000 cu.ft. per min. The volume of gas in this return current is then 50,000 × 0.025 = 1250 cu.ft. per min. In like manner, the volume of gas generated in the first split is 20,000 × 0.0075 = 150 cu.ft. per min. The volume of gas generated in the second split is therefore 1250 — 150 = 1100 cu.ft. per min. This makes the percentage of gas in the second split

$$\frac{1100 \times 100}{30{,}000} = 3\tfrac{2}{3}\ per\ cent.$$

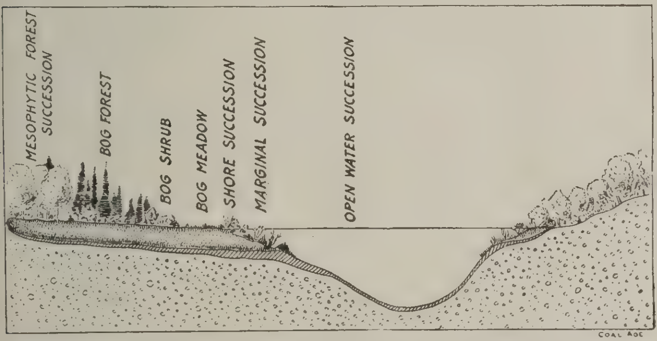
This answer assumes that the given volumes are measured at the return end of each split.

BOOK REVIEW DEPARTMENT

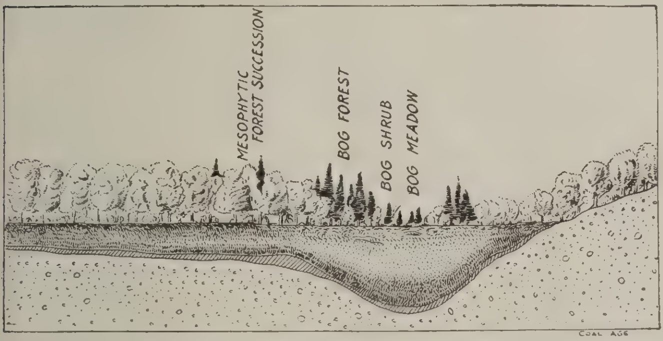
PEAT DEPOSITS—By Alfred Dachnowski, 392 pp. with 32-page index; 6½x9⅝; 1 map, 8 plates, 29 figures. Geological Survey of Ohio, Fourth series. Bull. 16. Cloth boards. Price, 75c.

This book was prepared with the coöperation of the Bureau of Mines, but we think that the main part of the assistance rendered consisted in the making of analyses and in the article on "The Uses of Peat," by Charles A. Davis. Certainly the clarity and simplicity of the bulletins of that admirable institution are not apparent in this report. When we have subjected the newer scientific expressions in many sentences to careful examination and then endeavored to extract the sense from such passages, we have found ourselves somewhat nonplused for the construction is as involved as the terminology is unusual.

However, this charge covers all the faults of the book. It is a most scholarly addition to the study of peat deposits dealing with the subject from economical, ecologic, agronomic and phytologic points of view, to make use of the author's own expressions. The study is of no little interest, though the present bogs are not tenanted by the same plants, as those of the carboniferous era, nor are they growing in soils analogous to those from which our coal beds sprang.



The Early Appearance of a Lake, Having Vegetation Suited to Free Water



The Lake Develops into a Bog, the Early Deposits Overlapping Older

They show a great variety of conditions derived partly probably from the variant nature of the component plants, the different characters of their soil foods and the unequal progress of the processes of decay. Thus the nitrogen in one moisture-free sample in Big Spring Township, Seneca County, ran 3.48 per cent. Had it been moisture- and ash-free, the figure would have been increased to 4.33 per cent. On the other hand, the nitrogen content in a moisture-free sample may fall to 1.01 per cent. in a peat where the ash present is only 8.45 per cent.

Sulphur also varies from 4.57 per cent. to 0.21 per cent. As the ash in the first sample is 22.14 per cent. the ash- and moisture-free sulphur content would rise to 5.88 per cent. The latter sample has only 7.59 per cent. of ash. Only occasionally is pyrite mentioned as being present. It does not appear that the ash, nitrogen and sulphur have any regular relationship. It is only by chance that the figures we give show at once high sulphur or high nitrogen and high ash. One peat with 45.08 per cent. of ash has only 0.35 per cent. of sulphur, the nitrogen being 2.30 per cent.

The large amount of sulphur in these Ohio peats is an evidence that if coal were formed today it would have as large a percentage of sulphur as coals of the carboniferous system. Vegetation now as then serves as a concentrator of all sulphur-trioxide compounds in soil and waters.

The author names the various plants which occur together in the peat bogs. These groups occur in a regular determinable succession, one group at the bottom and the other at margins of the lagoons from which the bogs are formed. The illustration shows these "successions" as the author terms them in their order. The book is extremely interesting and everyone who esteems himself a geologist or a botanist should have it in his library, not so much for the local facts, which are themselves extremely valuable, as for the broadened view the reader will obtain of the conditions determining vegetable growth and the deposition of coal.

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EXPLOSIVES. A SYNOPTIC AND CRITICAL TREATMENT OF THE LITERATURE OF THE SUBJECT AS GATHERED FROM VARIOUS SOURCES. By H. Brunswig. Translated and annotated by C. E. Monroe and A. L. Kibler, George Washington University. 322 pp. and index; 5¼x8¼ in., 45 ill.; John Wiley & Sons, New York, Cloth Boards. Price, $3.

Who Dr. Brunswig is, we do not know and the authors do not enlighten us, but it must be conceded that his book bears translation and the careful reading of the student. The original work is dated January, 1909, so that the information is quite reasonably up to date, though, of course, it does not treat explosives from an American mining standpoint. If it had not been for the mysterious words "Part 1" appearing at the head of the table of contents and of the first reading page, we would have thought it a complete treatise on explosives. More, of course, could be written, but the view taken seems to comprehend the whole field from a popular point of view. The subjects considered are. General behavior of explosive systems, velocity pressure, temperature, flame and products of explosive reactions, explosions by influence, and the properties of explosive bodies. Then igniters, fuses and detonators, mercury fulminate, propellants and blasting explosives are discussed. It may be noted that the book gives the bulk of its attention not to military but to civil explosives.

It is essential that this subject be understood by mine managers. In English examinations for such officials, stress is always laid on such knowledge and the emphasis is justified by the importance of the subject.

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AIR COMPRESSION AND TRANSMISSION, by H. J. Thorkelson, associate professor of steam and gas engineering, University of Wisconsin; 200 pp., with index, 6x9¼ in. Copious illustrations, also tables and diagrams. McGraw-Hill Book Co., 239 West 39th St., New York City. Cloth boards. Price, $2.

Mr. Thorkelson has written this book to meet the needs of the ordinary engineer. Turning the pages over one is confronted with a few integration signs and is disposed to think that the book is not suited for the use of beginners. But in all, the sign is used only seven times and is found only on two pages which occur consecutively. Avoiding these few paragraphs the reader who is seeking for elementary methods of presentation will not once be offended unless he feels that everything is made too explicit and that too much space is devoted to bedrock principles. In an appendix, Mr. Thorkelson even explains the use of logarithms. But though it is true that this little volume is suited to the use of beginners yet it covers the whole field—decompression, ventilation, rotary blowing machines, fans and their design, piston compressors, turbine blowers, hydraulic compression, the effect of altitude, the measurement of compressed air and the care of compressors. It is not written from the point of view of the colliery engineer, but it nevertheless will be found of great value to him in solving his problems and in explaining the wherefores of his compression machinery.

COAL AND COKE NEWS

Washington, D. C.

Statements have been given out by the American Mining Congress with reference to the 16th annual convention of that body which is to be held in Philadelphia during the latter part of October, a feature of which will be a display of mining machinery.

Special attention is to be paid to the problem of safety for miners, both in the discussion and in connection with the exposition of machinery. All classes of safety devices will be on show and there will be demonstrations of operation in order to furnish tests of efficiency. It is expected that there will be large representations from the West because of the supposedly greater advance that has been attained in that part of the country with respect to protection of human life.

Three special transcontinental trains will be run, one from Los Angeles, one from San Francisco, and one from Seattle, picking up men from all of the important mining communities in the West. A special train will also be run by the iron and copper men of Minnesota and Michigan and two trains are expected to be sent from Chicago. A fully equipped mine-rescue car will probably be loaned by the State of Illinois.

The Pennsylvania coal companies will also place on display a number of rescue cars and it is intended to have a working coal mine fitted up in the basement of Horitcultural Hall where the mining show is to be held. The Bureau of Mines will have its methods exemplified by demonstration and there will be moving pictures illustrating the use of safety appliances.

James F. Callbreath, secretary of the Mining Congress, says with reference to the exhibition that:

> The mining industry in the past has been the victim of misunderstanding and ignorance. As a result of all this, serious problems have arisen and we are going to attempt to solve some of them at this great national rally. Because of this general misunderstanding, the burden of taxation upon the mining industry in recent years has been so largely increased in many states that the mining enterprises have ceased operation. In others an undue handicap has been placed upon competition with states operating under less burdensome conditions; and in other states a double system of taxation is required—first upon the total value of the property, and, second, upon the output. A careful discussion of this subject will be presented at the convention and after a thorough consideration it is hoped that the convention will agree upon a general theory upon which a proper system of taxation shall be based.

A Possible Dissolution

Attorney-General McReynolds has announced his intention to file a suit, under the Sherman law, attacking the Philadelphia & Reading Coal & Iron Co.'s control, through stock ownership, of the Central R.R. of New Jersey. He has already filed a suit against the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co. (a selling concern only—the Lackawanna mines are owned outright by the railroad) in an attempt to undo the steps by which the Lackawanna management sought to meet the requirements of the "commodities clause" of the Hepburn act. These two steps sufficiently indicate the desire of the Attorney-General not only to "get at" alleged railroad combinations in the anthracite field, but also to divorce the anthracite industry from transportation.

Any separation of the Reading railroad and coal properties would bring up problems in connection with that concerns general mortgage, under which stocks of both railroad and coal companies are pledged. Obviously these would not stay the hand of the court, if that body were convinced that existing relations were illegal. A way out of the mortgage difficulty would be found by the litigants or pointed out by the court. A more serious question for the company would be whether a purchaser could be found, and on what terms, for a property which pays only 1 per cent. to 2 per cent. on a debt of $73,000,000, or, including the money spent on "new work at the collieries," less than 4 per cent.

After freeing its coal-company stock from the lien of the general mortgage, the Reading company could distribute that stock, together with the coal-company debt, in the form of income bonds or stock, to its own stockholders, provided such a method were approved by the Supreme Court. It would evidently meet the opposition of the Attorney-General.

But, even if the company were compelled to sell its coal properties to strangers, it could probably do so without great loss of earning power. So far as either the Sherman law or the commodities clause is concerned, its rigid application would not necessarily be destructive of or injurious to the investment value of Reading shares. It probably would not, by itself, seriously impair earning power. A more serious possibility is that of a conjunction of such divorce proceedings and a general reduction of freight rates on the carriage of anthracite to market.

So long as the mines and the railroads are under a common corporate ownership, the individual owners of the combined properties remain immune from the effects of whatever coal freight-rate reductions may be made. As it stands the Reading company is prepared to gain as a coal merchant what the Interstate Commerce Commission may take from it as a railroad, except as to the minor portion of the coal it handles which the "independents" produce. The commission now has under way a broad inquiry into anthracite rates.

HARRISBURG, PENN.

Among the matters to be considered at the tri-district board meeting of the United Workers of the anthracite region, to be held at Wilkes-Barre is the enforcement of the anti-docking bill, which goes into effect the latter part of this month.

The author of the bill, Representative Lenker, of the Lykens Valley district, will probably attend this meeting and give the boards the intent of his bill, and the attorney of the union will give an interpretation of the bill, as to its legal status.

The question of presenting a demand to the coal companies for a "check-off" dues system will be discussed. However, none of the officials of the union will talk on this particular question. It is thought that the independent operators, at least some of them, are favorable to introducing the "check-off," as it will eliminate many petty strikes now arising over buttons, but not much hope is held out that the large companies will agree to the proposition.

A labor forward movement in the anthracite region was inaugurated recently at a mass meeting held at Pottsville. One of its purposes is to solidify the unions of the several craftsmen of this region. The miners are taking an active part in this movement, and it is expected that President White, of the United Mine Workers, will be in Pottsville on Labor Day, Sept. 1, to make an address.

The greatest interest is being shown, not only in labor circles, but by the public generally, in the contest about to be waged in Philadelphia between the American Federation of Labor and the Industrial Workers of the World for leadership among the wage earners.

The success achieved by the I. W. W. in some parts of the state gives cause for apprehension. While a good many people are not in sympathy with all of the methods pursued by the Federation, they are vastly preferable to the prepaganda set on foot by the I. W. W. This latter organization was not very successful in the anthracite region, but is now carrying on a strenuous campaign in the bituminous fields. It is, therefore, with no small degree of anxiety that the contest for supremacy in the principal industrial city of the state is being watched.

PENNSYLVANIA

Anthracite

Hazleton—G. B. Markle & Co., operators of the Jeddo, Highland, Oakdale, Ebervale and Harleigh collieries, among the largest in the anthracite region, have announced that they will erect a hospital at Highland for the temporary care of employees injured in their mines. The hospital will be equipped with modern first-aid appliances.

Wilkes-Barre—A settlement has been made between the Lehigh and Wilkes-Barre Coal Co. and the officials of the county, whereby the county pays back $9450 in excess taxes under the 1907 triennial assessment, while the company pays $18,042 as a balance due on the 1910 triennial assessment.

The trouble and dispute arose over the increase of coal-property assessment six years ago, when the value of coal was raised from $50 to $67 per foot-acre. In a case of appeal the local court reduced the valuation and it was further reduced by the Supreme Court to approximately $49 a foot-acre, or by the superficial acre from $2793 to $1920 an acre. An appeal was taken in the 1910 valuation, but was not tried out in the courts and the coal companies attempted to adhere to the value fixed by the court on the 1907 assessment, so after a long conference during the week the settlement was reached.

Pottsville—The Philadelphia & Reading Coal & Iron Co. has given its assurance to the widows of the men killed in the East Brookside mine on Aug. 2, that it will continue them upon its payroll indefinitely. The widows of the bosses who were killed will each receive $72 and the other women will each receive $40 per month. In addition also each widow will be given $80 in cash at once.

Bituminous

Charleroi—The work of building the new steel tipple for the Carnegie Coal Co., at Charleroi, to take the place of the structure destroyed some two years ago, when the property was owned by the Charleroi Coal Works, is progressing rapidly.

Myersdale—James A. Kirkpatrick and son, J. B. Kirkpatrick, who recently opened a new mine near Addison, on the C. & O. branch of the Baltimore & Ohio, report that the work is progressing rapidly and that they will soon begin shipping coal. Mr. Kirkpatrick was for several years superintendent of the Southern Coal Co., at Casselman.

Rockwood—The new mining operations of Black Brothers near Wilsoncreek is now placing its mined product in stock preparatory to shipping it over the branch road that is being constructed from the mine to the Baltimore & Ohio main line near McSpadden Station. Meanwhile, several hundred dwellings are being erected for the miners and their families and soon the place will have all the earmarks of a prosperous mining town.

Johnstown—For the first time since the purchase of the holdings of the Kelso Mining Co., the mines were operated by the J. Blair Kennerly interest on Aug. 11. These mines adjoin those of the Valley Smokeless Coal Co., which is a holding of the Kennerly company. The output of the Kelso mines is about 500 tons per day. Extensions will be made shortly, providing for the operation of some coal lying between the Valley Smokeless Coal Co.'s mines and those of the Kelso on a royalty basis.

WEST VIRGINIA

Eccles—The miners of the New River Colliery Co., at Eccles, had called a strike to take effect on Aug. 12, but representatives of the union instructed the men to return to work pending a hearing of their grievance by the Arbitration Board. The miners had been digging coal by the car and demanded that the company should put in scales and weigh their output.

Bluefield—It is stated on good authority that the Berwind-White interests have purchased the plant of the Piney Colliery Co., on Piney Creek, in Raleigh County. This property contains approximately 3000 acres of coal land and has been shipping about 25,000 tons monthly.

The Pocahontas Coal Mining Co., Inc., has been recently organized in Virginia. The general offices will be in the Seaboard Bank Bldg., at Norfolk, and Thmas T. Boswell will be president and Edward T. Boswell, vice-president and general manager. These latter gentlemen will, however, have their offices in Baltimore. The present plans of the new company include the opening of a mine in the seam now being worked, while three openings will be made in the celebrated Red Ash seam, which heretofore has remained untouched. A new power plant will be built at an early date and coal is expected to be shipped within a short time.

Charleston—A wage agreement has been signed between the Loop Creek Coal Co., of Page, Fayette County, and the officials of district No. 29 United Mine Workers of America. This gives the men a substantial increase in wages and other benefits including the abolition of the mine guards. About 600 men are affected by this settlement, which is undrstood is entirely satisfactory to employers and employees.

KENTUCKY

Middlesboro—The Wallen's Creek Coal Co., near Middlesboro, Ky., recently suffered the loss of its tipple by a fire of unknown origin, causing damage amounting to about $10,000. It will be some days before shipments can be resumed. F. P. Wood and other Pineville, Ky., men, were the owners of the property.

Masu—The discovery of two veins of what is reported to be the best coal in the Perry County field, neaer Masu, 12 miles south of Hazard, on the Brashear tract of 4000 acres, was somewhat surprising to those familiar with the field, as it was a mooted question whether there was any coal to be found in paying quantities on this tract. A. C. Rineheart, of the North Fork Coal & Timber Co., which controls the property, will at once take steps to open up operations, and will install a large plant.

Lexington—The board of examiners of the Kentucky Mining Department recently awarded first- and second-class certificates to a number of miners who took the examination for mine foreman at Lexington, six first-class and 27 second-class certificates being given. Twenty-nine of the 33 candidates examined had just completed the eight weeks' course for miners given in the College of Mines and Metallurgy of the State University. The board will hold its next examination Aug. 25.

OHIO

Columbus—Considerable development work is being done in the Pomeroy Bend district of Ohio. The Kanawha & Michigan R.R. Co. as well as the Hocking Valley is building a line into the heart of the coal fields and as a result three new mines will be opened in that section in the near future.

The Calvin-Essex Coal Co. is preparing to open two mines and the Peacock Coal Co. will soon open one. The latter concern was a small river proposition, but with the extension of the railroad lines will become a larger producer. The development of the Pomeroy Bend field in Ohio has just commenced.

INDIANA

Clinton—Shaft sinkers employed at the Ben R. Whitcomb mine, four miles northwest of Clinton, have passed through coal at a depth of 120 ft. The No. 5, or top seam, at this point is 4 ft. 8 in. thick, and has a roof of black slate 3½ ft. thick. Drillings have shown that there are two other workable beds below this one, No. 4, which is 4 ft. thick, 100 ft. below No 5; also No. 3, 6 ft. thick, 75 ft. below No. 4. With these prospects in view the above mine promises to be active for many years to come.

Terre Haute—The receivers and owners of the Chicago & Eastern Illinois R.R. have decided to abondon the extension of the St. Louis & Chicago division into Peoria. This branch left the main line at St. Elmo, and was to run 35 miles to Chatham, from whence to Peoria the Alton tracks were to be used. The receivers have, however, just made an appropriation of $3,000,000 for improvements, new locomotives, rails and general increase in freight facilities.

Linton—A force of men began work recently on the new Templeton mine, which, when completed, will employ two hundred men.

ILLINOIS

Duquoin—The Security mines here recently made another local record by hoisting 2250 tons of coal in one day.

Springfield—Superior facilities for mining coal in and around Springfield are blamed by northern Illinois operators for the gradual decline of the mining industry around Coal City and Wilmington. Many miners have left that section of the state to work in Central and Southern Illinois coal fields.

Belleville—Attorney T. R. Mould has filed suit in the Circuit Court for Mrs. Barbara Hildebrandt, executrix of the estate of the late Fred Hildebrandt, against the Colb Coal Co., of Mascoutah for $10,000. This suit arises over the death of Hildebrandt, who on June 3 last was caught under a fall of slate and coal and instantly killed. It is charged that the company failed to have a mine boss in the mine.

Chicago—The Pana Coal Co., of Pana, Ill., has passed into the hands of receivers, by order of the court. The action was made on petition of the Continental & Commercial Trust & Savings Bank, of Chicago. The company's failure to take up and cancel its original issue of $100,000 worth of bonds is understood to have brought about the action. The two mines of the company, which are valued at $400,000, and which are good producers, will continue in operation.

Harrisburg—Dillie Carter, formerly a mine inspector at the Seagraves Mine, north of here, was found guilty in the county court of violating the state mining laws. It was charged that Carter's violation caused the explosion at the mine last winter, in which four men were killed and a number seriously injured.

New Baden—The charter of the miners' local at New Baden, Ill., has been revoked on account of the miners' refusal to work in the two mines of the Southern Coal & Mining Co., after a fine had been assessed against the miners for their refusal to load pit cars above a certain weight. The state organization sided with the operator, but the miners refused to work. It is understood that a new local will be organized and work will be resumed in a short time.

MISSOURI

Moberly—The heirs of J. T. Smith, of Fremont, Neb., recently purchased 1000 acres of coal land belonging to the Eagle Coal & Mercantile Co., a Kansas corporation. The property will be developed at once. Headquarters of the new company will be in Moberly.

KANSAS

West Mineral—It has been known for years that an upper bed of coal of an average thickness of 24 in. underlies the surface of the entire northwestern quarter of Cherokee County. A few days ago a petition signed by 500 miners was sent to Alexander Howatt, president of District No. 14, United Mine Workers of America, asking him to meet the operators and endeavor to secure a scale of wages for working this seam of coal.

ARKANSAS

Little Rock—On Aug. 11, thirty miners and employees of the Arkansas Western Coal Co., with mines at Bates, filed with the State Commissioner of Labor a petition asking that he take action against the above named company on the grounds that it had failed to pay its men. The miners set forth that they had been employed by the coal company for four weeks since their first wage was due, and that two weeks more had passed since the date of their second pay-day, but on neither occasion had they received their proper remuneration.

COLORADO

Oak Creek—Shipments of coal from the mines of the Oak Creek district last month amounted to 827 cars, the largest amount ever shipped out of Routt County in the month of July and an increase of 61 cars over the record for the corresponding month last year. Another record was also broken in the fact that for the first time in the history of the district July showed an increase over the month of June.

Denver—It is expected that 10,000 miners employed in the southern Colorado coal field will go on strike unless negotiations between Frank J. Hayes, international vice-president of the United Mine Workers of America, and officials of the operating companies for recognition of the union are successful. Besides a recognition of their organization, the employment of check weighmen at the mines, the abolition of the contract system, and the dismissal of Baldwin-Felts guards, the men demand a more strict observance of the anti-scrip law and the right to openly attend meetings of their union.

WASHINGTON

Seattle—Seven hundred miners employed by the Pacific Coast Coal Co. in three collieries at Black Diamond, 25 miles southeast of Seattle, walked out Aug. 11 because the company refused to reinstate George Ayers, who was discharged after a quarrel with a foreman. Ayers is an organizer of the Industrial Workers of the World.

FOREIGN NEWS

Colon, Panama—After having had the anthracite deposits on the Rio Indio reported upon by engineers, J. M. Hyatt, former American vice-consul at this port, has left for New York to attempt the financing of this deposit.

Vancouver, B. C.—The provincial executive at a special session in Victoria on Aug. 13 decided to order several militia companies to Nanaimo. The striking coal miners at that place and also Ladysmith appeared to be pretty nearly masters of the situation; hence the decision to call out the provincial troops.

Tampico, Mexico—Rebel activities in the oil fields is curtailing activities greatly and it is feared that the railroad contracts cannot be supplied unless relief comes soon. While a number of engines on most of the roads have been reconverted to coal burners, serious tying up of traffic is certain. Another problem is the coal supply, which is not sufficient to take care of the suddenly increased demand.

PERSONALS

Charles Carrol, former superintendent of the Bunson Coal Co., at its Indiana mines, has been appointed assistant superintendent of the Granville district by Thomas Moses, general manager of the company.

Charles Hoebel, superintendent of Rex No. 2 coal mine of the LaFollette Coal, Iron & Ry. Co., resigned that position recently, and H. Bevan, superintendent of the Rex No. 1 mine was made superintendent over both operations.

Although his term of office expired some time ago, John Laing, state mine inspector of West Virginia, will remain in office until a man can be found to fill his place. There have been no less than 51 applications for this position.

After being threatened with total blindness for several years, John Markle, of Jeddo, Penn., is recovering his sight. He recently returned from Europe, where he has been taking special treatment and now declares that his sight is improving steadily.

CONSTRUCTION NEWS

Philadelphia, Penn.—The Pennsylvania Southern will expend $200,000 on an extension in Clarion County to tap newly opened coal fields.

Sonman, Penn.—The Sonman Shaft Coal Co. is carrying out a plan of extensive improvement at its operations here. A new B. & W. boiler of 500 hp. capacity is being installed.

Woodward, Ala.—The H. Koppers Co. is installing a second battery of 80 byproduct coke ovens at the plant of the Woodward Iron Co. at Woodward, Ala. Work on the battery of 68 ovens of the same type for the Republic Iron & Steel Co. at Youngstown, Ohio, is being rushed with a view to their being placed in operation in the early Fall.

California, Penn.—A company will be organized shortly for the purpose of building a trolley line from California to several mining towns along the Monongahela River, including Granville, Centerville, Vesta No. 5, Fredericktown and Millsboro in Washington and Greene Counties. Rights-of-way have already been secured for the greater part of the distance.

La Follette, Tenn.—The La Follette Coal, Iron & Ry. Co. is building a four-track steel tipple provided with shaking screen at its Rex No. 2 coal mine near La Follette, to replace the wooden structure burned at that place a few months ago. The steel tipple was designed by Myer & Whaley, of Knoxville, Tenn., is being fabricated in Pittsburgh and will be erected by the coal company.

Louisville, Ky.—Actual work on the pipe line which will convey natural gas to Louisville from the West Virginia field by way of Inez, Ky., has been begun at two different points in the state. Ground was broken simultaneously at the edge of the Kentucky River at Frankfort, and near Paintsville in the eastern Kentucky mountains. The proposed line will be about 200 miles long and will cost $3,000,000.

Connellsville, Penn.—F. J. Harry & Co. have been given contracts by the Pittsburgh Coal Co. for three shafts at Hill Staion, 17 miles from Pittsburgh, on the Washington branch of the Panhandle R.R. The contract includes the sinking of a shaft 200 ft. deep, the pumping of water out of two shafts that have been idle 15 years, the concreting of these two shafts and the driving of two main headings 1800 ft. long, and lining them with reinforced concrete.

Pottsville, Penn.—The Pennsylvania R.R. Co. has awarded a contract for building a track to extend from a point near Gilberton station, west to the new operation of Madeira, Hill & Co., between Frackville and Mahanoy Plane. The estimate calls for 300,000 cu.yd. of excavation, which, with grading, is to be finished by January, 1914. The new breaker which Madeira, Hill & Co. will build at the end of this line will prepare the output from the old Lawrence colliery and the Bear Ridge, which are being reopened in addition to that of the Brookwood mine, which is now in operation. This will mean a breaker of immense capacity.

NEW INCORPORATIONS

Paris, Tenn.—A new coal and ice company has been organized here. The capital stock is $20,000, and each shareholder is limited to four shares of $25 each.

Belleville, Ill.—The St. Clair County Coal & Mining Co. has been organized with a capital stock of $1500, to produce coal for local and shipping markets. The incorporators are Val. F. Lauf, Mary A. Lauf and F. Kissell.

Huntington, W. Va.—At a meeting of the officers of the Millard Creek Coal Co., with over two-thirds of the members present, it was decided to raise the capital stock from the present amount of $25,000 to $500,000.

Harrisburg, Penn.—A state charter has been granted to the Panther Creek R.R. Co. to build a 25-mile line from near Nesquehoning to a point near Tamaqua, with a capital stock of $250,000. S. B. Warriner, of Philadelphia, is president.

Terre Haute, Ind.—The Kettle Valley Mining Co. has been organized at Terre Haute for mining and trafficking in coal. Its capital stock is $75,000, and the incorporators are Cyrus E. Davis, Albert Seifert, Christian A. Hansing, Joseph W. Frisz, and Arthur L. Kelso.

Wheeling, W. Va.—The Virginia & Montana Mining Co. has been organized with an authorized capital of $10,000, to acquire mineral claims and develop mineral lands in Lewis & Clark County, Mont. The incorporators are John E. Schellhase, Wm. H. Pfarr, J. T. Goodwin, Geo. B. Maxwell and W. H. Chapman, all of Wheeling, W. Va.

Rivesville, W. Va.—Ohio capitalists have formed the Rivesville Coal Co. to mine coal in Marion County, W. Va. The authorized capital stock is $75,000, of which $7500 is subscribed and $5000 paid in. The incorporators are R. A. Pollock, of Massillon, Ohio; P. B. Pollock and Wm. Brogden, of Canton, Ohio; Frank Stoner, of Massillon, and Wallace Dixon, of Canton.

Ottumwa, Iowa—A new coal-mining company, to be known as the Bidwell Coal Co., filed articles of incorporation Aug. 11. The new corporation is established at Bidwell, Ia., and will do a general mining business. The capital stock of the company is $50,000, and the officers are: John Ramsey, president; John Shuler, vice-president, and Homer H. Harris, secretary and treasurer.

Blairsville, Penn.—The Wilbur Coal Co. has been incorporated with a capital stock of $100,000. This company was organized to develop about 1000 acres of coal lying on the east side of Stony Creek, about two miles from Hooversville and near the Otterbein church. The incorporators are: J. W. Campbell, of Philadelphia; James A. Hill, of New York; Telford Lewis, of Johnstown, and W. P. Graff and F. M. Graff, of Blairsville. The work of development has already been started.

INDUSTRIAL NEWS

Wellsville, Ohio—The new Salisbury Mine, together with the property of the Buckeye Clay & Coal Co., has been sold at private sale by Trustee Frank McCord, of Lisbon, to Henry W. Rumsey, of Chicago, for $23,200.

Pottsville, Penn.—The Lehigh Valley Coal Co., owner of the land occupied by Maysville Park, has discovered a rich bed of coal directly underneath the pavilion, and will prepare to mine the same in the near future.

Hatfield, W. Va.—The Mary Helen Coal Co. is installing a retarding conveyor to take the place of its present system. It is of the rope and button type, 150 ft. long on a slope of 33 deg., or 65% with a capacity of 60 to 100 tons per hour. This equipment was furnished by the Fairmont Mining Machinery Co., Fairmont, W. Va.

Denver, Colo.—Rumors that the coal road of the United States Smelting, Refining & Mining Co. has been sold to the Denver & Rio Grande R.R. Co. have been denied. Work on both ends of the line is going on, and only a tentative agreement with the Rio Grande has been entered into for the hauling of coal.

Careyville, Tenn.—The Sun Coal Co. will install a 375-k.v.-a. Curtis turbo-generator with 14-kw. exciter, one 150-kw. motor-generator set, switchboard and accessories, and will place in operation in the mines two new 8-ton electric mining locomotives. The equipment has all been ordered from the General Electric Co.

Unalaska, Alaska—A cargo of Australian coal has been recently delivered at Unalaska for the use of government vessels, and after a voyage of 8000 miles will cost approximately $15 per ton. A short distance inland from Unalaska lies the much talked of but undeveloped coal ranges which are supposed to contain coal of a superior quality.

Chicago, Ill.—Moving pictures are to be utilized by the Illinois Central R.R. to instruct its employees in the burning of coal to the best advantage. Last year the road used 4,400,000 tons. The saving of one shovelful in every ton of this fuel would have saved $88,000. Lessons will be given by the movies on the firing of locomotives and large amounts of time and energy thus saved.

Wheeling, W. Va.—Representatives of coal interests keeping in the background are taking up options on a considerable block of coal land in the southern part of Belmont County. They have been at work for some time past, and it is understood, have secured options on a considerable acreage, that has been overlooked by operators who have been buying coal in that section the past few years.

New Orleans, La.—With the withdrawal of the tug "Mamie Coyle" to Memphis, one of the landmarks of the coal trade in the harbor here has passed. The "Mamie Coyle" was sold recently to the Memphis Bridge Co. by W. G. Coyle & Co., local coal dealers. She had done duty in this harbor for 43 years. The boat was built in Chester, Penn., in 1870. Despite her long usage the tug sold for $12,000.

Washington, Penn.—J. Howard Clarke recently purchased the Pittsburgh vein of coal underlying the farm of his deceased uncle, the late Harvey H. Clarke, of South Franklin Township, the price paid being $200 per acre. The location of this coal is the upper Chartiers Valley on the Eastern side of and near the crest of the Washington anticline. As the area in question covers 260.66 acres, the consideration totalled $52,133.40.

Washington, D. C.—The Senate on Aug. 15 cleared the way for work to be started at the new site of the Bureau of Mines in Pittsburgh, when it authorized the Treasury Department "to accept such funds as may be received by contributions from the State of Pennsylvania, or from other sources, for the purpose of enlarging by purchase, condemnation, or otherwise, and improving the site authorized to be acquired by the Bureau of Mines."

Pittsburgh, Penn.—An agent, said to represent a prominent real estate dealer of Pittsburgh, has been at work in the Bradley Junction coal field, securing options on a large tract of coal that has not passed into the hands of any of the numerous companies doing business in that section. The field lies in corners of Cambria, Carroll and Allegheny Townships, and was under option to Kirsch Bros., of Nicktown, until a short time ago.

Pittsburgh, Penn.—The Rochester & Pittsburg Coal & Iron Co. will place in operation new electrical apparatus consisting of a 200-kw. rotary converter, twelve 40-k.v.-a. and three 75-k.v.-a. transformers, and a 100-hp. motor; also a 300-kw. rotary converter, three 110-k.v.-a. transformers, and fifty 5½-hp. and fifteen 7½-hp. motors. Thirteen new 6-ton and eleven 10-ton electric locomotives will be operated in the mines. All this apparatus has been ordered from the General Electric Co.

Washington, Penn.—C. N. Savage, on behalf of Wm. E. Jackman, a lunatic, has presented his petition to court, asking leave to enter into a lease for certain coal underlying Jackman's farm in East Pike Run Township. Among the assets of the estate is 7 acres of coal underlying the house, barn and other farm buildings, which has heretofore been reserved. It is desired to continue the mining of this coal upon the payment of the regular royalty of 1c. per bushel, the coal in that locality yielding about 10,000 tons to the acre, or 275,000 bushels.

Rio Janeiro, Brazil—American consular agents lean to the belief that a profitable market can be found by American coal operators along the Amazon River, suggesting that the coal be shipped in barges direct from the mines along the Ohio and its tributaries. Such barges would find profitable return cargoes of rubber and other products. The Amazon River industries are entirely dependent upon the extensive steamboat traffic necessary for the collection and marketing of their products. The rubber business alone is valued at $50,000,000 per year.

Louisville, Ky.—The prolonged drought in the Ohio Valley, in common with that in the Middle West generally, has resulted in a stage of the river too low for the movement of the larger steamers, and as a consequence, the towboat "Strague," coming up from the lower Mississippi, and bound for Louisville with 35 empties, has been forced to tie up at Cairo. Recent more or less general rains, however, have helped somewhat, and a navigable stage may be expected soon, which will enable something like 3,000,000 bu. of coal now tied up at Pittsburgh wharves to move.

Hazard, Ky.—R. D. Baker, of Big Stone Gap, Va., with local capitalists, at Hazard, Ky., will soon begin the construction of a four-story office and store building in that city, and S. A. D. Jones, manager of the Racoon Coal Co., is planning the erection of a three-story office building on the site of his office building, which was destroyed by fire some time ago. The demand for office and other business space caused largely by the continuing coal development around Hazard, has made the present buildings inadequate, and those indicated are the first of a number which will be built.

COAL TRADE REVIEWS

GENERAL REVIEW

Bituminous prices showing a tendency to soften. Recent tension in the trade much relieved. Market well maintained in the face of a temporary sagging tendency. Undertone excellent. Anthracite a trifle more buoyant.

Both the wholesale and retail hard-coal markets have experienced a slight impetus during the week, due partly to the beginning of the return of the summer vacationists and the preparations for starting up furnaces. The middle of September will see the winter trade definitely under way and indications point to an active business throughout the season. Some weak spots are still found occasionally where one of the individual operators has been attempting to force the market by cutting the regular company circular. Such business is not meeting with much success, however, and the trade is holding generally firmer than the average for this period.

While the soft-coal market continues to maintain its excellent position, conservative observers believe they see indications of an easing up. Buyers are showing a disposition to hold off until September, with the result that prices have softened in spots and sellers, who were slow about taking business earlier in the season, are now beginning to look for orders. The tension has been materially relieved generally, and indications point to a slight temporary, though probably unimportant, sag in the market. On the other hand, it is still a problem in some districts to obtain sufficient coal, although it is clear that there is more in the market than for some time.

Mines in the Pittsburgh district have a moderately large supply of both cars and labor, and production is very heavy. Substantial premiums are being obtained for any spot tonnages available of which there are only a few odd lots; indications are that there will be considerable buying in the prompt market up to Dec. 1 by dealers whose requirements are not covered for this period. The Ohio docks continue loading Lake coal at full capacity. The steam trade in the state is holding remarkably strong, and the large interests are anticipating an advance on this grade. The market is firm in all directions and indications are bright for an active fall and winter business. Demand and prices at Hampton Roads continue firm, but the vessel tonnage has been light, with the result that considerable coal has accumulated in the yards; this situation will be relieved shortly, however.

The situation in the Southern market is much improved, there being less coal on track and orders for prompt delivery more numerous. The heavy cotton crop is having a stimulating effect on coal. In the Middle Western markets, one of the principal features is a deadlock at Chicago, due to the buyers refusing to meet the new high prices on the domestic grades. Supplies are still further reduced and an advance in quotations is anticipated the first of the month. At St. Louis screenings are heavy, while the domestic grades are ruling firm; practically no smokeless is coming in, and the car supply has only been about 50 per cent. requirements.

BOSTON, MASS.

Pocahontas and New River coming forward more freely. Shippers begin seeking orders. A dull period looked for. Pennsylvania grades quiet but firm. Anthracite shows good prospects for September.

Bituminous—There are signs that the market is already somewhat easier. Pocahontas and New River are coming down more freely, and practically all the shippers have now caught up with their old obligations. Receipts here have been very heavy the past week, the vessels and barges that were detained at Hampton Roads having now arrived in squadrons. The agencies that took only a minimum of business early in the season are seeking orders and prices at New England distributing piers have softened on that account. Loading despatch at the Virginia terminals is prompt, and at all points there is a decided let-up after the tension of a month or so ago; f.o.b. prices are now only 5@10c. up from the $2.85 contract figure, and the expectation is that spot coal will sag off within a short time to the season price. Meanwhile there is little inquiry and the disposition of buyers who did not cover their requirements in the spring is to await developments at least until September. The off-shore demand is good, and that will do much to keep the tidewater market steady during the dull period that is looked for the next fortnight or so.

A quiet tone is also observed this week with regard to the Pennsylvania grades. Prices are still firm, but it will be strange if they are not modified in response to the better supply of West Virginia coals. Those from Pennsylvania come to this market in relatively smaller shipments, however, and it may be they will hold their strong position so long as their output continues less than normal. Buyers who are "hedging" are likely to buy Cambrias and Somersets for hand-to-mouth supply and reserve their purchases of Pocahontas and New River until the prospect is better outlined. Georges Creek continues with a steady demand. The output is rather smaller than usual and thus far is being practically all applied to contracts.

Anthracite—There is more impetus to retail trade and the wholesale demand shows some improvement. The scarcity of broken coal is a feature and by some is regarded as serious. There is good prospect of an active market beginning in September, and doubtless full time will then be resumed at the mines. Some of the individual shippers are trying to force coal on the market at prices somewhat off the circular, but their efforts do not seem very successful.

Wholesale quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.55	$1.35@1.70	$1.67@1.77	
Philadelphia*	2.40@2.80	2.60@2.95	2.92@3.02	
New York*	2.70@3.10	2.90@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.95
Boston†				3.83@3.88
Providence†				3.90@4.00

*F.o.b. †On cars.

NEW YORK

Bituminous a trifle easier, but with an excellent undertone. Buying slightly restricted. A temporary sag seems to be developing. Hard coal now over the dull period and beginning to tune up for the fall and winter.

Bituminous—There has been a slight tendency to ease up in the local market during the week, although no specific weakness has developed. There is probably a little more coal at tidewater than has been on hand for some time. This tonnage could be easily moved were the sellers inclined to recede from their high price level, but quotations are being firmly maintained and production moderately restricted in the mining regions.

There is an increase in the demand at tide, but prices are not quite so firm as before. However, the outlook for the winter trade is excellent. Close observers are agreed that there is a strong undertone to the market and a large consumption seems to be assured. The railroads have done very little buying so far, and will be an important feature in the situation. The car and labor supply continue to be the controlling features. Labor is fairly plentiful, but the car situation is showing a tendency to tighten, particularly at some points on the Pennsylvania R.R. The market is not quotably changed, and we continue last week's prices as follows:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—The regular August dullness prevails in the hard-coal trade, with everything moderately quiet. However, the market has now gone through the two dullest months of the year in remarkably good form; in fact, in much better condition than in previous pears. Many of the summer vacationists are returning, and steam-heating plants are beginning to make preparations for starting up, with the result that there is already some activity. There will also probably be a small rush for coal at the end of the month by consumers anxious to stock up before the full winter circular goes into effect Sept. 1. Indications point to a good stiff business during the winter.

Stove coal continues to be in short supply, as has been the case all summer, and broken is now a close second. A slight temporary shortage is even reported in pea. Chestnut appears to be the heaviest and most difficult to move. The new Pennsylvania State tax on anthracite is still creating great deal of confusion and some uncertainty. The companies charging this tax to the buyers are placing a severe andicap on selling agencies; this increase is tending to scare way what little demand there has been.

We quote the New York market on the following basis:

	Circular	Individual	
		Lehigh	Scranton
roken	$4.70	$4.45@4.85	$4.50@4.90
gg	4.95	4.95@5.10	5.05@5.15
tove	4.95	5.10@5.20	5.15
hestnut	5.15	5.25@5.35	5.40
ea	3.50	3.30@3.45	3.35@3.50
uckwheat	2.75	2.15@2.45	2.55@2.75
ice	2.25	1.70@1.95	2.25
arley	1.75	1.30@1.70	1.75

PHILADELPHIA, PENN.

Anthracite has shown little sign of improvement. Shipents to Northwest are growing less, owing to storage facilities there being well filled up. Broken coal about the only eature to the market. Bituminous still continues strong, vith prices firm, and coal hard to get.

The curtailed operations at the mines would seem to inicate that the near future does not seem to hold any prosect of any immediate increased demand for coal. As a mater of fact, the latter part of August finds the trade in this icinity in a very lethargic condition. The large tonnages hat have gone from this territory to the great lakes have bout filled the storage places there, and for some of the izes, the companies are finding themselves hard put to find n outlet. This applies particularly to chestnut coal; ever ince the increase in the price of this size to 15 to 25c. over he stove, there has been a gradual falling off in the demand. hree or four years ago, the demand for this size was far in xcess of the supply; as a deterrent, the price was doubtless aised, and it has had the effect of diverting the demand to ther sizes. Pea coal was the natural substitute for those eeking a cheaper fuel, as witnessed by the heavy demand or this size during the winter months. The demand for roken coal is unprecedented, and while most of this grade noves on contract, it is almost impossible to secure any uantity at less than the full circular price, and even at that arge orders are being turned down. It is unreasonable to uppose that the operators will work their mines for the production of this size, when the demand for the others is such hat it means stocking, and as a consequence, the market is uffering. This may be ameliorated when the full mining tarts in, but it is a fact now that the demand is far in excess of the supply.

Bituminous coal cannot be bought now at less than $1.25 t the mines, and one has trouble in securing supplies, even t the prices quoted. Operators are willing to name prices, ut they persistently refuse to guarantee any deliveries, alhough in the face of this, it may be paradoxical to remark hat there is reported to be coal on demurrage at tidewater. his is due, however, to the inability to secure transportaion facilities. Water freights are way up, and tonnage carce, and as the season for the resumption of anthracite ctivity approaches, the condition is not likely to improve.

BALTIMORE, MD.

Bituminous trade is strong, but coke demand has not reponded. Congestion at the piers for brief time. Anthracite all is improving.

The bituminous trade is strong and in many cases the call n contract is now exceeding the supply. The problem still ontinues to be one of getting out enough fuel in the face f a labor or car shortage; in West Virginia cars were somehat easier the early part of the week, but there was a ghtening up toward the close.

The steel industry is showing good form, according to reorts in coal offices here, but coke has not responded to the pward trend. Among the fuel that accumulated at tide durg the week was considerbale coke that did not find ready isposal. Probably a thousand cars of coal were also tied p here temporarily, but were finally disposed of to an adantage.

One of the encouraging features is heavy demand for ack from the cement industry. Other industries are also sking for screenings and prices have stiffened so that little offered at less than 70c.

The anthracite demand generally is improving. Not only re deliveries fairly heavy, but orders are being placed which ssure a fine latter September and early October delivery.

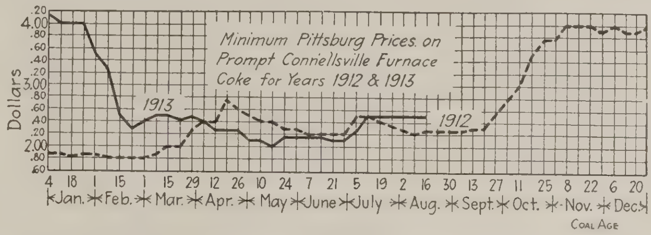
PITTSBURGH, PENN.

Extremely heavy Lake shipments. Slight car shortage. ittle free coal, and fancy prices paid. Coke supply larger, ut prices firm.

Bituminous—Coal shipments continue at the heaviest rate ossible, with mines working very nearly full. More labor ould be employed, but on the whole the supply is as good as it has been at any time lately. Several mines on the Monongahela division of the Pennsylvania lost time last week through car shortage, and a small wreck at the Conway yards made additional trouble. About 10,000 loaded cars are at the lake front. The car supply in general, however, is fairly satisfactory.

There is no free coal, except for occasional odd lots. Mine-run for spot shipment has brought $1.50 without difficulty, while 1¼-in. has sold to retail dealers at $1.75. The dealers were not eager enough to close contracts for the season, and many are indifferently provided. To take care of their trade up to December they will probably have to buy much coal in the open market at premium prices. It is practically impossible to shade 90c. on slack and despite the heavy lake shipments and consequent large production of slack there is very little being stocked, so that slack promises to command a premium in the winter. Reguar season prices remain nominally as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—There has been a plentiful supply of coke in the past week, shipments being better on contract, while it is relatively easy to pick up prompt and spot lots. Prices, however, remain absolotely firm and there is practically no prospect of the operators receding from their position of demanding $2.50 for furnace coke for any delivery. Demand has been very light since such furnaces as were not early covered for August made purchases for the month. In two or three cases there are negotiations on for September coke and for coke for the balance of the year, no prices being mentioned as likely under $2.50. Foundry coke continues very firm at $3 for both prompt and contract.



The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 9 at 392,825 tons, an increase of 7760 tons, and shipments at 397,362 tons, an increase of 31,309 tons.

BUFFALO, N. Y.

Still absolutely no coal in the open market. Contracts are being taken only when the seller obtains a concession from the buyer. Heavy movement, but market remains strong.

Bituminous—There is said to be rather more bituminous coal on the market than for some time, but not enough to weaken prices. In fact nobody appears to anticipate any weakness before the fall demand opens. There is all of the former complaint of slow work in the mines. The men have never before been called on to work steadily in summer and they cannot be made to do so now. On that account there are those who look for the coal prices to be no stronger in the fall than they are now, for the miners will go to work when the weather becomes unpleasant. On the other hand coal cars will become scarcer right along and the motive power of the railroads will be occupied with other freight, so that consumers will suffer if the consumption continues large.

It is a constant source of wonder that there is no coal on sale in the open market. Shippers who need a quick supply for loading lake vessels are often unable to buy enough to fill out their cargoes at any price. They sometimes offer more for the last of such a cargo than they are getting for it, but the coal is simply not to be had.

It is pretty certain that the consumers are going to be caught with small supplies this fall and winter, but they do not seem much disturbed about the situation and are merely running on a fine-weather schedule, apparently considering the reports of a coal shortage in midsummer as a device to sell coal on. The trade looks for higher prices and is obtaining them to some extent. The rule is not to take contracts unless something more than the current quotation can be obtained. Jobbers are not at all at ease over the outlook. They say it is going to be a difficult thing to buy coal on time and be assured delivery. The seller usually finds a better customer and makes some excuse for shipping the coal to him.

Bituminous quotations remain very strong at $2.90 for Pittsburgh select lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack, with the latter stronger than formerly. The price of Allegheny Valley grades is about 15c. less than Pittsburgh.

Coke—There is a somewhat stronger feeling in all grades of coke. The efforts of consumers to cut the price down still further have not succeeded; producers maintain that prices are at the bottom and that they would shut down if they could not get present asking prices. Quotations are stronger at $4.60 for best Connellsville foundry, f.o.b. Buffalo and the Bridges.

Anthracite—There is a slight stir in the demand for anthracite, but it will be light until about another month passes. Shippers are still at sea over the Pennsylvania tax and consumers are holding off some on that account. The rail lines are doing a fair business, but all efforts are given to the lake trade, though some companies are running out of storage room at upper-lake ports. Shipments for the week were 210,000 tons.

TOLEDO, OHIO

Local trade anticipating an advance in quotations on the steam grades. Prices strong and the movement heavy. Docks loading Lake coal at full capacity.

Steam coal is moving remarkably well and is strong in price. In fact, nearly everybody connected with the coal business is looking for an increase in steam prices at an early date, both buyers and dealers alike. Domestic sizes for line shipment are also strong and there is no tendency toward weakness. There is more or less coal on track here which is being sold at less than circular prices to avoid demurrage, but this is purely a local condition and in no way indicates a weakness. Lake shipments continue strong and all the docks are busy loading coal as fast as the machines and men can work. Outside dealers are beginning to buy more freely and all express themselves as satisfied with the outlook.

Prices quoted here are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump.........	$2.50	$1.70	$2.50	$1.75	$2.50	$1.35	$1.35
Egg.................	2.50	1.35	2.50	1.50	2.50	....	....
Nut.................	2.00	1.20	2.25	1.50	2.50	....	....
¾ lump..............	....	1.55	....	....	....	1.20	1.20
Mine-run............	1.60	1.35	....	....	....	1.10	1.10
Slack...............	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

The local coal trade is ruling strong in every way. Demand good for all grades, and the new circular prices are well maintained. Steam business is increasing in volume, and the lake trade is still active.

The trade during the past week has been active in every direction. Domestic demand is good and is gradually increasing from all sections. Steam business is also active and the same is true of the lake trade. Taking it all in all, the market is in excellent condition and future prospects are bright.

Domestic trade is increasing in volume as the fall approaches. Many of the larger householders have placed their orders and the retailer is busy making deliveries. Retail stocks are not heavy, and with the constant drain upon them, dealers are compelled to place orders for supplies. Most of the orders now placed by retailers are for immediate delivery, although there is some business being done for delivery in September. Operators and jobbers are loath to book orders for business any farther ahead than September. School and municipal contracts are now being filled.

Lake trade is strong, although the growing car shortage is cutting down the volume to a certain extent. The demand from the Northwest is still good, and activity will undoubtedly prevail in the lake trade up to the close of navigation. The interior movement from the upper lake ports is going on steadily.

The steam demand is also one of the strong points to the market. Manufacturing plants are taking a good tonnage and the same is true of railroads. One of the strong points of the steam trade is the good demand for the small sizes, such as nut, pea and slack and coarse slack, all of which are advancing in price. The supply of steam grades is not large.

The output during the week has been curtailed to a certain degree by the growing car shortage, and it is estimated that the state produced but 75 per cent. of normal. The car shortage was the most pronounced in Eastern Ohio, many of the mines there being compelled to close down for a portion of the week. The situation was the best in the Hocking Valley district, but even there some trouble over lack of transportation facilities was reported.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump.....	$1.70 @ 1.65	....	$1.70 @ 1.65	$1.70 @ 1.65
3-4 inch............	1.55 @ 1.50	$1.30 @ 1.25	1.45 @ 1.40	1.50 @ 1.40
Nut..............	1.30 @ 1.20	....	1.35 @ 1.30	....
Mine-run...........	1.35 @ 1.25	1.20 @ 1.15	1.30 @ 1.25	1.20 @ 1.25
Nut, pea and slack..	0.70 @ 0.65	....	0.70 @ 0.65	0.65 @ 0.70
Coarse slack........	0.60 @ 0.55	0.75 @ 0.70	0.60 @ 0.55	0.55 @ 0.50

HAMPTON ROADS, VA.

Quite an accumulation of coal has developed at tidewater. A falling off in vessel tonnage. Market remains firm and prices stationary.

Dumpings over the Hampton Roads piers have not been as heavy as anticipated. Vessel tonnage was plentiful at the beginning of the week, but fell off completely toward the end and as a result there is quite an accumulation of coal in the various railroad yards. Contracted vessel tonnage due in the next few days, however, will greatly relieve matters and heavy loadings are expected during the next week.

The demand for coal inland has been fair and prices are remaining firm on both Pocahontas and New River grades, but there is little inquiry for Kanawha splint or gas coals as buyers seem to be well stocked with these grades.

Shipments both foreign and coastwise have been light. Foreign cargoes have been made to Genoa, Canal Zone, Jamaica and Rio de Janeiro.

LOUISVILLE, KY.

An abnormally heavy demand on the Kentucky operators. Producers cautious about further commitments. Car shortage developing and rumors of labor trouble are being heard.

The local market continues brisk, with the demand good on all grades and sizes. The eastern Kentucky operators, particularly, are experiencing one of the strongest demands in the history of the trade and are now inclined to be conservative about future commitments. There is distinct evidence that they are in fear of overselling and so are going very slowly in this respect. This unusual situation is due to an abnormally heavy demand, particularly from the North, and there does not seem to be any indication whatever of a letup in the consumption.

Another factor that may develop to serious proportions, is the persistent rumors to the effect that there are grave possibilities of labor troubles in the Jellico district, and other portions of the eastern Kentucky field. There are said to be a number of labor agitators in there, and there are many indications of unrest among the miners. In addition to this, operators have already experienced some difficulty in getting sufficient cars, and the situation in this respect promises to be serious before long. Shipments into Chicago are particularly difficult to negotiate, for the reason that the Louisville & Nashville R.R. positively refuses to accept consignments in their equipment because of the long delay in returning same. The heavy movement into the Northwest has taken a large number of cars, and even under the best conditions, the return of this equipment to the mining regions is slow. The new cars being supplied the roads do not seem to be relieving the situation materially.

Steam grades are unusually good in view of the fact that operations have been restricted in certain large consuming branches; operators and dealers are finding that they have none too much of this grade to meet the demand. The better grade eastern Kentucky screenings are in strong demand at 85 to 90c. with the western Kentucky at 55 to 65c., f.o.b. mine. Eastern Kentucky block is steady at about $1.85; block and lump, $1.60@1.65; round, $1.35@1.40, with a very strong demand from industrial plants for mine-run at $1.25. Prices are showing a strong upward tendency and September deliveries will take on a good advance over the above figures; new contracts are being uniformly made at an advance of 10c. over the last year's figures.

DETROIT, MICH.

Some further contracting at good figures. Demand for gas coals unusually strong. The railroad movement slow. Anthracite will advance Sept. 1.

Bituminous—Local wholesalers and dealers are expressing a great deal of satisfaction over the fact that the West Virginia labor situation has now been definitely cleared up. Indications point to a strong, active market, and dealers are anxious that the supply shall not be restricted. Several uncertainties in the situation have created an unusual activity in contract business, some of which for large tonnages, have been closed during the week; business in this line is particularly buoyant.

One of the unfavorable features in the situation is the apparent inability of the railroads affected by the Ohio floods to reëstablish normal conditions on their lines; from present indications, it is not at all improbable that the effects of this will be felt well into the winter months.

Orders for mine shipments, particularly for gas coal, are especially good; the minimum figure now quoted on Youghiogheny slack is 90c., f.o.b. mine, with only a little available at that figure; about the same situation is in effect on West Virginia gas coals. Several cars of slack, which were standing on tracks here a few weeks ago, have been cleaned up, and there are practically none of the smaller sizes in the spot market today. The Pocahontas grades are coming in slowly, and continue to maintain their former strong position; most of these are apparently being shipped either to Tidewater or the upper lake ports.

The local market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.60	....	$1.75	....	....	$2.50	$2.40
Egg	1.60	....	1.75	....	....	2.50	2.40
Steam lump	1.40	....	....	....	....	....	....
¾-in. lump	1.35	$1.20	1.25	$1.25	$1.25	....	....
Mine-run	1.10	1.10	1.10	1.10	1.10	1.50	....
Slack	0.85	0.90	0.75	0.75	0.75	....	....

Anthracite—While hard coal seems to be coming in freely, the demand is unusually heavy, and indications point to a scarcity this fall and winter. Local jobbers state that prices will be advanced 50c. per ton on Sept. 1.

BIRMINGHAM, ALA.

The local situation has improved during the week. Spot orders more numerous and there is less coal on track. Coke a trifle stronger.

A canvass of the principal operators here shows that the trade is somewhat improved over last week. The amount of coal on track has been reduced and spot orders are coming in at an increased rate. The principal cause for the change is the increased shipping instructions from the oil-mill trade whose busy season will begin in September.

In the domestic grades of standard coals it is found that all mines are practically sold up on No. 2 lump and nut, but fancy lump is moving slowly and it cannot be said that the market has improved on this special grade. Reports from some of the dealers indicate that fancy lump is heavier than customary at this season of the year owing to the increase of 25c. over last year's prices on nearly all standard coals in Alabama, while the lower grades of lump coal are being sold at about the same level as in 1912.

Due to a better pig-iron market furnace coke is stronger, although it is not believed that the furnaces recently put out of blast will go in again in the near future.

NEW ORLEANS

High fuel-oil prices increase demand for coal. Yard room filled to capacity. Tap-line orders placed.

The high price of fuel oil is greatly increasing the sale of coal. With the certainty of a large cotton crop and the probability of a heavy yield of sugar cane both ginners and sugar-mill men are buying largely. Every foot of room in the regular yards of the companies handling Alabama coal is filled, yet there is no interruption in the movement to take advantage of cars while they are to be had.

Announcement that extensive rebuilding will be necessary on one of the locks in the Warrior River will delay the coal-carrying experiment of the Alabama-New Orleans Transportation Co. until mid-winter at least, it is thought. Whether the power barges, which are over 200 ft. in length, can handle coal economically down the small Alabama rivers is yet to be proven, although coal men generally are preparing to meet a lower price that is likely to develop with the perfection of the lock system in the Warrior River. Several orders were placed this week by lumber and tap-line railroads.

The New Orleans Ry. & Light Co. will place their annual contract for 150,000 tons of coal in the near future.

ST. LOUIS

Only a 50% car supply furnished during the week. Screenings continue a drug, but domestic grades are ruling high. Hot weather affecting the market.

The only thing that has prevented the coal market from soaring for the past ten days has been the continued hot weather. There was everything to keep the price up; the mines in Williamson and Franklin Counties worked two days this week on commercial coal, on account of the car shortage. The Iron Mountain operators fortunately got about three days and the same applies to the Illinois Central. This is about 50% of the called-for equipment, and if this condition exists now, it is an easy matter to figure out what it will be with 60 days.

Screenings are still a drug on the market, although there has been little change in the price. However, if there is a flood of equipment for a matter of a week, the price will drop. Franklin County operators are rapidly advancing, quotations being oversold on account of the shortage.

Anthracite is absolutely a drug in the St. Louis market, and chestnut is sold as low as $7.05, whereas the circular, including the tax, is $7.44. There are between 50 and 75 cars of chestnut due in the next ten days that have not been sold, coming in on speculation.

The same thing applies to coke, and there is practically no smokeless coming in at all. The indications are that there will be no change in conditions for the next week, unless it is an advance in the price of high-grade lump and egg. Standard operators are selling their coal at the cost of production.

The market is now quotable on the following basis:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$0.95@1.00
3-in. lump	....	....	$1.30	....
6-in. lump	$1.40 @ 1.60	....	1.40	1.20@1.30
Lump and egg	....	$2.10	1.40	....
No. 1 nut	1.10 @ 1.20	....	1.05	0.87½
Screenings	0.65	....	....	0.80
Mine-run	1.50	....	....	0.75
No. 1 washed nut	1.50 @ 1.60	....	....	....
No. 2 washed nut	1.20 @ 1.30	....	....	....
No. 3 washed nut	1.10 @ 1.15	....	....	....
No. 4 washed nut	1.00 @ 1.10	....	....	....
No. 5 washed nut	0.70 @ 0.75	....	....	....

CHICAGO

Dealers refuse to meet the recent advance on domestic grades and buying has stopped. Further advance expected Sept. 1.

There is little activity in the Chicago market, so far as domestic coal is concerned, retail dealers, as a rule, refusing to purchase standard coals at present prices. Despite the fact that a car shortage is in sight and the coal supply will be decreased they contend that offerings at reduced prices will be made within a short time. On the other hand, the general trend of opinion among market observers is that there will be a sharp advance in the price of standard coals by Sept. 1.

It is also regarded as certain that a shortage in the supply of smokeless coal will soon develop. Smokeless mine-run is quoted at from $1.50 to $1.60 on the spot market and lump and egg is selling at $2.25 to $2.50 at the mines for spot shipment. An advance has been made by Hocking Valley operators on inch and one-quarter lump to $1.70 at the mines and on six-inch lump to $1.95, the mines. Coal operators in the Franklin County district are obtaining $1.60 at the mines for their product. Springfield operators have established a uniform price of $1.50 at the mines, so far as country sales are concerned. Concessions are being made, however, on Chicago shipments. There has been little change in the anthracite market, business remaining at a low level. Prices prevailing at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07@2.32	$2.45@2.65	$2.27	
Steam lump	1.92		2.07	
Egg		2.45@2.65		$4.30@4.55
Mine-run	1.82	2.30	1.87	3.55@3.65
Screenings	1.32@1.37	1.60@1.75	1.32@1.37	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

PORTLAND, ORE.

Situation unchanged. Imports light, but will increase in the fall.

The market in domestic coal is quiet and prices have shown no change although the wholesale price to dealers on Utah coal advanced 25c. per ton, Aug. 1, as has already been announced.

Coal has not been imported here in very large quantities so far this summer and there is reason to believe the shipments will be rapidly increased with the approach of fall. As much of the coal will move over the C. W. R. & N. lines, the additional equipment ordered for them is of importance to the coal trade.

FOREIGN MARKETS

AUSTRIA

The Austrian coal production for the first half of the current year was as follows:

Year	Coal	Coke	Liguite	Briquettes Coal	Briquettes Lignite
1913	8,086,786	1,247,050	13,840,183	97,452	118,167
1912	7,605,151	1,115,561	12,747,064	83,042	116,138

FRANCE

The following shows the production of fuel in the Pas-de-Calais and Nord districts during the first half of the current year and last year:

	Pas-de-Calais 1913	Pas-de-Calais 1912	Nord 1913	Nord 1912
Coal	11,039,919	10,798,746	3,906,105	3,742,998
Coke	810,445	786,080	429,917	423,950
Briquettes	286,648	316,207	605,804	565,134

GREAT BRITAIN

Aug. 8—Despite holiday influences there is a good demand for all kinds of large coal, and prices continue firm:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$4.08@4.20
Best seconds	4.56@4.68	Seconds	3.96@4.02
Seconds	4.32@4.50	Best Cardiff smalls	2.46@2.52
Best dry coals	4.32@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for June, and the 12 months ending June 30, 1912-13, in short tons:

	June		12 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	253,448	307,023	3,531,202	22	4,324,397	24
East	192,316	152,020	2,549,552	16	2,164,960	12
West	1,067,682	1,074,797	9,221,463	57	11,105,871	62
Total	1,513,446	1,533,840	15,302,217		17,595,228	
Coke	30,015	20,811	315,474		236,518	
From connections						
Bituminous	91,617	16,578	729,741	5	214,703	2
Anthracite	1,794	1,673	15,746		35,228	
Total (except coke)	1,606,857	1,552,091	16,047,704	100	17,845,159	100

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 16:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	83	83	83	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	33¼	31¼	31½	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com.	53	51½	52	52½	47¼
Island Creek Coal Pref.	85	84	84½	82	80
Pittsburgh Coal	19¼	18¾	18¾	24⅜	14½
Pittsburgh Coal Pref.	85½	83¾	83¾	95	73
Pond Creek	21⅝	20	20	23¾	16½
Reading	162⅜	158⅛	161	168⅞	151⅜
Reading 1st Pref.	...	....	86	92½	86
Reading 2nd Pref.	88¼	88¼	88¼	95	84
Virginia Iron, Coal & Coke	42½	42½	42½	54	37½

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	93½	98	95½	July '13	93⅝	99⅛
Colo. F. & I. gen. 6s	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.	83	84¾	83	84	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	85⅞	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	80	Sale	80	80½	73	80½
Tenn. Coal gen. 5s	99	Sale	99	99	99	103
Birm. Div. 1st consol. 6s	100⅝	101	100⅝	100⅝	100⅝	103
Tenn. Div. 1st g 6s	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	93	92	Aug. '13	92	98

American Coal—Dividends of 3% payable Sept. 1 to holders of records Aug. 30. Transfer books do not close for this dividend.

FINANCIAL DEPARTMENT

Lehigh Coal & N. Co.

President S. D. Warriner, of this company, says under date of Feb. 10:

Results—The net revenue of the company from the various sources increased or decreased as follows: Coal decreased $444,047; canals decreased $45,814; railroads increased $1752; miscellaneous income increased $163,196; total net revenue decreased $324,913.

The increase of $163,196 in miscellaneous revenue is mainly accounted for by the proceeds of the sale of the collateral trust power bonds being placed at advantageous rates of interest pending the need of the money for construction purposes. Another large item making up this increase was the initial dividend of 4%, received on 5079 shares of capital stock of the Lehigh & Hudson River Ry. Co., held by your company.

Coal-Mining Department—Coal tonnage from lands owned and controlled:

Mined by company..tons	3,275,585	3,615,141	3,375,541	2,828,788
Mined by lessees	181,505	215,887	285,822	224,927
By Alliance Coal Mining Co.	88,067	39,645	......	......
By lessees of Alliance Coal Mining Co.	71,776	130,334	188,492	134,264
Total commercial coal.	3,616,933	4,001,007	3,849,855	3,187,979

In addition there was consumed for power and other purposes at the mines 463,685 tons, making the total production from all sources 4,080,618 tons, against 4,515,906 gross tons in 1910.

The decrease in commercial production is accounted for mainly by the suspension of mining during April and part of May, pending negotiations with the United Mine Workers as to the terms of a renewal of the agreement which expired Mar. 31. The new agreement entered into provided substantial advances to the mine workers, and mining was resumed the latter part of May. Production was further curtailed by interruptions at several collieries which occurred in September and lasted for 19 days, due to trouble among the men over the question of union membership.

The decrease in production was general throughout the anthracite trade in 1912, as the official statistics show that the total shipments of anthracite during the year amounted to 63,610,578 tons, a decrease of 6,343,721 tons, as compared with 1911. The cost of mining increased on account of increased maintenance charges during the suspensions of work above referred to, as well as on account of increased wages and cost of supplies.

Market conditions were satisfactory during the year, excepting for the company's inability at times to supply the demand for its coal, owing to the suspension above referred to. The company sold its entire production during the year as well as its supply of stock coal. The tonnage sold was 3,646,431 gross tons, an increase of 58,967 tons compared with 1911.

Insurance and Coal Lands Sinking Funds—During the year the coal lands sinking fund has increased $51,434 and the insurance fund $17,580 from income on investments and interest on deposits, making the total amounts of securities and cash in these funds, Dec. 31, $1,082,565 and $488,639, respectively. During the year an exhaustive investigation was made into the operating and accounting methods, and, in accordance with the advice of certified accountants, your board are agreed on the wisdom of a policy of accounting under which there shall be established proper reserves for coal-lands depletion, depreciation of improvements, insurance, mining hazards and similar items entering into mining costs; and have, beginning with the current year, in accordance with this plan, transferred the securities and cash in the coal-lands sinking fund and the insurance fund into the general funds of the company, under appropriate accounts establishing the proper reserves, which will appear in the balance sheet for the year 1913.

Lehigh Navigation Electric Co. New Power Bonds—In January, 1912, the company received payment for and issued $3,000,000 collateral trust 4½% 10-year gold power bonds, due Dec. 1, 1921, which had been sold to provide for the financial requirements of the Lehigh Navigation Electric Co. in the construction of its power plant at Hauto.

The construction of the Lehigh Navigation Electric Co.'s power plant at Hauto, Penn., and the transmission lines radiating therefrom, is progressing rapidly. It is expected that the plant will be completed in the summer of 1913. The 38 electric companies chartered to operate in the several townships reached by the transmission lines were merged and consolidated by agreement dated Dec. 23, 1912, into a corporation under the title of the Lehigh Navigation Electric Co., and letters patent issued to the latter company under date of Jan. 6, 1913.

Extension of Lehigh & New England R.R.—The extension from Danielsville, Penn., to Tamaqua, Penn. (at which point connection is made with the Panther Creek R.R. of your company), some 32 miles in length, was completed and put in operation on July 8, 1912. The new line, in addition to proving a source of increased revenue to the railroad, affords a direct all-rail route to the Eastern markets as well as a physical connection with the main trunk lines.

Financial—Advances to Sub. Companies—The financial requirements of the Lehigh & New England R.R. Co. and the Lehigh Navigation Electric Co., in carrying on the work as above outlined, have been provided for by the purchase of their securities and by advances by this company amounting during the year to $1,754,766.

PRICES OF MINING SUPPLIES

THE MARKET IN GENERAL

The depth of pessimism, for the time being at least, seems to have been reached early in July and since then, there has been a steady gain in confidence among large business interests. Several reasons exist for this apparent sudden change of front, the principal one of which is the cessation of hostilities in the Balkan States with easier monetary conditions in France, Germany and England. It became evident, too, at about that time that the currency bill before Congress would not seriously affect American industries, and drive gold out of the country as was feared. After that, came excellent reports from the West regarding the crops, particularly wheat, which have stimulated enthusiasm, not later dampened by the deplorable shortage in corn, due to a severe drought in Missouri, Kansas and Oklahoma. The arrival of buyers in large numbers in New York from all parts of the country started business flowing in many channels, and their optimism was even more reassuring, for they told of excellent conditions at home, and how the consuming public of their section was in need of a large quantity of goods. For this reason, prices have not declined as it was feared they would, and while some readjustments have been made in the iron and steel market, these have been by no means general.

The steel situation shows little improvement. Steel companies are receiving orders for a larger product than was formerly the case, but at the same time their unfilled orders are decreasing, showing that plants are operating at a larger capacity than the country is consuming. There have been revisions in the price of wire and pipe and there will probably be lower prices for bars.

The market for metals shows a decided change for the better, and copper moved rapidly upward to 16c., while lead and spelter are likewise higher.

Business has apparently discounted any changes which are likely to occur through a revision of the tariff.

Labor

The situation has been much more peaceful. There have been few strikes of large import, increased pay for the railway trainmen still being under consideration by the Arbitration Committee, and the Paterson strike having fallen through. In other places, the demands of workingmen seem to be readily granted by employers when there is any sound basis for a revision. In some sections of the country, complaint is heard that there is a shortage of workers, this being particularly true of the agricultural districts where farm-hands are needed, and in New England, where mill operators are needed.

Immigration statistics show a remarkable gain in the number of immigrants coming into the country. The figures for June, which were recently published, there being delay in all government publications of this character, show that 176,000 aliens came to the United States in that month as compared with 92,000 last year, 71,000 in 1911 and 105,000 in 1910. For the first six months of the year the number of aliens coming into the country numbered 650,000, in comparison with 478,000 in the previous year, 423,000 in 1911 and 615,000 in 1910. Ordinary outside labor commands $2 a day.

Iron and Steel Products

A further reduction in the unfilled orders of the U. S. Steel Corporation was recorded during July, amounting to 5,399,000 tons, a reduction since January of 2,500,000 tons. At the same time, the production of pig iron has fallen off only about 10,000 tons per day from the maximum, and now is approximately 82,000 tons daily. The mills are curtailing their output slightly, but not to any great extent, and there seems to be no accumulation of supplies.

Some reductions have been made, principally in wire products and in butt-welded steel pipe. Pig iron is slightly higher than a month ago, and the demand shows some improvement. The recently issued report of the American Iron & Steel Institute shows that the production of all kinds of finished and rolled forms of steel in the year 1912 established a new high record, the total output amounting to 24,655,841 tons. Of this, the production of iron and steel rails aggregated 3,227,000 tons; plates and sheets 5,875,000 tons, a new high record; wire rods, from which wire products are drawn, 2,653,000; structural shapes, not including plates, 2,846,000 tons; bars, skelp and all other forms, 9,908,000 tons. It is interesting to know that the iron and steel products exported during the fiscal year ending June 30, 1913, amounted to $340,000,000, setting a new high record and also a new high proportion to the total exports of 12.4%.

Pig Iron—The output of pig iron in the United States by blast-furnace interests during July was computed as approximately 82,000 tons daily. This was a reduction of 10,000 tons compared with the high figures reached in February, but even with the curtailment in the output, there was an accumulation of stocks of pig iron in many quarters. On the other hand, some extremely good buying was reported during the month, notably, heavy sales of Southern foundry No. 2 by furnace interests in that district which were willing to make concessions, and book business at a low figure. The principal interest doing this had a goodly tonnage ordered on its books at the end of the month, and was able to advance quotations $1 per ton. Since July 1, there has been an advance in pig iron in almost all centers, averaging approximately 50c. to $1 per ton.

Steel Rails—The leading trunk lines of the country have not begun to make up their buying schedules for rails yet, and very little business is being transacted. Rolling mills, however, are actively engaged in turning out products, and will be for the next several months. No change has been made in quotations, nor is it believed that there is any likelihood of a revision in prices.

Quotations are unchanged at $28 per ton for standard sections of bessemer rails, and $30 for openhearth rails, f.o.b. Pittsburgh. These represent a quotation of 1.25c. per lb. for standard sections weighing from 50 to 100 lb. per yd.; 1.21c. for 40- to 50-lb. rails, and 1.30c. for 16- to 20-lb. rails. In Chicago 16- to 20-lb. rails are 1.30c.; 12-lb., 1.33c. Relaying rails are sold at $24 per gross ton in Chicago and in New York at $22.50.

Track Supplies—The demand is no larger than it was a month ago, as far as new business is concerned, but shipments on old contracts are active, and most of the mills are working full time. Spikes are not at all firm at $1.80, and concessions of $1 a ton are frequently made. Track bolts with square nuts are $2.30 to $2.40 per 100 lb. These quotations are f.o.b. Pittsburgh. In Chicago, railroad spikes are $1.75 to $1.80; track bolts with square nuts, $2.30 to $2.40 and tie plates are $32 to $34 per net ton.

Pipe—There has been an unusually large business transacted in line pipe, and some of the largest contracts ever made have been closed this summer. These have been from the oil companies. At the same time, the demand for smaller sizes of standard pipe has fallen off materially. The revision as announced, which is approximately one point, applies only to pipe ¾ to 2 in. in diameter, butt-welded.

Discounts and net prices are as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded..........	80%	71½%
2½- to 6-in. steel lap welded..........	78%	69½%
7- to 12-in. steel lap welded...........	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

Diameter	Cents Black	Cents Galvanized
¾-in........	2.30	3.26
1-in.........	3.40	4.83
1¼-in.......	4.60	6.60
1½-in.......	5.50	7.90
2½-in.......	12.90	17.80
3-in.........	16.80	23.30
4-in.........	23.00	33.20
5-in.........	30.50	45.00
6-in.........	42.25	58.25
7-in.........	59.50	85.00
8-in.........	62.50	89.00
10-in.......	$1.03	$1.46
11-in.......	1.13	1.64
12-in.......	1.27	1.82

Sheets—Continued pressure has been brought to bear on the sheet market, but without obtaining concessions of more than $1 a ton from the rollers, and in some cases it was impossible for buyers to secure even this advantage. Production has been rigidly curtailed, and the American Sheet & Tin Plate Co. is operating only 68% of its capacity. Within the last fortnight, there has been much better demand and some heavy inquiries have been received by the mills, buyers evidently being possessed by the idea that prices are about as low as thy will go, and nothing will be gained by waiting. The following quotations are for small lots of a few bundles or more, f.o.b. Pittsburgh and Chicago. The price for large lots is unchanged at $2.25, f.o.b. Pittsburgh, for No. 28 black.

	Cents per pound			
	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24	2.70	3.50	2.65	3.45
Nos. 25 and 26	2.75	3.65	2.70	3.60
No. 27	2.80	3.90	2.75	3.85
No. 28	2.85	3.95	2.80	3.90

Structural Steel—With the railways practically out of the market, as far as buying bridge material and cars is concerned, building work in the East extremely quiet, and little new structural-steel business in sight, there is no end of complaint by fabricating works that business is dull. Some extremely low quotations were made for work when there was any chance of securing the business. Structural-steel shapes are unchanged on a basis of $1.50, Pittsburgh, for plates, beams and angles, and in Chicago, $1.68 to $1.73. These prices are per 100 lb. in carload lots. Some recent buildings in New York were erected complete on the ground for about $50 per ton for the structural-steel work. Light material, such as roof trusses, would command considerably higher quotations.

Spiral Riveted Pipe—Prices are without change. The following quotations are f.o.b. factory, freight equalized with New York, being figured at a discount of 50, 10 and 10% from list. These are for orders amounting to approximately $250. For large orders, prices are cheaper by 12½ to 20½%.

Diameter in in.	Thickness Birmingham wire gages	Net price per 100 ft. With bolted joints complete		
		Plain	Asphalted	Galvanized
4	18	$19.76	$21.48	$30.74
5	18	23.40	23.70	37.14
6	16	33.05	35.76	49.73
7	16	37.58	40.76	56.82
8	16	43.17	46.80	65.00
9	16	50.06	50.10	74.22
10	14	66.42	71.08	96.15
11	14	71.20	76.57	102.24
12	14	83.75	89.15	118.30

WIRE PRODUCTS

Wire—After considerable irregularity, the mills made an open reduction in quotations. Manufacturers applied this reduction to all shipments made since Aug. 1. Quotations are as follows: Annealed fence wire in large lots, $1.50; galvanized barbed wire, $2.15; annealed, $1.75. These quotations are per 100 lb., f.o.b. Pittsburgh. In Chicago, plain wire is $1.73; painted barbed wire, $1.93 and galvanized, $2.33, these quotations likewise being for large lots.

Copper Wire—A steady increase in business has been noticed in the last fortnight, and some good buying is reported, principally from trolley companies who believe that the market has turned permanently. Much of this business has been placed on a basis of 17.50c. per lb. The copper situation shows a decided improvement, and the wire trade has not been as hopeful for several months as it is at present.

Wire Rope—Quotations for the smaller sizes of cast-steel wire rope per foot, f.o.b. Pittsburgh, are as follows: 1¼-in., 23c.; 1-in., 15c.; ¾-in., 10c.; ⅝-in., 7c.; ½-in., 6c.

METALS

Copper—The price of copper advanced steadily during the month, and by the middle of August 16c. was paid for Lake, and 15.75c. for electrolytic. This was largely due to a strike of miners in the Lake regions curtailing the output of Lake copper, but the strong statistical position of the metal also influenced buyers. European consumers continue to buy very freely.

Tin—The market is steadier than last month, and most of the time it hovered between 40 and 42c. per lb. The price of 42c. per lb. prevails at this writing for large lots.

Solder—Strictly half and half solder is cheaper, in accordance with lower prices for tin, and can be had at 25 to 26c. per lb.

Lead—The advance in the quotation made by the American Smelting & Refining Co. brings the retail price of lead in New York to around 5c. per lb.

HARDWARE

Nails—Prices are lower and wire nails can be had at $1.75, Pittsburgh, and $2.05, New York, for kegs of 100 lb., in large lots. Business is not active, but stocks are sufficiently large to meet the demand. For small lots from jobbers' store, $1.95 is quoted in Pittsburgh and $2.15 in Chicago.

Bar Iron and Steel—Business of dealers is active, as many consumers who often buy in carload lots from the mills are drawing on stocks at warehouse. Prices are steady, and from store may be quoted as follows:

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square	2.10c.
1½ to 4 in. x ⅜ to 1 in.	2.10c.
1½ to 4 in. x ¼ in. to 5/16 in.	2.30c.
Norway bars	3.60c.
Soft steel:	
¾ to 3 in., round and square	2.05c.
1 to 6 in. x ⅜ to 1 in.	2.05c.
1 to 6 in. x ¼ and 5/16 in.	2.20c.
Rods—⅝ and 11/16 in.	2.15c.
Bands—1½ to 6 3/16 in. to No. 8	2.35c.
Beams and channels—3 to 15 in.	2.15c.

Extras for triple B (BBB)

3/16 and ¼ in.	2c.
5/16 and larger	1.75c.

Chain—Ruling quotations per 100 lb., f.o.b. Pittsburgh, are as follows:

3/16 in.	$7.50
¼ in.	4.95
5/16 in.	3.95
⅜ in.	3.40
7/16 in.	3.20
½ and 9/16 in.	3.00
⅝ and 11/16 in.	2.90
¾ and 13/16 in.	2.80
⅞ and 15/16 in.	2.70
1 to 1¼ in.	2.60

Extras for BB

3/16 in.	1.50
¼ in.	1.50
5/16 and larger	1.25

MISCELLANEOUS

Brattice Cloth—The reduction of price which was noted about the middle of July, has been followed by an advance, and prices are now as high as they have beeen at any time. Advices from manufacturers abroad are to the effect that market conditions there are very firm, and no reduction in price is expected. The demand is fully up to normal and stocks are sufficient to meet the inquiry resulting from this.

Portland Cement—Business has been steady, deliveries large, and the market is well sustained. The manufacturers of portland cement will have all the business that they can take care of for the next few months, but it is doubtful if this will last during the winter. In the East, the greater amount of business in New York in connection with the building of new subways is making up for the loss sustained in building construction, but elsewhere in the country, there has not been the same demand. Prices show no change. In Pittsburgh, the quotation is 90c. to $1; in Chicago, $1.25; Detroit, $1.34; St. Paul and Minneapolis, $1.45. These quotations are f.o.b., but do not include the cost of the package. In general, consumers have to pay about 40c. per bbl. for the package, also freight to destination. Quotation in Pittsburgh and New York is $1.58 with the usual allowance for bags returned, of 7½ to 10c. per bag.

Bars, Concrete Reinforcing—A reduction amounting to $1 a ton was made early in August. Quotations for small lots from Pittsburgh warehouses are as follows:

PITTSBURGH, CENTS PER POUND

	Warehouse Stock
¾-in.	1.95@2.05
⅝-in.	2.00@2.10
½-in.	2.05@2.15
⅜-in.	2.20@2.30

Asbestos—Building felt and sheathing, in small lots, is 3½c. per lb. for the light, weighing from 6 to 30 lb. per 100 sq.ft. and 4c. per lb. for the heavy, weighing from 45 to 56 lb. per 100 sq.ft.

Millboard sells at 5c. per lb. in lots of 100 lb. and over. This price applies only to sheets of standard size.

Miscellaneous Metals—Small lots of brass, bronze and other metals can be obtained in New York at the following quotations per lb.:

Bismuth	$2.25
Brass tubes, iron-pipe sizes:	
½-in.	.21
3¾- to 3-in.	.20
3½-in.	.20
4-in.	.20
Brass rods	.16⅜
Brass sheets	.16⅝
Solder, half and half guaranteed	.30
Zinc sheets	.08¾
Manganese bronze rods	.16¾
Manganese bronze in crucible form	.15

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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Advertising Index, Last Page

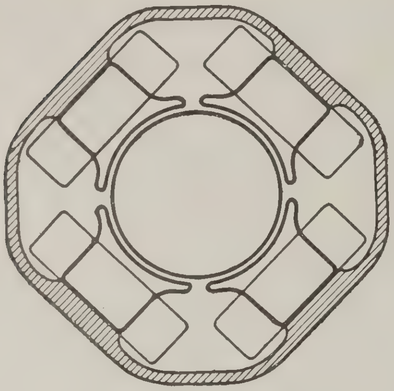
PLANT OF THE OHIO VALLEY MINING CO., WEST FRANKFORT, ILL.

The Reason for the Commutating Poles

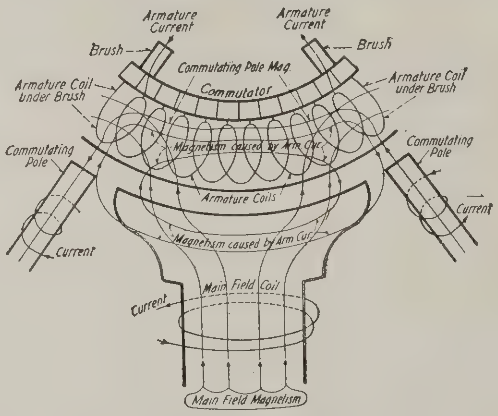
In the Motors Used on

Baldwin-Westinghouse

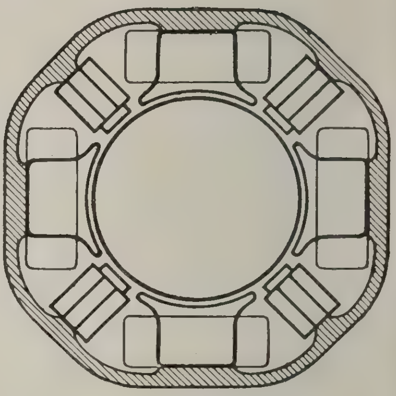
Electric Mine Locomotives



The above sketch shows the general arrangement and proportions of a non-commutating pole motor.



Diagrammatic Sketch of Magnetism and Current in a Westinghouse Mine Motor.



This sketch shows general arrangement and proportions of a commutating pole motor.

In the non-commutating pole machine, the armature current generates magnetism which passes through the armature iron and the pole, as shown in the drawing. Part of the magnetism caused by the armature current passes through the two armature coils under the brushes and through the pole tips. This is the magnetism that makes the machine spark, and is strongest when the armature current is strongest, so the machine sparks the worst on heavy loads.

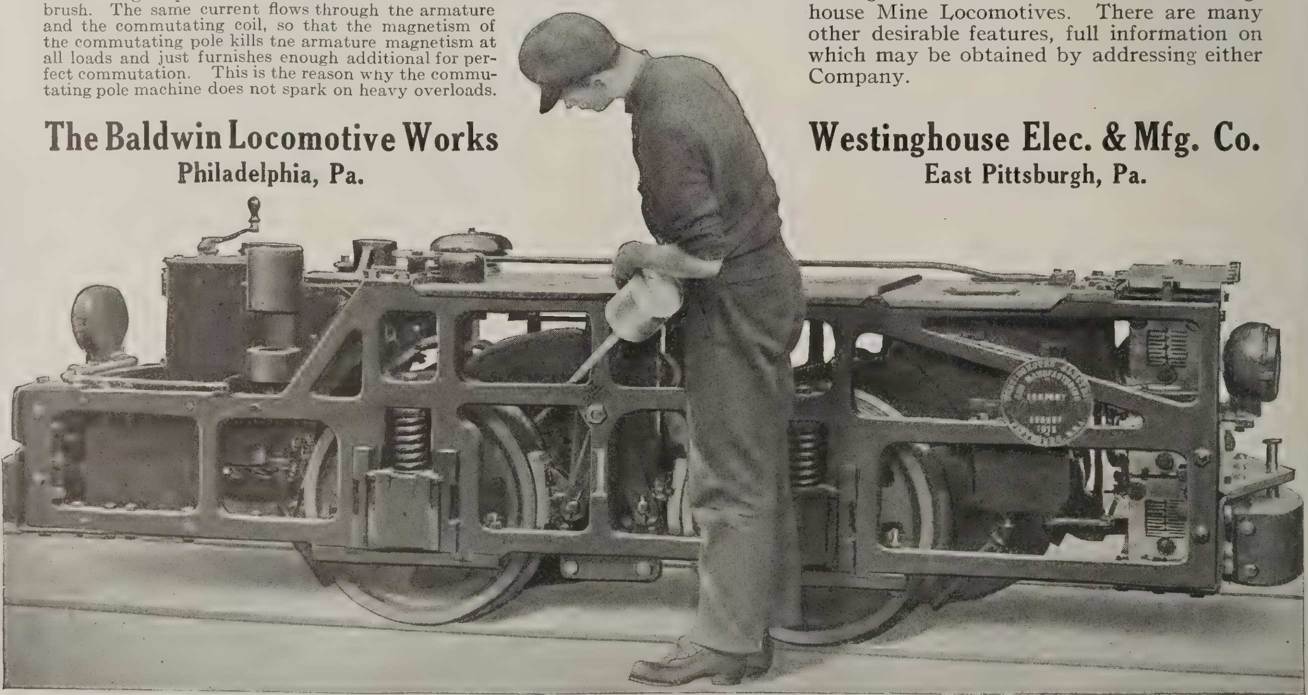
In the commutating-pole motor, the commutating coils are designed to send magnetism through the armature, which will kill the magnetism caused by the armature current and furnishes enough additional magnetism to give perfect commutation of the armature coil under the brush. The same current flows through the armature and the commutating coil, so that the magnetism of the commutating pole kills the armature magnetism at all loads and just furnishes enough additional for perfect commutation. This is the reason why the commutating pole machine does not spark on heavy overloads.

The motor will operate without sparking at all loads and voltages found in service. The commutator is always bright and polished. All bucking or flashing is eliminated. The commutator shows hardly any wear at all. Brushes wear very slowly, often lasting for years. Brush-holders do not deteriorate from flashing. Commutators do not burn out from short circuits due to flashing. There is less likelihood of breakdowns of insulation in armature, fields and brush-holders, as the carbon or copper dust in the motor is practically eliminated.

The commutating-pole motor is one of the most important factors entering into the success of Baldwin-Westinghouse Mine Locomotives. There are many other desirable features, full information on which may be obtained by addressing either Company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Elec. & Mfg. Co.
East Pittsburgh, Pa.



COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,550

None sent free regularly, no returns from news companies, no back numbers

Honesty Is The Most Profitable Policy

The Weekly Ad-Talk Page

Here is a statement recently issued by the Wichita (Kans.) "Beacon" which illustrates how the demand for *truthful* advertising is being met by publishers throughout the country.

"The 'Beacon' is going to make an effort hereafter to be responsible for the character of advertising which appears in its columns. The paper will endeavor to educate the public to believe that what it sees in the news columns and in the advertising columns is alike worthy of serious attention as truthful statements."

From the fake mining schemes and doped patent medicine advertisements of ten years ago to the above is a far cry.

But publishers and advertisers have realized for some time that advertisements must tell the truth if the business of both is to prosper.

For the success of any business depends upon the confidence the public has in it.

Confidence begot of the truth found in its advertisements.

And to so great a degree is this true that a single untruthful statement contained in an advertisement may be the little pill with which the Advertiser commits Business Suicide.

We know of a merchant who for 12 years conducted a prosperous business because he held the confidence of the public.

Until one morning, partly because of some freak stunt on the part of a competitor, and partly because he wanted to take advantage of the Tariff agitation, he wrote an advertisement in which the public was informed that owing to the *passage* of the Tariff Bill by Congress, he was able to quote bargains out of the ordinary.

Just three men responded to the ad—and one didn't buy.

Some of his customers who had seen the ad wanted to know whether the business had changed hands, because up to that time they had thought the advertisements of this concern reliable.

We think that the publishers of the paper in which this advertisement appeared are as much to be censured as the merchant who tried to "put one over" on the buyer.

We realized long ago that in admitting a fraudulent advertisement in its columns a publication is fouling its own nest.

That possible purchasers come to regard its advertising columns with suspicion because some of the advertisements contained therein are untrustworthy.

We went further. Since the subscriber of this publication buys it because he knows it helps him in a business or professional way, we decided that no product that could not be used toward this end should be admitted in the Selling Section of Coal Age.

That perfumes, crackers and steam yachts, being products which have no place in the solving of coal mining problems, are debarred from our advertising columns because they don't "belong."

And this has resulted in the formulating of the Hill Advertising Code which, briefly, declares that:

No advertisement can appear in Coal Age which contains misstatements, gross exaggerations, "knocking" copy, fake "free" offers, products not ready to be marketed, or behind which the necessary finances to advertise it profitably are lacking; and products which cannot be used in a business or professional way by the reader.

All of which assures you of the reliability of the manufacturers whose products, truthfully advertised, you find in the Selling Section of Coal Age.

COAL AGE

Vol. 4 NEW YORK, AUGUST 30, 1913 No. 9

Just Between Friends

Doubtless your pay isn't highly luxurious,
  Surely your job isn't easy or light,
Doubtless your life is a trifle penurious
  Still—are you doing your labor all right?
Have you been fair to the man who is paying you—
  Have you been honest and square with the boss?
Isn't your laziness often delaying you—
  Hasn't your carelessness caused him a loss?

No one denies that your task is laborious,
  No one denies that you're often oppressed;
Still we would ask—though in no wise censorious,
  Have you been faithfully doing your best?
Haven't you wasted a lot of coal needlessly—
  Haven't you tried to get credit for slate?
Haven't you monkeyed with peril quite heedlessly—
  Dallied with danger and frivoled with fate?

While you are thinking of grievances various,
  Maybe the boss has a grievance or two,
Maybe his business is mighty precarious
  Simply because of the things that you do;
Bosses there are who are wrong in their attitude
  Greedy and selfish and crazy for pelf,
But—have YOU really shown fairness and gratitude—
  Have you been doing the square thing yourself?

IDEAS AND SUGGESTIONS

Cleaning Coal

By Josiah Keely*

A story is told by a mine foreman on his old boss, who now holds high office in one of our largest bituminous-coal companies:

"Talk about cleaning coal—we had to clean it when I dug coal for Old Man ————. I was driving one of the best headings in the mine, and there were a dozen other fellows waiting for my place. He came in one morning and began looking up and down the sides of the track like he had lost a dime. Pretty soon he stopped and held his light up into my face and said: 'Where are you throwing your dirt?' 'I says, 'There ain't no dirt in this coal.' He didn't even look at the coal, but said, 'Young man you want to find something by the time I come around again.'

"Now, I knew two things: First, the Old Man would be back, and second, if there were no bands and sulphurs scattered back along the ribs, I would take my tools and hike. I didn't want to lose that place, and there was not a scrap of bad coal in it. But next morning I went in early (you could go in as early as you was a mind to in those days), and I took an old sack and gathered up bands and sulphurs as I went along. In a day or two the Old Man came in. I didn't look around, but kept digging like h—. He never said a word, but grunted and went out. And, don't you know, I had to keep carrying them bands in for three months. Believe me, we had to clean 'er in those days."

To those of us who are "up against" the proposition of cleaning coal today, this story, though perhaps embellished, illustrates a number of things: The attitude of both boss and miner fifteen years ago in regard to cleaning coal on the inside, the abundance of labor then, and the method of getting things done. How many mine foremen now make a systematic examination of the ribs to see what is being thrown back? How many miners make a regular practice of throwing back their dirty coal? To say nothing of carrying in dirt to satisfy the inspector. However, there is nothing more futile than dwelling on early methods of getting things done. Human nature has not changed; industrial conditions have. The demand for clean coal is greater than formerly, so, what are we to do?

Begin at the Proper Place

We can still imitate our old friend, the Boss, in going to the proper place to begin. Clean coal still depends, not so much on what is picked out at the tipple, as what is thrown back in the working places, and, on the whole, it is perhaps not much harder to require the proper service from inside men than from those outside at the tipple. Of course, the daylight is an advantage, but a handful of tipple men handling large tonnage can hardly be expected to do all the cleaning for the hundred miners loading up everything that is shot down.

We might turn again to our story of the early days for a lesson in fixing individual responsibility. We will probably not be able to dispense with the man who gives the final inspection to the railroad car, nor those who pick slate as the coal is dumped; and it looks as though any future improvement in cleaning would have to come from a closer inspection of the coal on the car of the miner. Dockages are too often spasmodic and out of proportion to the impurities. Too little is known of the real inside conditions producing the dirt found.

Again, when the miner is able to "put over" a lot of bad stuff without hearing from it, and then gets a dock on something not nearly so bad, he is apt to remark cynically that the company needs the money. The fear of losing miners by requiring too much inside cleaning is greatly exaggerated. Miners who quit on account of dockages have either a real or a fancied grievance. An old-time school master is said to have called up all of his smaller pupils and given them a "licking," partly for fear that some had broken a rule without detection, and partly to intimidate the older children. If the docking has been done on this principle, some of the grievances are probably real. If dirty coal has been allowed to pass until the miner has only a hazy idea of the standard, and then is given all his docks in a bunch, he is not much to blame if he feels that some injustice has been done.

We Are All About Alike

The lower animals require systematic discipline to develop a standard of efficiency. Even human actions and habits are formed the same way, but with a difference. One shock of the wire will sometimes break a mule from carrying his head high in the mine, while "gee" and "haw" were probably repeated a thousand times and emphasized with sundry knocks with a sprag before action conformed to word. The miner who drops a spark in a powder can will probably not do so again, yet you would hardly advocate this method of teaching men not to fill cartridges under an open light.

We are all alike when it comes to learning to do things in a required way, so the only hope of rescuing these remarks from a mere pronouncement of platitudes is the earnestness to secure something like patient, consistent, daily attention to the root of the difficulty. There will probably not be so many dockages necessary, but that a considerable number of them can be taken up with the miner on the next day after the dirt is discovered, and it is possible that the cases for individual attention may become less frequent, but this will only be in proportion to the regularity of the attention. Results can not be brought about without certain penalties, but results are not of necessity in proportion to the number of penalties.

I am aware that an appeal for closer supervision may be along unpopular lines, because this involves daily vigilance and an attention to the job that is not always realized from a salaried position. The man who reads coal journals to discover short cuts and easy methods need read no farther than the opening anecdote, but there are still some men on small salaries who are conscientious enough to realize not only that eternal vigilance is the price of clean coal, but that the bands and sulphurs along the ribs tell the story better than the pile of refuse at the tipple.

---

*District superintendent, Consolidation Coal Co., Acosta, Penn.

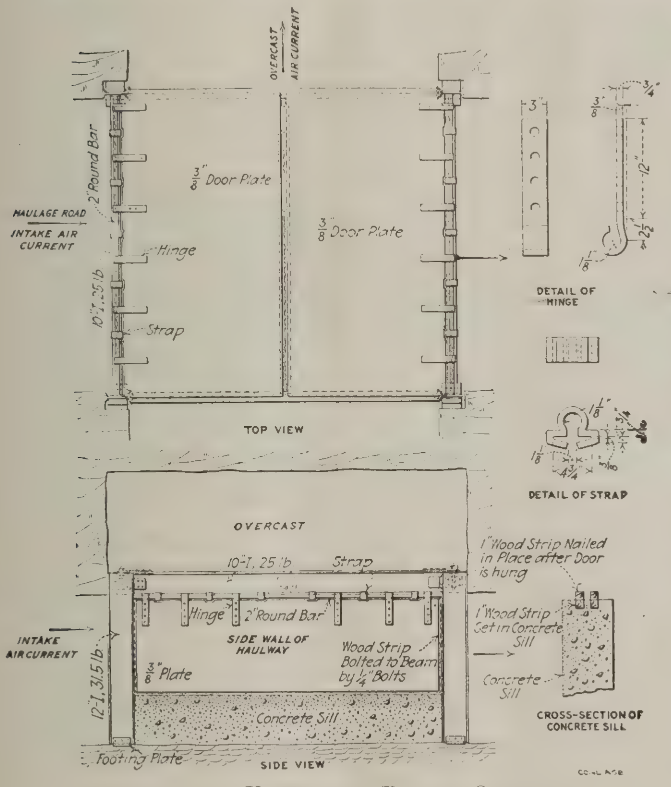
⁂

An Automatic Fireproof Overcast

The accompanying illustration shows what is designed to be an automatic, fireproof overcast, as invented by John C. Duncan, Supt., Mine Rescue Station, Benton, Ill.

The object sought in this construction is to provide swinging sidewalls of sheet steel, which are held in place, at the bottom, by wooden strips. A concrete sill 2 ft. wide is first constructed on each side of the roadway, across the crosscut opening. These sills are imbedded deep enough in the floor to give a substantial support. Two wooden strips 1 in. square, are imbedded in the top of each concrete wall, as shown in the detail sketch.

The steel doors forming the sidewalls of the haulage road are made of 3/8-in. boiler-plate steel. These are hung from two 2-in. round bars, spanning the crosscuts and supported by the 12-in. I-beams set at the four respective corners of the overcast. The round bars are hung from two 10-in. I-beams, by the straps shown in detail, while the doors are swung from these bars by the hinges, which are also shown in a detail sketch. After the doors forming the sidewalls are in place, 1-in.-square wooden strips are nailed on each side of the door and over the strips imbedded in the concrete. These light strips are sufficient to hold the doors in place, except when acted upon by the force of an explosion.



Details of Explosion-Proof Overcast

Above the haulage road and forming the floor of the overcast are, likewise, two doors of 3/8-in. boiler steel that are free to open upward, under the force of an explosive blast. These doors are hinged respectively to two 2-in. round bars, supported by the 10-in. I-beams spanning the haulage road, as shown in plan and elevation.

The purpose of this design is to provide an overcast that will permit of the expansion of air and gases, during an explosion, and, at the same time, will not be destroyed by the force of the blast. It is expected that both the side doors and the top doors will assume their original position after the force of the explosion has passed. The main posts and concrete sills should be hitched securely into the sides and floor of the entry.

⁂

Nitric Acid from Coke-Oven Gas

The engineering supplement of the *Times*, of London, says:

The latest addition to the interminable list of byproducts obtainable from coal is nitric acid, and apparently large quantities of this substance can be obtained with the aid of coal gas, unless the researches of German investigators prove to be in error. The recovery is made by exploding a definite mixture of gas and air in a special "bomb." Oxides of nitrogen are evolved, with the consequent deposition of nitric acid. In one form of plant the gas and air are compressed to from four to six atmospheres, and the mixture is strongly heated before explosion. The products of combustion are rapidly cooled down by passing through a special condenser, finally finding their exit through an oxidizing tower.

It is stated that by adding pure oxygen to the gas in the proportions of one of the former to two of the latter, and heating the mixture to about 500 deg. F. before combustion, a yield of 12½ lb. of nitric acid can be obtained from 1000 cu.ft. of gas. The process, however, would appear to be somewhat costly, for, assuming that gas were obtained and treated for the moderate figure of 50c. per 1000 cu.ft., the cost of nitric acid works out at nearly $90 per ton, against an average figure of $85 for that produced by ordinary sodium-nitrate methods. At a coke-oven plant the case would, of course, be different, and there seems little reason why such concerns should not deal with a portion of their gas, which to them is a byproduct, in this way. A factory for the purpose of generating nitric acid by this method has recently been erected at the Wendle colliery in Westphalia, to deal with 170,000 cu.ft. of gas a day. Pure oxygen is supplied by a Linde plant, and coke-oven gas is used. [If this information is reliable, the products of all explosions will bear closer examination.—Ed.]

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Salt in Coking Coal

The *Gas World*, of London, Eng., says that in certain districts of England, and also in Germany much trouble is experienced owing to the corrosion of the walls of the ovens. After a comparatively short period of use, the brickwork in the interior of the ovens becomes friable and detaches with the coke during the coke-pushing operation. This corrosion is attributed largely to the deleterious effect of the salt in the coal on the silica contained in the bricks. Much of this salt can be removed by careful attention to the washing. Various preparations have been put forward for lining the interior of the ovens, but none of these has so far proved satisfactory.

Coal Shipping on the Great Lakes

By J. W. Chamberlain*

SYNOPSIS—This installment of the Lake article takes up the gradual development of the coal freighters. The necessity of rapid loading and unloading, together with the comparative shallowness of the Lakes, has resulted in a distinctive type of vessel for this service. The modern boat is constructed of steel and has a capacity ranging up to 15,000 tons.

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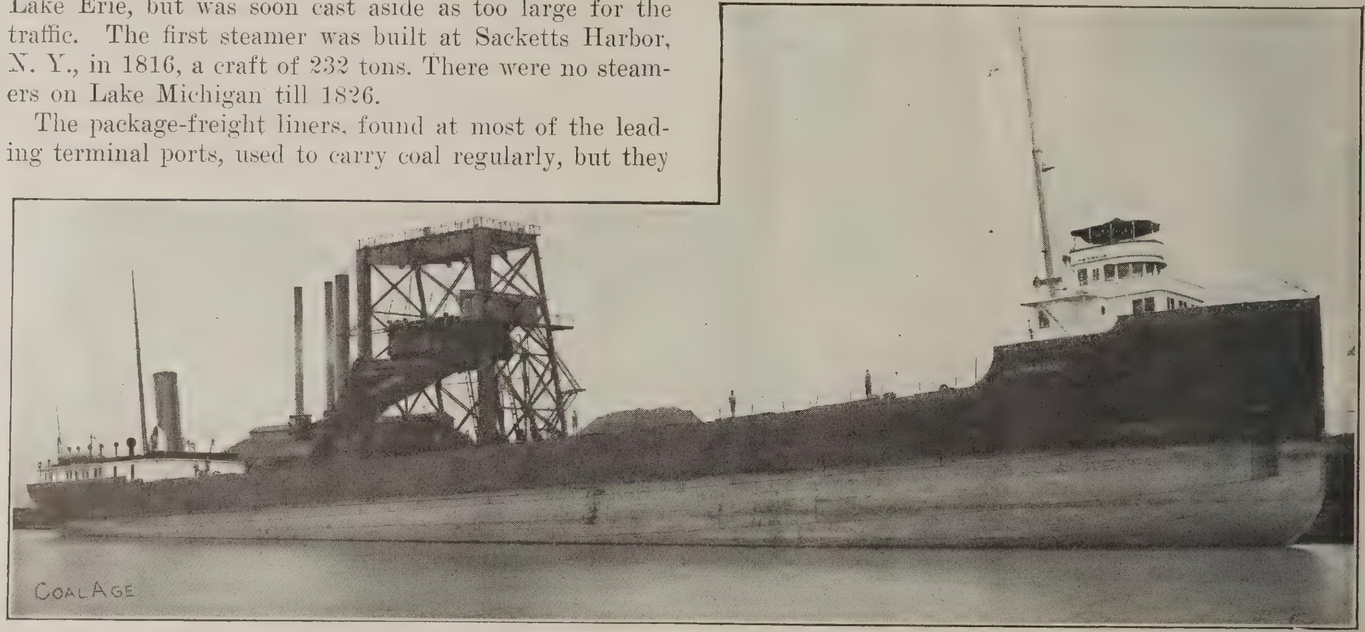
Perhaps no industry of its day has come up so fast as the trade on the Great Lakes. In 1679 the "Griffon," a 60-ton ship, was built near Buffalo, but she was a mere toy. She sailed as far as Green Bay, and was lost the first fall, with all on board. Development followed this pioneer very slowly; in 1814 a 96-ton brig was built on Lake Erie, but was soon cast aside as too large for the traffic. The first steamer was built at Sacketts Harbor, N. Y., in 1816, a craft of 232 tons. There were no steamers on Lake Michigan till 1826.



Freighter "Wainwright" Loading at the Pittsburgh Coal Co.'s Dock in Ashtabula Harbor

The package-freight liners, found at most of the leading terminal ports, used to carry coal regularly, but they have not done so in the past 20 years or so. Sailing vessels were at their maximum in the "sixties," with steam just beginning to assert itself. David S. Bennett, who built the first grain elevator in Buffalo, said to the writer that once in 1863 he saw more than 60 sailing vessels off that port at the same time. They carried a very small amount of grain, often less than 10,000 bushels. This capacity finally ran up to something above 3000 tons for wooden sailing vessels, but none of that class, even as consorts, has been built since 1897. Steam began to supersede them in the "seventies."

While it is common for the Lake Ontario schooner to load as little as 150 tons of coal at a cargo the steamer "St. Joseph," which ran for a long time from Oswego to Toronto, carrying about 600 tons of Ontario & Western anthracite, is a good type of that trade. She is 260 ft. long, has no hold compartments and only four hatches, which are 9x11 ft., with stanchions at each end of the hatches. A former wooden arch at the sides later on gave way to steel arches that do not extend above the rail. Her keelson is only about 2½ ft. high, but on other vessels it was sometimes 5 ft. high, so that the cargo space was a terror to any sort of unloading apparatus and was not tolerated long after horse hoists began to give way to steam hoists. At first these latter were merely a stationary engine on the dock with rope attachments, but these have now in turn given way to the clam-shell hoists, though even Chicago used horse hoists as late as 1875.

The Evolution of the Lake Freighter

At first the clam-shell hoist found a host of difficulties in the hold of a vessel but it has worked such a revolution in vessel construction that it is now dictating size as well as build of the hold. A coal operator lately undertook to sell a 2000-ton cargo to a Western jobber, but found that his dock had an 8-ton clam-shell for unloading and it would not work on such a cargo. So something had to be done with the older vessel holds. The stanchions were moved, the hatches increased and enlarged, and the keelsons cut down where possible. These latter are not a part of the frame, but merely a beam running longitudinally along the hold and bolted to the middle of the floor frames, all this new construction being previous to the water bottoms or side tanks.

The first big revolution of bulk-freight carrying on the lakes came with the steamer "Onoko" in 1882, built of iron. Though not the first metal craft on the lakes, it had such an enormous capacity as compared with most wooden vessels that there was a rush for this new type. Older metal crafts had solved few problems, the first of them being the "Merchant," built in Buffalo in 1862. The "Onoko" merely showed the new possibilities in the size; she had two decks and the old-style stanchions to interfere with bulk-freight handling. In 1889, the "America" appeared, provided with deck beams, but no between decks. Her cargo of 3100 tons was all in a sin-

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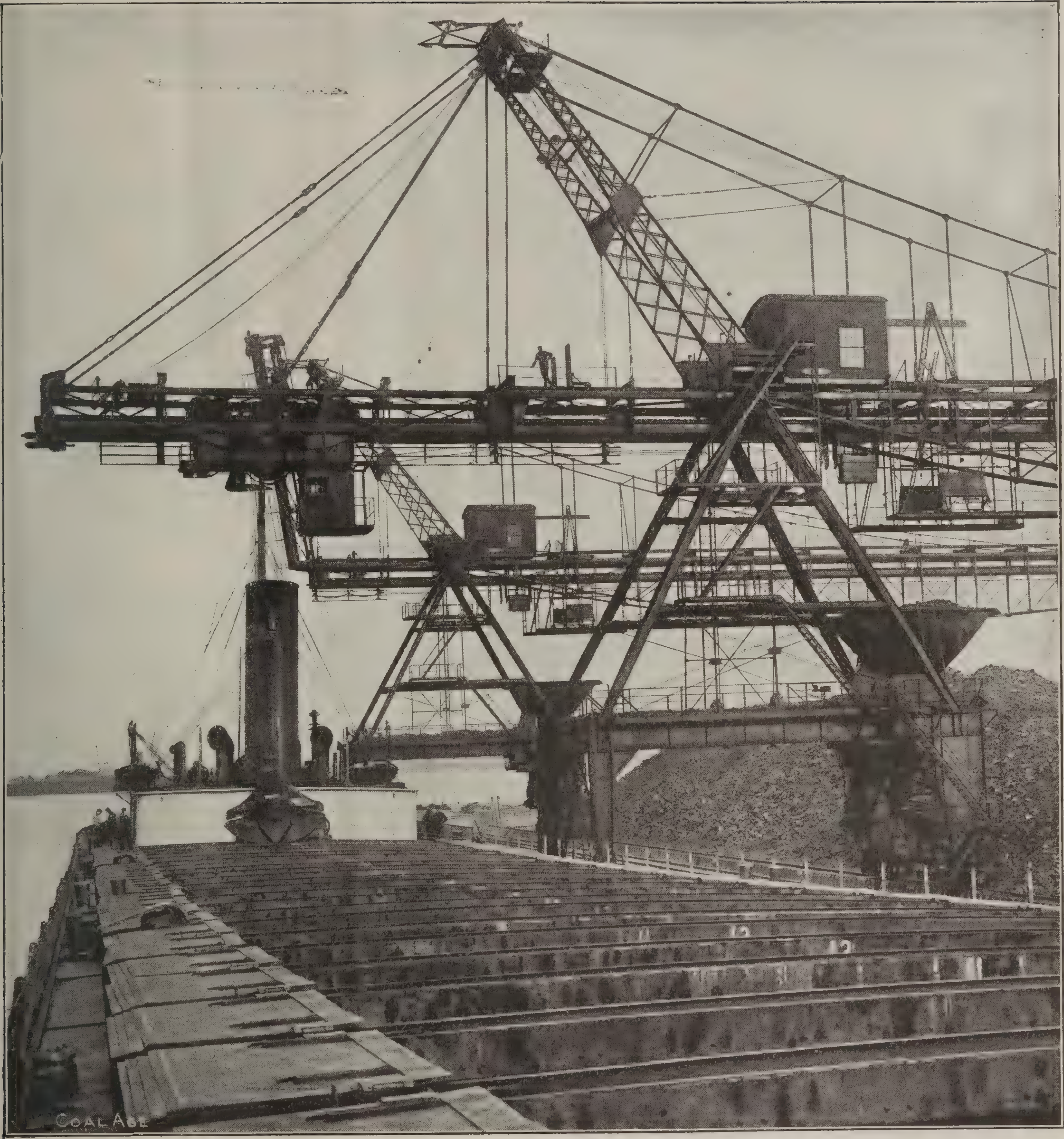
*90 Johnson Park, Buffalo, N. Y.



A Brownhoist Unloading a Vessel on the Upper Lakes. This Shows the Typical Open Hatch, Characteristic of the Coal Freighters

gle space, though that has since been divided into three permanent compartments, two of 900 tons, the third of 1300 tons capacity. This division was in part to strengthen the hull and also to facilitate the getting of cargoes. Except for iron ore it was difficult for a long time to get large cargoes of one commodity for the same consignee and port destination. Steamers of this class were derisively called "tin pans" and it was predicted that they would collapse in stress of weather. They did not, however, and soon a further step was taken, all in the interest of less obstructed holds to facilitate unloading bulk freight.

The Modern Type of Vessel

The steel steamer "A. B. Wolvin" was built in 1904, answering to the following description: Gross tonnage 6585 tons; capacity, 10,300; length, 540 ft.; keel, 56 ft.; beam, 32 ft.; hold, 33 ft. having 9-ft. hatches with 12-ft. centers; one compartment and arch construction. It has been found that something must be done to strengthen the deck of a vessel about her hatch openings before it was safe to remove the stanchions and to lessen the number of beams in order to increase the size of the hatches. So the arch was put in crosswise between the hatches and tied to the beams that support the deck; it was also attached to the belt frame that runs up from the high floor inside of the side tanks, for by this time not only had water bottoms been devised, but there were side tanks of about 5 ft. in thickness running up to about the load line and affording additional protection to the cargo, but not interfering with the openness of the hold.

The improvements in the hold of the "Wolvin" worked well, but the change of hatches from 24-ft. centers to 12-ft. was not all that was required. The main beams and center stanchions were already dispensed with, the first to leave them out being the steamer "James H. Hoyt," built in 1902. The "Hoyt" also appreciated the value of transverse bulkheads, both for strengthening the vessel and for dividing the cargo into suitable lots, so that special bulkheads would not be required. This boat is 404 ft. long, with a carrying capacity of 6700 tons. She has twenty-three 8-ft. hatches with 12-ft. centers, so that, like the modern lake bulk freighter in general, she is fairly all hatch in place of deck. She also has six compartments of from 1000 to 1300 ton capacity each, so that she might be called six vessels in one, as compared with the coal carrier of the '80's, when an average cargo was less than 1000 tons.

The increase of size in lake steamers has been rapid, but the limit is now probably about reached. In 1895 the average iron-ore cargo was only 1800 tons, in 1909, it was 7178 tons and had been 8325 tons the season before on account of an extra depth of water in the harbors and inter-lake passages.

Since the introduction of the transverse arch and the increase of hatch capacity the Isherwood longitudinal construction has come in, but that is a mere matter of economy in hull frames. So far only a few lake vessels have been built on this plan. The arch, however, has so entirely met the needs of shippers and especially receivers of bulk freight, that every winter a number of steamers are changed over from the old beam-and-stanchion style. Were the vessels built of wood it might not be economy to rebuild their interiors, but the lake fleet is now nearly all of steel construction, the life of which is quite indeterminate so that any desired change is usually made unless the cost is too heavy.

For some time after the opening of navigation to Lake Superior it is said that all the tonnage of that lake could be put into the hold of a single first-size freighter of today. There are now on the lakes about 1250 bulk freighters of cargo capacity running up to 15,000 tons and 225 passenger steamers, many of them also freight carriers, not to mention a host of small local craft and tugs. For a score of years Detroit has seen the largest fleet pass her doors of any port in the world. In the season of 1910, 25,578 vessels passed that port in 235 days, 160 in one day, the aggregate tonnage for the season being estimated at 75,000,000 tons.

The lake coal carrier and bulk freighter is now a strong, steel-clad seaworthy box, and such it is likely to remain indefinitely. The machinery has also about reached its maximum development. The triple-expansion engine and Scotch boiler came in quite a long time ago and efforts to supersede them have not succeeded. Power needed and crew required have not increased with the later increase of carrying capacity. With reference to the coal trade it should be said that the amount offering for shipment has not kept pace with the increase of tonnage and it is doubtful if it ever will again.

Railroad-Car Ferry "Ashtabula," Which Makes Two Trips a Day out of Ashtabula, Across to Canadian Ports

For a long time the main bar to the coal trade was the lack of storage capacity on the upper lakes, but that is increasing fast. For awhile the coal shippers tried to oblige consumers to buy enough in summer to keep the moderate-sized receiving docks moderately free during the active season, but they have about given that up as impracticable. People will buy when they want the coal and not much before that time. So when the shippers, especially of anthracite, have begun to erect vast storage docks at the chief upper-lake ports and it is now stated that a winter's supply can be laid down at more than one of these ports, if only a small percentage is shipped out before winter. The other ports are following.

But it is somewhat different with bituminous coal. The consumer is a more constant quantity than a railroad company or a manufacturer, with a large storage capacity. The amount of bituminous is, however, much greater than of anthracite, so that dock storage is in that case also, a large factor.

The Coal Output of Alaska

The production of coal in Alaska in 1912, as stated by E. W. Parker, of the U. S. Geological Survey, was 355 tons, valued at $2840, a decrease from 900 tons, valued at $7200 in 1911. The production in 1912 does not include the coal mined under the direction of the U. S. Bureau of Mines for testing purposes, which amounted to 900 tons, but, of course, no commercial value can be placed upon this coal.

A little coal was mined in Alaska prior to 1884 by the crews of vessels that ran short of fuel, but this probably did not aggregate more than a few hundred tons. The total output of coal prior to 1889, including that mined by the Russians, was probably less than 10,000 tons.

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The 1912 Coal Production

The production of coal in the United States during 1912 reached the grand total of 534,466,580 short tons, valued at the mines at $695,606,071, according to the figures of E. W. Parker, of the U. S. Geological Survey.

In 1882, the first year for which statistics are available, the total coal production of the United States had reached what was then considered as about high-water mark, 103,551,189 short tons. In 1912, the production of bituminous coal in the State of Pennsylvania alone exceeded that figure by nearly 60 per cent. and the combined production of bituminous and anthracite in Pennsylvania was 2¼ times the total production of the United States in 1882, while the total production of the whole country for 1912 was more than five times what it was in 1882. The United States is at present contributing 40 per cent. of the world's supply of coal, and is consuming over 99 per cent. of all the fuel it mines.

In 1912, the production of coal in the United States not only passed all previous tonnage records, but the average value per ton exceeded that of any normal year in the 33 years for which statistics are available. There has been only one year when prices generally were higher than in 1912 and that was 1903, the year of a fuel famine.

The gain in output in 1912 over 1911 was 38,095,554 short tons, and the increase in value was $69,040,860. The production of bituminous coal increased from 405,907,059 short tons to 450,104,982 tons, a gain of 44,197,923 tons, with an increase of $66,607,626 in value. The decreased production of anthracite, amounting to 6,102,469 short tons was due entirely to the suspension of mining in April and May, when practically the entire region was idle.

Those factors which contributed to the increased output of bituminous coal were first the revival in the iron and steel industry, which stimulated production in the Eastern states, the coal made into coke alone showing an increase of nearly 6,000,000 tons; second, bountiful crops of grain and other agricultural products, which gave prosperity to the farming communities of the Middle West; third, decreasing supplies of natural gas and fuel oil in the Mid-Continent field and their consequent lessened competition with coal from the Southwestern states; fourth, increased consumption by railroads and in nearly all lines of manufacturing; fifth, activity in the mining and smelting of the precious and semi-precious metals in the Rocky Mountain and Pacific states.

Of the twenty-seven states in which coal mining may be considered to be conducted on a commercial basis, there were twenty-one in which the output of 1912 showed an increase over that of 1911, and in all but two of the important states the increase in value was greater than the increase in tonnage.

In the production of bituminous coal, Pennsylvania in 1912 showed an increase of 17,304,231 short tons. West Virginia's increase in 1912 was 6,955,107 tons. Illinois increased its production by 6,206,108 tons; Ohio by 3,768,741 tons; Kentucky by 2,440,818 tons; Indiana by 1,084,363 tons; Alabama by 1,079,179 tons; Virginia by 981,971 tons; Colorado by 820,441 tons and Kansas by 807,454 tons.

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A Small Peat Production

While the United States is the richest country in the world in deposits of peat, little active work is being done in mining or digging it, and so far as is known, very few of the peat-fuel plants established have gone beyond the experimental stage, and many of them have never been equipped with essential machinery. Reports from all known peat-fuel plants in the United States, according to Charles A. Davis, in his Mineral Resources in 1912, show that with one exception they were idle during the summer of that year. The only plant reporting production made air-dried cylindrical peat blocks which, when thoroughly dry, were about six inches long and two inches in diameter, dense and hard and stood handling well. The output of peat fuel was reported as about 1300 tons, valued at $4550. All of this peat was sold.

The production of peat for fertilizer was, so far as reported in 1912, 41,080 short tons, of which about 8000 tons was reported as sold air-dried, that is, not dried by artificial heat. The value of this material at the selling prices reported was $186,522.

The amount sold for mixing with prepared stock feed was reported to be 3000 short tons, bringing an average price of about $6 per ton. An increased production of paper stock from peat fiber over that of 1911 was reported by the only company producing this material. The output for 1912 was reported to be 3000 short tons. The production of peat-moss stable litter in the United States in 1912, so far as could be learned, was suspended. As in past years peat-moss was imported from Holland, the importation last year being 9053 short tons, valued at $39,867, almost exactly the same as in 1911. This material is used almost exclusively as bedding for horses in stables in the thickly populated parts of large cities. It is especially adapted to this purpose on account of its absorbent and deodorizing properties.

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Natal Coal

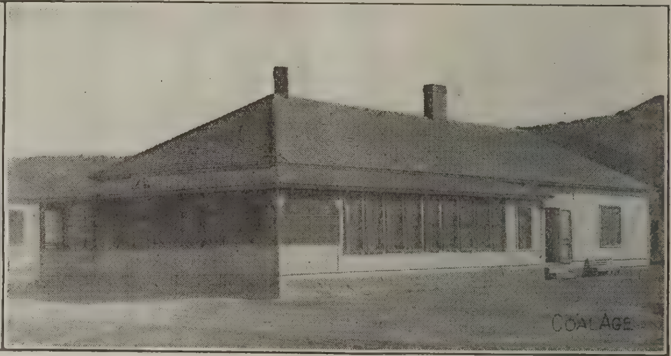
According to the Daily Consular and Trade Reports, coal is the only mineral mined in Natal to any extent. The industry is at present in a better condition than during 1912, because of an agreement which was entered into among a majority of the operators to coöperate instead of acting independently, and which has resulted in higher prices. A difficulty in the way of great expansion in the near future is the inability of the Government to meet all demands of the operator for rolling stock to transport coal from the mine to the port.

SNAP SHOTS IN COAL MINING

Sawing Mine Timbers, White City, Ky.

Columbus Coal Co.'s Camp, Columbus, Kan.

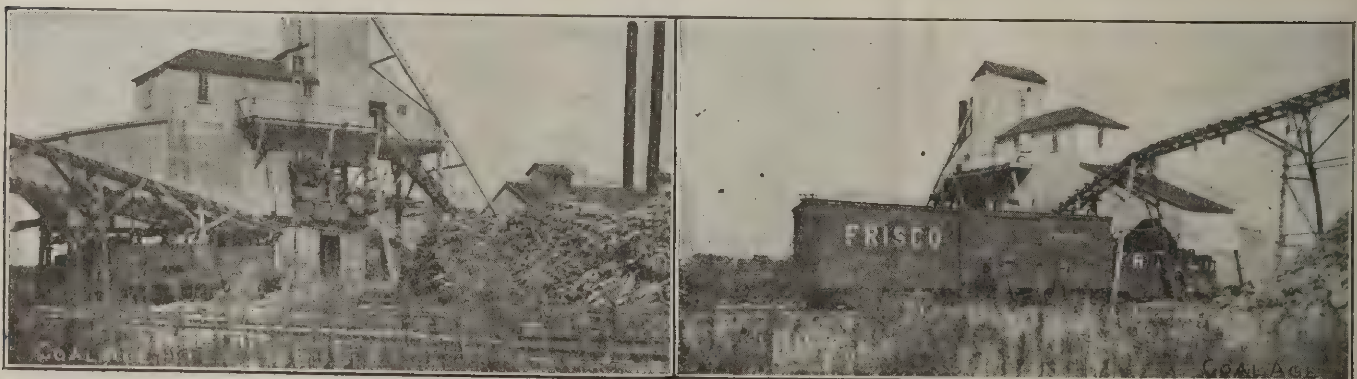
Victor-American Co.'s Hotel, Heaton, N. M.



Victor-American Co.'s Hospital, Gibson, N. M.

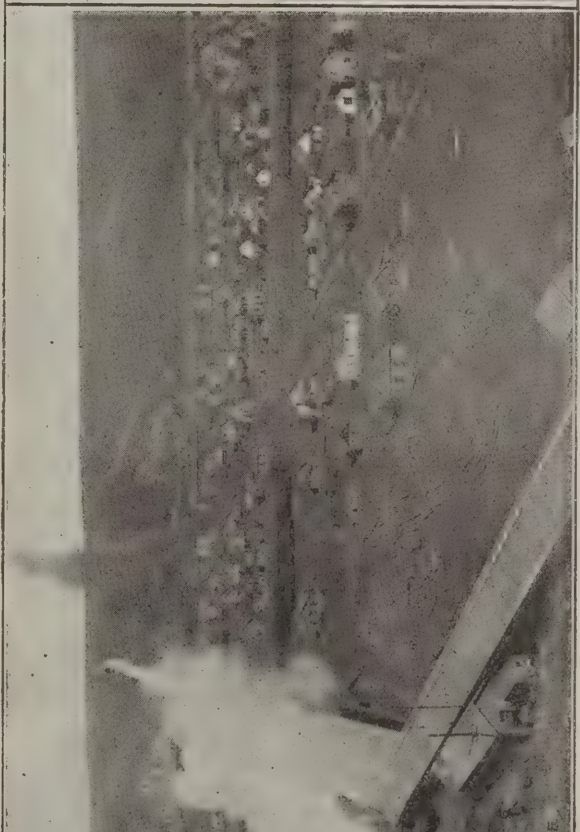
Runaway Locomotive, Sunnyside, Utah

The Fox Run Tipple, St. Charles, Ky.

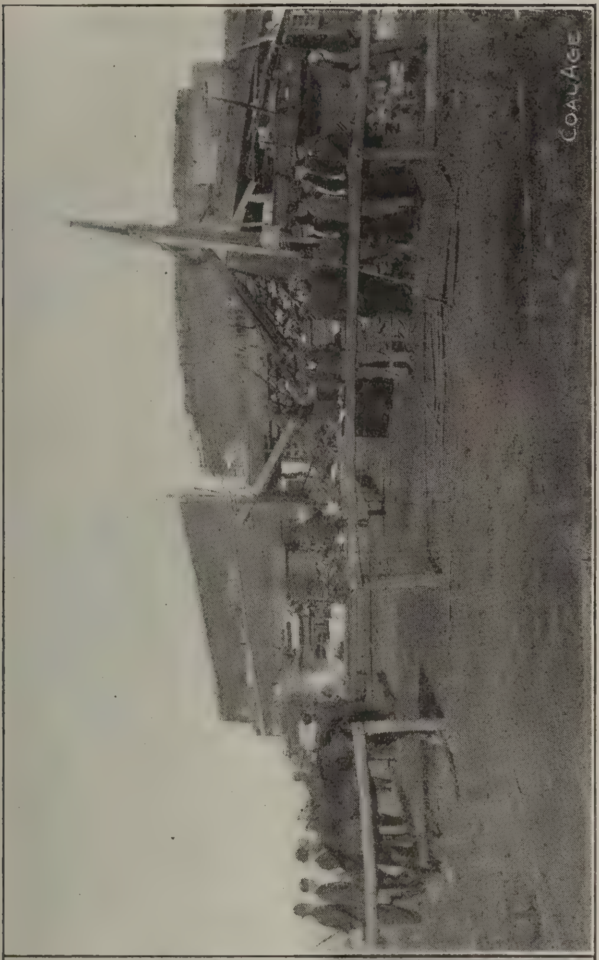


Mines Nos. 14 and 15 at Croweburg, Kan.

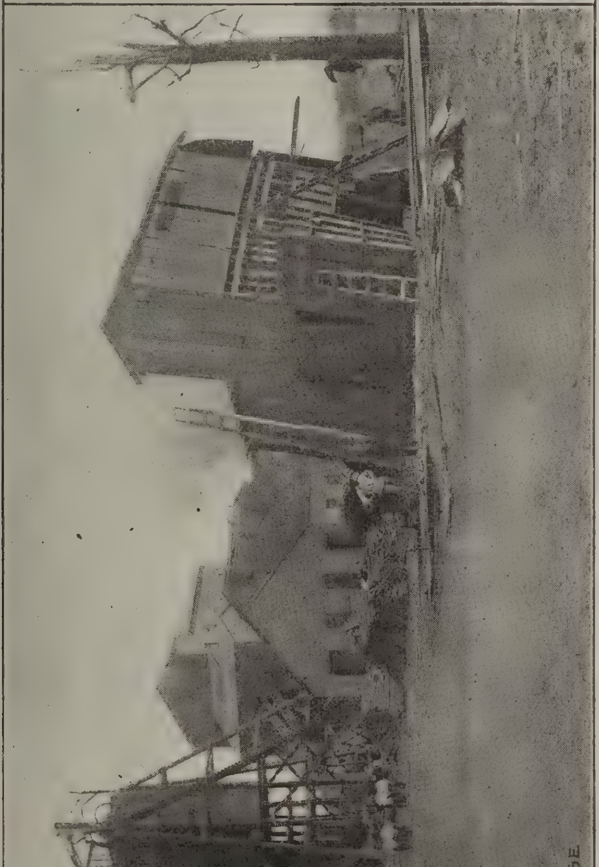
Showing Croweburg, Kan., from Reservoir Hill



Birdseye View, Looking East, Red Lodge, Mont.



What Remained of Company Store at No. 3 Mine



Mine No. 1, Bush, Kan., after Cyclone Passed

Some Notes on Briquetting Methods

By C. L. Edholm*

SYNOPSIS—A few remarks on some of the results obtained in briquetting. The possibilities of briquetting are touched upon and some interesting photos given.

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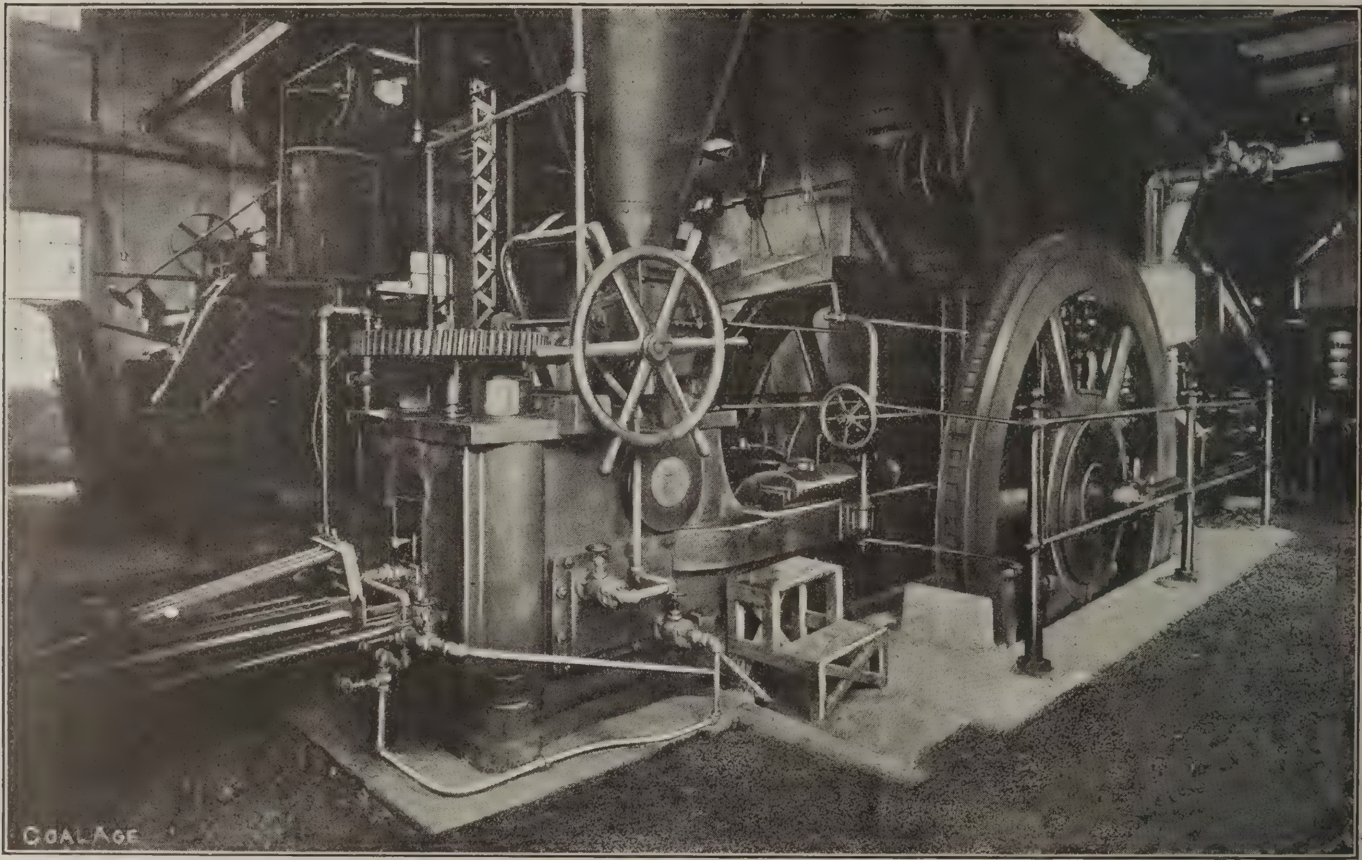
The low-grade Western lignites have only one redeeming quality—they are unusually cheap, having a value per ton at the mine of 90c. in Texas, $1.45 in North Dakota and $2.46 in California. Furthermore, there are enormous supplies of them, 150,000 square miles or so of our Western states contain deposits of lignite and the government owns millions of acres of such lands, probably because no one cared enough for them to take them up.



General View of German Briquetting Apparatus Showing Presses

With the advancing cost of high-grade coal the Bureau of Mines has turned its attention to the possibilities of this inferior product and the results have been highly satisfactory. Not only was a furnace developed on one of the Western reclamation projects which solved the problem of burning the lignite as it came from the mine, but experiments were made with foreign and American briquetting machines; these show that lignite can be compressed into excellent fuel, in some cases without the addition of a binding element to make the particles cohere. Where a binder is required, it has been found that sulphite-pitch, a product of the waste of paper mills, can be utilized to good advantage; this is a profitable discovery, inasmuch as the disposing of this waste material has been a serious problem in the past.

Briquettes have various advantages over the lignite as it is mined. By the drying, which is one of the processes of manufacturing, the heating qualities are tremendously increased. The elimination of moisture also makes for economy, in that the shipper does not have to pay for transporting so much useless water. The briquettes have been tested for both exposure to the weather and the rough handling, by dropping and revolving in a tumbler to show that they will stand transportation and storage.

Another advantage for household use is that the briquettes develop no offensive gases in burning, whereas the lignite has an unpleasant odor. They burn brightly with a yellow flame and the smoke is not black, like that of bituminous coal, but thin and yellowish. For many years such briquettes have been in use in Germany and the comparative cleanliness of Berlin and other German cities is ascribed partly to the use of this fuel.

The German and English Machines

A German briquetting machine and one of English make have been installed at the experimental station of the Bureau of Mines at Pittsburgh. Carloads of lignite from various parts of the country were shipped in and tested separately with widely differing results, but with a satisfactory average. It was found that lignite from each of the various states from which samples were received could be compressed into briquettes without the use of a binding material; but the manufacture of briquettes with

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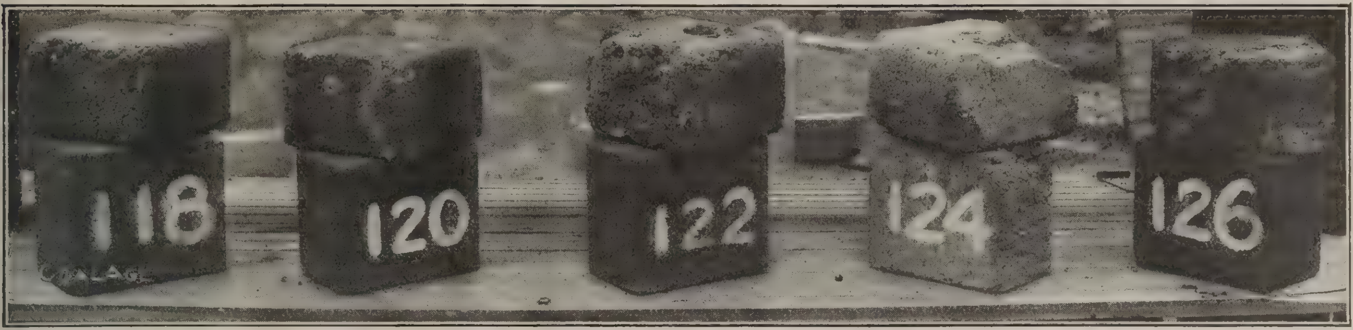
*4624 Figueroa St., Los Angeles, Calif.



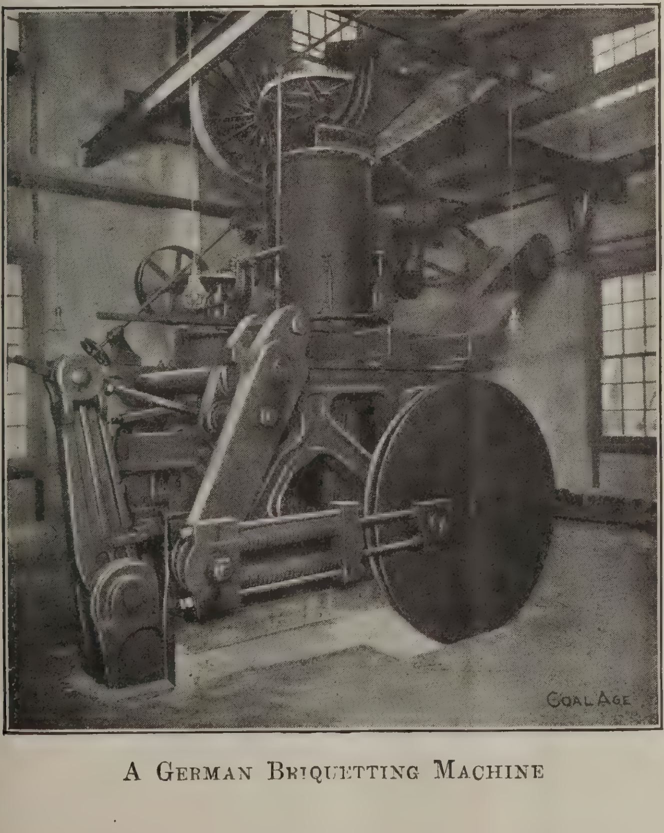
Samples of Briquettes, Showing Effects of Weathering on Different Types

an addition of binding material, such as sulphide-pitch, coal-tar pitch, water-gas pitch, and some form of starch offered encouraging possibilities for further experiments.

The English machine was used for making briquettes with the addition of a binder, while the German apparatus was adapted for those made without such binding material. In addition to the experiments made at Pittsburgh, tests were made with a privately owned briquetting machine, of American make, operated by a fuel company in Indianapolis; the fact was here demonstrated that briquettes of good quality could be made of American lignite with a machine designed and constructed in this country.

Variously shaped briquettes are produced by the different machines, cylindrical, brick-shaped with rounded ends, and cubical, and they range in weight from one to three pounds. The surface is smooth and the best of them do not lose their glossy finish and sharp edges after exposure to the weather, although this varies greatly with the different fuels used. Combustion tests were made in a range and a heating grate with satisfactory results.

The cost of the manufacture of briquettes (in addition to cost of lignite) is estimated at from $1 to $1.72 per ton, according to the local conditions, cost of labor, etc., in the various states where lignite is mined. The cost of installation is placed at $56,000 for the German plant and between $18,000 and $19,000 for the English plant, the former producing 25 tons of lignite briquettes in a 10-hour day while the latter has a capacity of 38 tons in the same time.



A German Briquetting Machine

American Coal in Sweden

There is great opportunity for American coal in Sweden, according to the Daily Consular and Trade Reports. The only difficulty to be solved is the question of freight. The shortcomings in this respect may be said to be all our own for the reason that we have no ships; and what is true of the coal situation is true in many other branches of trade.

Sweden imports something like $16,000,000 worth of coal annually, chiefly from England. American coal producers could have half of this trade if they could free themselves from English domination in the question of tonnage. The chief obstacle that American coal merchants have to contend with today in shipping coal to Mediterranean countries and to South America is not the price or quality of the fuel, but purely and simply the ability of English ship owners to raise or cut the price of coal freight at will, or as suits their purpose in controlling these markets.

How much more difficult is it therefore to pass by England to the Swedish market? Sweden is dependent at present upon England for coal, at the same time the country's state railways and industries are entirely at the mercy of strikes in England, which fluctuate the market and even jeopardize many manufacturing plants by threatening coal famines. Swedish manufacturers would gladly free themselves from such conditions by importing American coal if they were able to do so.

Coal in North Manchuria

The only coal mine in operation in North Manchuria, according to the Daily Consular Report, is located at Djalainor, near Manchouli. It is owned by the Chinese Eastery Ry. and leased to a Harbin capitalist under agreement to supply coal to the Chinese Eastern Ry. at 70.8c. per ton, and to the Trans-Baikal Ry. at $2.266 per ton, delivered to Manchouli.

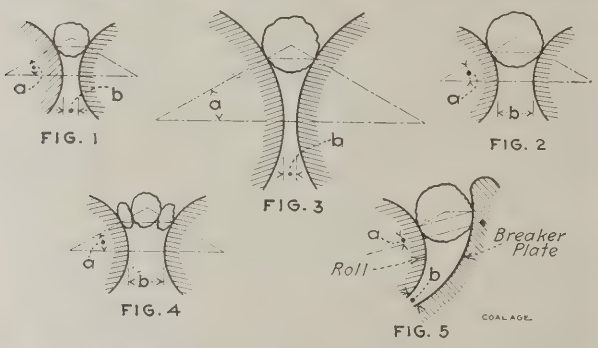
During 1912, the Chinese Eastern Ry. took 142,880 tons, amounting to $101,159, and the Trans-Baikal Ry. 35,720 tons, at $80,942. The sales of coal from the Japanese mines in Fusan have greatly increased during 1912, the principal consumer being the Chinese Eastern Ry.

A New Single-Roll Crusher

A patent was recently issued to the Jeffrey Mfg. Co., of Columbus, Ohio, for a new type of single-roll crusher. This promises to be of considerable value to coal producers, since it embodies a practical machine capable of reducing run-of-mine coal to stoker size in a single operation.

The double-roll crusher, heretofore generally used for such work, is limited in its scope by the following considerations. Fig. 1 shows a pair of smooth rolls acting on a lump of material lying between them. Such rolls will not pinch the lump unless the angle *a* becomes less than the angle of repose of the material. Roughening the surface of the rolls, or providing them with tooth projections, will, of course, increase the angle of repose, and hence enable the rolls to grip larger pieces than would be otherwise possible.

Fig. 2 shows how, with the same rolls, larger pieces may be handled by simply placing the rolls farther apart. This, however, leaves a larger gap between them, and hence the product will contain larger pieces.



The Action of Double-Roll and the New Single-Roll Crusher

Fig. 3 illustrates how, by increasing the diameter of the rolls, larger pieces of material may be handled without increasing the gap. The rolls here shown would handle as large pieces as those in Fig. 2, and reduce them to the same size as those shown in Fig. 1. For hard, tough coals, like Indiana block, the gap must be brought down to the size desired in the product. For soft, friable coals, like Pocahontas, a slight pressure on the side of the lump will result in reducing it to small pieces.

Fig. 4 shows how two or three pieces of such coal may become wedged in a wide gap, and all be properly reduced. Consequently, crushers handling very soft coal may be run with a wider gap, and will have a correspondingly greater capacity than will obtain with the same crusher operating upon a tougher material.

Fig. 5 shows how the new single-roll crusher with concave breaker plate is able to diminish the pressure angle, and thus reduce the larger lumps to a smaller size than would be possible with any two-roll crusher.

The face of the drum is covered by renewable iron segments. Fig. 6 shows these segments to be covered with a system of tooth projections of three different sizes and shapes, whose office will be readily understood. If the breaker plate is so set that the gap between it and the drum be of a certain width, it is evident that all coal passing through this gap must be reduced in one of its dimensions to this size. The coal, however, may come through in large slabs of this thickness.

Teeth Are Required on the Drum

The friction of the coal on the breaker plate will be more than the traction of the drum, hence the numerous hook teeth shown in Fig. 6. These teeth should be far enough apart to engage the coal between them, and must not extend radially from the drum farther than the width of the gap. Spaces exist roughly in the form of squares inclosed between the various teeth, which will contain slabs of coal not thicker than the gap. In order to break these slabs up pyramidal teeth are placed in the center of the squares formed by the hook teeth. We now have a combination of projections that will reduce whatever may pass through the machine to a product not larger than the gap.

The retarding action of the breaker plate is, however, so great that the machine will not readily grip large pieces. Hence a set of large thin hook teeth are placed at intervals around the drum, and narrow grooves are cut in the breaker-plate shoe to clear them. These serve the purpose of engaging the larger pieces and breaking them up, or forcing them through the machine without passing any material which has not been reduced to the required size.

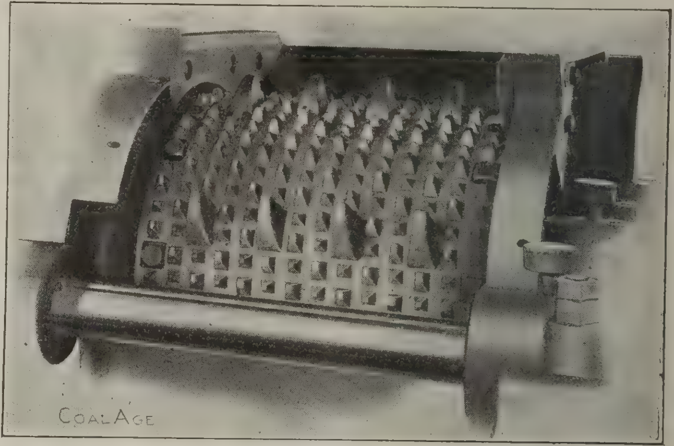


Fig. 6. Arrangement of Teeth upon Roll

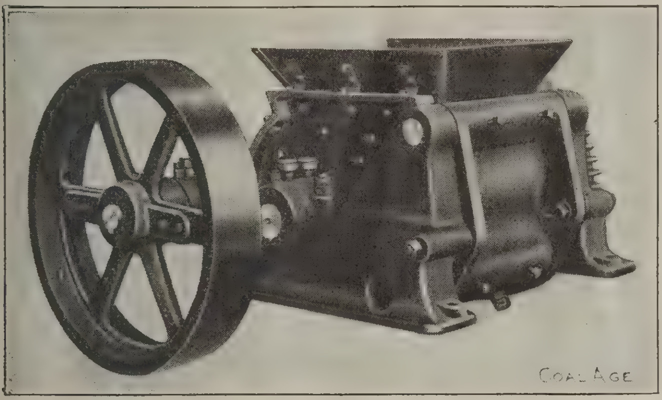
The degree of reduction to be had with any size of this crusher depends in a great measure on the adjustment of the breaker plate. This is also affected, however, by the character of the coal. A soft, friable coal will, under similar conditions, split into smaller pieces than harder and tougher varieties.

The capacity of these crushers depends on the size of the product, the speed of drum rotation, and the friability of the material. The power required to operate when making a fine reduction will vary with the kind and condition of the coal reduced, but will average about one-third horsepower per ton per hour. These machines are manufactured in three standard sizes, namely, 30x30 in., 24x24 in., and 18x18 in. The larger size will handle any coal up to 20-in. cubes, while the smaller takes lumps up to 8 in. They are primarily built for belting to an electric motor, and this appears to make the most desirable installation whenever possible. The heavy band-wheel carries the machine over the peak loads and makes a smooth, quiet-running equipment. When desired, however, a geared-motor drive is substituted for the pulley and belt, with quite a saving in room where space is valuable.

Each machine is provided with a self-contained countershaft, which drives the roll through a pair of heavy gears, thus giving so heavy a starting torque that it may readily be put in motion even when the machine is full of coal. In many cases this is a great advantage, as coal may be received directly from a large hopper or bin without any auxiliary feeder.

An Efficient Safety Device

The belt wheel is not keyed directly to the countershaft, but drives it through a hub, over which it is fitted. This hub has a pair of radial arms, so attached to the arms of the band wheel, that a system of wooden pins serve to make the driving connection between the two. When any undue strain comes upon the drive, as by a piece of steel or other foreign material getting into the throat of the machine, these wooden pins shear off, and thus prevent injury to the more important parts of the mechanism.



General View of Crusher

The breaker plate is heavy, and is lined with a hard iron renewable shoe. It swings on a top pivot, and is held up to its adjustment by steel tension rods. The nuts for this adjustment are conveniently located and accessible at all times, and the adjustment for position of the breaker plate may hence be varied if desired, even while the machine is in motion. The springs under the adjusting nuts are heavy enough to resist the action of the crusher when doing ordinary work, but sufficiently elastic to allow the breaker plate to give way slightly when abnormal strains come upon it. This allows the stress to come gradually upon the wooden safety pins until the load is more than they can stand, when they give way.

Throughout the design and construction of these machines durability and accessibility have been considered constantly of prime importance. All parts have been so constructed that they will not only wear well, but may be easily and quickly replaced, should occasion such as the failure of a plate or segment, demand their renewal.

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The quantity of air circulating in a mine should be measured at the foot of the downcast or at the main intake and, also, at the foot of the upcast or in the main return, at least once each week, and the quantity recorded in the mine-report book. The quantity of air passing in the last crosscut, in each split, should also be measured, so as to ascertain that a sufficient quantity of the air reaches the men.

Transporting Coal through Pipe Lines

The method of transporting coal by water pressure through a pipe has been suggested by E. G. Bell, engineer for the Hammersmith Electricity Works of London. By this method from 30 to 60 tons of coal per hour can, it is claimed, be forced through an 8-in. pipe leading from the Thames and under Chancellors' Road to the yard of the power plant on Fulham Palace Road, a distance of 600 yards.

If the scheme is adopted, a large mixing tank will be erected beside the wharf. The coal will be lifted from the barge by a mechanical grab, and after passing through an automatic weighing machine, it will be filtered into the mixing tank, which will contain approximately 15 per cent. of coal and 85 per cent. of water. A powerful electrically driven pump will then force the mixture of coal and water at high velocity through the transmission tube to a reception tank at the works.

The coal will sink to the bottom of this tank and another pump will drive the water through a return pipe to the mixing tank. Another grab will lift the coal out of the reception tank into the storage yard.

Although the initial cost of such a plant might be high, it is believed that it would eventually be a paying investment, since the present cost of transportation is approximately 14c. per ton, or somewhat over $3500 for the 25,000 tons which are used annually.

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Coal Consumption of the Iron Industry

The production of pig iron by means of bituminous coal and coke amounted in the first half of 1913 to 16,075,264 tons or 97½% of the total, according to the American Iron & Steel Institute. The amount of mixed anthracite and coke iron was 225,665 tons. The production with anthracite coal alone was 11,491 tons, and the production with charcoal was 176,182 tons, including a small quantity made with charcoal and electricity.

The production of iron by the various fuels for whole years since 1877, in which year the total production first exceeded 2,000,000 tons, is herewith shown.

	Anthracite	Charcoal	Bituminous and Coke	Total
1877	834,640	283,789	948,165	2,066,594
1878	975,777	261,963	1,063,475	2,301,215
1879	1,136,629	320,422	1,284,802	2,741,853
1880	1,613,974	479,963	1,741,254	3,835,191
1881	1,548,627	570,391	2,025,236	4,144,254
1882	1,823,338	623,130	2,176,855	4,623,323
1883	1,683,568	510,469	2,401,473	4,595,510
1884	1,416,476	409,301	[illegible],272,091	4,097,868
1885	1,298,562	357,004	2,388,960	4,044,525
1886	1,874,640	410,319	3,398,370	5,683,329
1887	2,087,847	516,234	3,813,067	6,417,148
1888	1,719,401	534,633	4,235,704	6,489,748
1889	1,714,602	575,268	5,313,772	7,603,642
1890	2,186,411	628,145	6,388,147	9,202,703
1891	1,866,108	576,864	5,836,798	8,279,870
1892	1,797,113	537,621	6,822,266	9,157,000
1893	1,347,529	386,789	5,390,184	7,124,502
1894	914,742	222,422	5,529,224	6,657,388
1895	1,270,899	225,341	7,950,068	9,446,308
1896	1,146,412	310,244	7,166,471	8,623,127
1897	932,777	255,211	8,464,692	9,652,680
1898	1,203,273	296,750	10,273,911	11,773,934
1899	1,599,552	284,766	11,736,385	13,620,703
1900	1,677,048	384,482	11,727,712	13,789,242
1901	1,712,527	383,441	13,782,386	15,878,354
1902	1,115,247	390,169	16,315,891	17,821,307
1903	1,911,347	505,684	15,592,221	18,009,252
1904	1,228,140	337,529	14,931,364	16,497,033
1905	1,674,515	352,928	29,964,937	22,992,380
1906	1,560,586	433,007	23,313,498	25,307,191
1907	1,371,554	437,397	23,972,410	25,781,361
1908	355,009	249,146	15,331,863	15,936,018
1909	698,431	376,003	24,721,037	25,795,471
1910	649,082	396,507	26,257,978	27,303,567
1911	229,575	278,676	23,141,296	23,649,547
1912	247,179	347,025	29,132,733	29,726,937

Twelfth International Geological Congress

By Phillips Thompson*

SYNOPSIS—The congress has signalized its Toronto meeting by the publication of a monumental book on the Coal Resources of the World. This monograph contains the cheering information that there are seven trillion tons of coal awaiting the miner. The delegates seemed to think that the chemists should no longer be allowed to classify coals but that such fuels should be examined microscopically in order to determine their petrographic characters for the purposes of classification.

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The Twelfth International Geological Congress began its sessions on Thursday, Aug. 7, in the Convocation Hall of the University of Toronto, Toronto, Can. About 500 delegates, speaking 25 different languages and coming from all parts of the world, were in attendance. The formal opening meeting was held at noon. Sir Charles Fitzpatrick, administrator of the Canadian government in the absence of the Duke of Connaught, welcomed the delegates on behalf of the government. In his address, which he delivered in French, he called the attention of his auditors to the many features of special geological interest in Canada, including the Laurentian plateau, the nickel, silver and gold deposits of Ontario, and the extensive coal beds of Saskatchewan and Alberta. Addresses of welcome were also delivered by A. W. Hearst, Ontario Minister of Mines, Controller Thomas Church, representing the city of Toronto; and President Falconer, of the University.

The newly elected president of the Congress, Dr. Frank D. Adams, of McGill University, Montreal, then took the chair and briefly thanked the Congress for the honor conferred upon him. R. W. Brock, of the Canadian Geological Survey, addressed the Congress, stating that the Executive Committee had arranged excursions so that the delegates might have the opportunity to visit localities of special geological interest. The excursion routes arranged covered a total distance of 20,000 miles. Dr. Emil Tietze, of Austria, replied on behalf of the delegates.

An Encyclopedic Record of Coal Reserves

At the afternoon sitting, over which T. Tschernyschen, director of the Russian Geological Survey, presided, R. W. Brock formally presented to the Congress the elaborate monograph on the "Coal Resources of the World," the result of an investigation made on the initiative of the Congress. It is intended to form a companion work to the "Iron Ore Resources of the World," published under the auspices of the Eleventh Congress, and consists of three quarto volumes, containing in all 1360 pages, illustrated by upward of 175 maps and figures and accompanied by a 68-page atlas of maps, colored so as to show geologic features.

The preparing and publication of the monograph was entrusted by the Executive Committee to a Coal Resources Committee, consisting of G. G. S. Lindsey, Convenor; F. D. Adams, R. W. Brock, D. B. Dowling, Charles Fergie, James McEvoy, J. B. Porter and William McInnes, and the actual editing was done by William McInnes, D. B. Dowling and W. W. Leach, of the Geological Survey.

In the main body of the monograph, reports on 64 countries are included, some of which contain over 100 pages. The greater number of the reports are in English; ten are in French and six in German. In the "summary," which appears in the first volume, all the reports are reviewed by the editors, in English.

Coal Classification

Owing to the lack of uniformity in the usage of the different countries of the world in regard to the commercial classification of coals into anthracite, bituminous coal and lignite, it was found necessary to adopt an arbitrary classification which might be used by all and thus make the results more easily comparable. The Coal Resources Committee drew up a scheme of classification, dividing the coals into A, B, C and D groups, with various subdivisions, based mainly on composition and heating value. In this scheme A roughly corresponds to anthracite, B and C to bituminous coal and D to subbituminous coal, brown coal and lignite.

With few exceptions, the reports submitted conform to the classification prescribed as they do also to the other requirements regarding the depths to which computations were to be carried and the division of the reserves into actual, probable and possible reserve, though in some cases the information at hand has not been full enough to warrant strict compliance with the specified form on all these points.

The Geological Range of Coal Beds

In the introduction, Mr. Dowling summarizes the results, dealing first with the distribution of coal in the various geological series. The range of important fields in the Paleozoic extends from Lower Carboniferous, in the case of the fields of Central Russia, Scotland and the Arctic Islands through Upper Carboniferous, to which the large deposits of Western Europe and Eastern America appertain, to Permo-Carboniferous, in which are embraced most of the very extensive fields of China, India and Australia. The Mesozoic, though not so widely spread, contains important coal basins in Europe, Western America and Asia. The Tertiary contains deposits of importance in most parts of the world, including fields in Central and Western Europe, in Japan, in New Zealand and throughout the great plains region of North America.

Seven Trillion Tons of Coal

The total reserves of the world, compiled from all the reports received, amount to 7,397,533 million tons, of which nearly 4,000,000 millions are bituminous coals, nearly 3,000,000 millions are brown coals of various grades and nearly 500,000 millions are anthracite coals. Of the latter, Asia, which includes the great Chinese coal fields, has by far the largest supply of any of the great continental divisions, furnishing 407,637 million tons; in bituminous coals America, with 271,080 million tons, leads by a great margin, as she does also in the various grades of brown coals. The world's production of coal for the year 1910 was about 1145 million tons, so that, though much must be allowed for loss in mining, and for areas that for various reasons cannot be economically mined, there still remain many hundreds of

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*Box 497, Oakville, Ont.

years before the exhaustion of the supply will occur. Taking up the individual countries, however, it is found that in more than one case the end is in sight.

CHEMIST VERSUS PETROGRAPHER

An interesting discussion followed the presentation of the monograph. J. M. Gordon, of Montreal, objected to the method of classification of coal adopted in its preparation. He urged that there was no certain significance in the relation between fixed carbons and volatile matter. Many attempts had, he said, been made to classify coal, but there is no classification today that can be said to have any degree of accuracy. The classification by length of flame was only comparative. No division into classes by chemical analysis was possible, and the quality of coal could only be determined with a microscope.

A. Defline, of Paris, gave a paper setting forth in detail the coal resources of France. Professor Krusch, of Germany, read a paper prepared by Mr. Bokar, upon the subject of classification. The writer maintained that an ideal division into classes was not possible, because enough was not known about the genesis of coal and the chemical changes through which the original vegetation passed after deposition.

A. E. Kitson, of the West African Gold Coast Survey, gave an interesting description of the brown-coal deposits of Victoria, which attain the extraordinary thickness of from 808 to 1110 ft. He was disposed to agree with Mr. Gordon as to the unreliability of present methods of classifying coal as the character of the fuel depends largely on its origin. The Congress disbanded on Aug. 14.

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The Illinois Mining Board

The following resolutions were passed at a recent meeting of the Illinois State Mining Board, held at Springfield, as a tribute of high esteem and respect for the former president of the board, Richard Newsam, who died Aug. 5, 1913:

Whereas, it has pleased an allwise Creator to remove from our midst Richard Newsam, who for a number of years was the president of the State Mining Board; and

Whereas, by his ability and honesty the stand and efficiency of the State Mining Board and state mine inspection service has been raised until we are second to no similar board in the United States of America; and

Whereas, the deceased, by his wide knowledge of mining matters, practical and theoretical, and his aptness and ability in imparting such knowledge to all who were seeking the same, was a valued and competent presiding officer of the State Mining Board; therefore be it

Resolved, that we pay a just and fitting tribute to his ability and memory when we mourn for him as one in every way worthy of our respect and esteem.

Resolved, that we sincerely condole with the widow and family of the deceased, and commend them to the keeping of Him who looks with tenderness on the widow and fatherless.

Resolved, that these resolutions be spread on the records of the State Mining Board, and that copies of the same be forwarded to the widow of our late friend, to the newspapers and mining journals of the state, and that the same be made a part of the thirty-second annual coal report.

STATE MINING BOARD:
Evan D. John, Actg. Pres.
Martin H. Linskey, H. E.
S. M. Duggan, Secy.
Wm. Spenny, Member.
Martin Bolt, Chief Clerk.

STATE INSPECTORS OF MINES.

Hector McAllister,	1st	Dist.
Thomas Hudson	2d	“
John Dunlop,	3d	“
James Taylor,	4th	“
W. S. Burris,	5th	“
Thomas P. Back,	6th	“
W. W. Williams,	7th	“
W. L. Morgan,	8th	“
Walton Rutledge,	9th	“
Thomas Little,	10th	“
Frank Rosbottom,	11th	“
J. W. Fairbairn,	12th	“

A Mining Class

One of the most practical examples of the effective instruction given by many mine foremen to their employees, is that of Foreman Evan W. Evans, mine foreman of the Capouse Colliery, of the Scranton Coal Co. Mr. Evans was formerly (1896) one of the brightest students in the Y. M. C. A. mining class, taught by J. T. Beard, at Scranton, Penn. Since that time, Mr. Evans has continued his mining studies and has performed many practical experiments in the application of theory and principles to mining practice. He has prepared and read many interesting papers on subjects of mining.

We are glad to be able to reproduce here a recent photograph of a mining class, organized and conducted by Mr. Evans, as an evening school. For two years this class was conducted at the Evans home, until its increasing numbers required larger accommodations. Through the generosity of the School Board, permission was obtained to hold the class twice a week in one of the classrooms of No. 18 school. This class is attended by earnest, hard-working mining men, who are making every effort to better their own conditions and secure greater safety in the mines, for themselves and their fellow workers, by increasing their knowledge of mining principles and conditions. The regular attendance upon the sessions and the work performed by the class show the appreciation of the men for the disinterested efforts of their foreman, who receives no pay for his services other than the hearty good will of the men.

THE EVANS MINING CLASS

The members of the class represent all grades of workers in and about the mines, including hoisting engineers, firebosses, "nippers," timbermen, tracklayers and miners. Their ages range from 25 to 50 years. One of the practical features of the class is the illustration of the principles taught by practical experiment. The example of this faithful mine foreman is worthy of emulation by others who are capable and in a position to give instruction to mine workers, along similar lines. The class and its conductor have the best wishes of COAL AGE for the success of their efforts.

POWER DEPARTMENT

Purchase of Electrical Apparatus

By Henry D. Jackson*

SYNOPSIS—Simple suggestions are here given concerning the details of construction and installation of electrical machines and switchboards. The selection and placing of indicating instruments receive particular attention.

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In purchasing alternating-current generators, it is advisable to examine carefully all constructional details, particularly with reference to the methods of insulation and the windings of fields and rotors, as well as the manner of applying the exciting current. The windings of the rotors are especially important with direct reference to the ease of repair and the means of fastening the coils in place in the slots, as well as securing their ends against the effects of short-circuit. The field coils should be examined for methods of fastening in place to prevent the possibility of movement and also with regard to ease of replacement.

The flywheel effect on alternating-current machinery is of considerable importance, particularly when it is necessary to operate generators in parallel, as the combined flywheel effect of engine and generator must be large in order to insure a constant turning moment. It is advisable that the turning moment of all machines should be practically the same, so that there will be no interchange of current between them when they are operated in parallel.

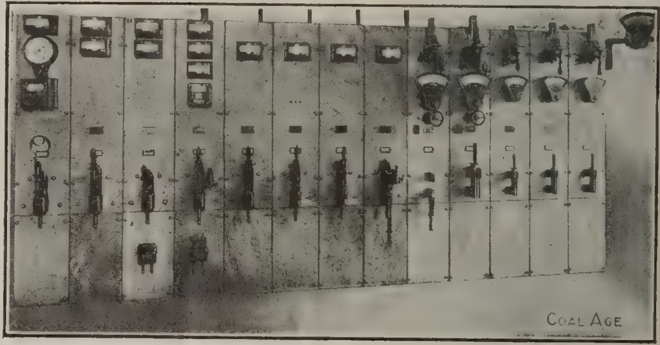
In most mine work it is not advisable to have a generator of inherently good regulation, in fact, it is better to have one of rather poor regulation, because in case of short-circuit, the machines, having a high self-induction, will prevent current reaching any excessive value. If good voltage regulation is absolutely necessary or desirable, this can be obtained through the use of a Tirrell or some other regulator.

Temperature guarantees are of extreme importance, and figures should be obtained at unity, at 80 per cent. and at or about the power factor at which the plant may be expected to operate. This figure in many cases is low. There is, however, no reason why, with a proper design of the plant—by which is meant the entire outfit, generators, motors, rotary converters, etc—the power factor should be low; and for the best interests of the owners, care should be taken to keep this figure as high as possible in order to get maximum output from both engines and generators, and thus decrease the operating costs of the plant.

Twenty-Five Cycles Is Best for Mine Work

For mine work, a frequency of 25 cycles is to be recommended, principally owing to the greater stability of the rotaries and synchronous motors at this frequency, particularly if the former supply direct current at over 500 volts. The usual practice calls for three-phase transmission, and this is for general purposes by far the best. There are plants at present installed using quarter-phase, but as the amount of copper used by the transmission line is thereby considerably increased without any compensating gain, it is not to be advised.

Attention has already been called to the fact that for voltages up to 13,200 it is probably as satisfactory to purchase generators which will produce this voltage direct, as it is to use lower-voltage generators and step-up for the line. Machines of this character are perfectly reliable; and by purchasing them one will be relieved of the necessity for the use of step-up transformers with their additional cost. Above this voltage, however, owing to the increased cost of construction, it is probably better to buy generators which will give a lower voltage, and step-up through transformers to the potential of the line.



A Well Designed Switchboard

The voltage at which to generate would depend upon a number of considerations; but is is usually kept low enough so that it may be carried direct to the board, if desired, without danger. It may be noted here that in case it is desired to run the generators in parallel, the engines should be provided with a device operating on the governor, by which their speed of rotation can be controlled.

This device is used for paralleling the machines and also for their control when it is desired to divide the load between them and to drop one out of service, since the generators of this character do not divide their load in proportion to the voltage generated but in proportion to the power delivered by the prime mover. This condition has not infrequently been lost sight of and has been the cause of considerable difficulty in operating generators satisfactorily in parallel. For the same reason it is advisable to watch closely the type of engines purchased, in order to see that they too operate with reasonable uniformity.

The above outline will show the necessity for a thorough knowledge of the strength of materials, the conditions of operation, and the features of design both of the engines and generators, in order to be certain that

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*88 Broad St., Boston, Mass.

the best types of both are selected for mine service. In purchasing motors or rotary converters, the same general characteristics have to be taken into account as in buying any other A.-C. apparatus, the principal features being a careful examination of the materials and methods of construction, and the ease of repair.

Material and Arrangement of the Switchboard

The switchboard may be of slate or marble, depending upon the voltage employed, and also whether or not it is desired to make a "show" plant. For all practical purposes with voltages up to 500 or 600, a well selected slate board is quite as good as marble, and has the advantage of being considerably cheaper and far easier to keep neat. Above this voltage, owing to the possibilities of metallic veins in the slate, marble is to be preferred.

For the best results and for ease in adding future sections, the slate or marble should be supported on pipe framework, as this is cheaper, stronger and more readily handled than angle iron. In laying out the switchboard, it is usually advisable to figure on the future, because it is necessary for the best results in operation that the panels of similar character should be bunched together, that is to say, generator panels should all be in one line, the exciter panels in another, and the line panels in another, each set complete in itself, making, however, one continuous switchboard.

This can be secured by leaving blank places for future generator and line panels, and installing the exciter panels at one end of the board and the line panels at the other, leaving those for generators between. If it is desired, as it frequently is, for purposes of record, to have a totality panel or one on which all the power generated can be recorded, this can readily be inserted between the generator and line, and upon this panel can be installed, if desired, the power-factor meter, frequency indicator and synchronizing device.

With direct-current switchboards, the same reasoning holds true. For best results in operation, the generators should be bunched on one end of the board, and the line bunched on the other end, here again using, if desired, a totality panel between the two.

In direct-current work, owing to the fact that the main leads are usually carried direct to the board, it is more or less frequently necessary to work behind it, and consequently sufficient room should be left for easy working with the necessary tools, without danger. This means that the board should be at least 2 ft. and preferably 4 ft. from the wall.

The Instruments Required

The instruments required on a direct-current board depend upon the information which may be desired; but in general it may be stated that an ammeter is all that is necessary for the generator panel, provided that a voltmeter is so located as to be available for this generator and future installations. It is, however, not unwise to install a voltmeter and an ammeter on each generator panel, arranging the voltmeter so that it can be plugged to the generator, and another instrument on a swinging bracket which will show at all times the voltage on the main bus. In this way there is always a voltmeter showing the condition of the line and at hand another which will show the voltage on the generator as it is being built up ready to be put into service. This will enable the machine to be put into service promptly and accurately without any unnecessary plugging. It will also serve to prevent the throwing on to the line of a generator, in case the machine happens to be reversed by any accident. This is only true, however, in case the voltmeter used is one having a marked polarity, so that there is no danger of its indicating the voltage in case the machine happens to be reversed, as would be the case if the voltmeter were of the solenoid type. Where a single generator is used, the recording wattmeter, if one is installed, should be placed upon the generator panel.

Other Instruments Are also Advantageous

Another instrument which frequently serves a good purpose is a ground detector, as this will enable one at any time to discover whether or not the line is grounded. In mine work it is not infrequent to find grounds which, while not being excessive, might still be the cause of considerable leakage and, therefore, lost power which may eventually cause a station blowout with more or less disastrous results.

Another device of value is a switch whereby a voltmeter may be connected to various points upon the system, enabling the operator at the station to determine at any time the condition of the transmission line as to whether or not the drop over it is too great for successful operation of the machinery. If this voltmeter is connected at times of heavy load to various sections, the condition of the line can be readily obtained accurately without calling in outside assistance, and may serve to prevent considerable trouble with the mining machinery. It will also obviate the necessity for sending men into the mine for making these tests, which, while giving an indication, are by no means satisfactory owing to the possibility of the readings being taken at different intervals.

It is neither wise, nor good practice, to rely upon inferior instruments on the switchboard. They may be cheap in first cost, but are usually expensive in the end, first, because they are not accurate, and second, because the current required to operate them will in less than a year frequently cost much more than the interest charges on the difference between their cost and that of better-quality instruments.

Use Switches of Ample Capacity

Each machine should be provided with main switches of ample capacity and also with a switch connecting the equalizer. This latter may or may not be at the board. If the run from the switchboard to the generator is long, it is cheaper and on the whole frequently far more satisfactory in operation to have the equalizing switch at or near the generators, although there are reasons for objecting to this, particularly if the employees about the station are not careful men. The objection is that a three-pole switch on the generator will insure that the equalizer switch be closed when the main line is closed. If, however, the equalizer switch is at the machine, it is not uncommon to find that the operator forgets to close it, with the result that one or both machines may drop out of circuit or that there will be great and sudden fluctuations in voltage at the two machines.

The switches should be of ample capacity for the service. There is frequently a tendency to buy switches having a small copper section, on account of the cost.

A little thought will show that those switches having a small copper section, have a comparatively high resistance. This resistance will cause a loss of power, and this loss over a switch of high resistance as compared to one of low resistance, may be sufficient to much more than pay for the difference in cost of the two switches. Further, the heating may result in melting out the contacts back of the board and shutting down the station. Small switch area also means small contact area, which has a similar effect, and, therefore, it is unwise to attempt to economize along these lines.

Use Two Circuit-Breakers

A circuit-breaker should be installed on both line and generator, though frequently the latter is neglected. if the line breaker is particularly adapted to the service rendered. It is, however, a safety feature well worth keeping in mind, to place these breakers on the generator, as mine loads are greatly fluctuating, "shorts" are not uncommon, the line breaker may "hold over" and on a heavy short the generator, unless protected by a circuit-breaker, may be burned out. Attention should be paid to purchasing breakers whose continuous capacity is sufficient to carry the heaviest steady load which is ever likely to come upon them, and to operate the plant with the breakers set at the highest possible *safe* point. It is cheaper to have the breaker blow than to burn out the machine.

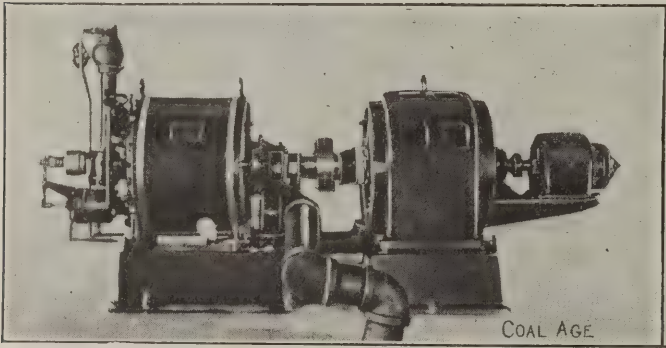

Fig. 1. 15-Kw. Turbo-Generator at Bearcreek, Mont.

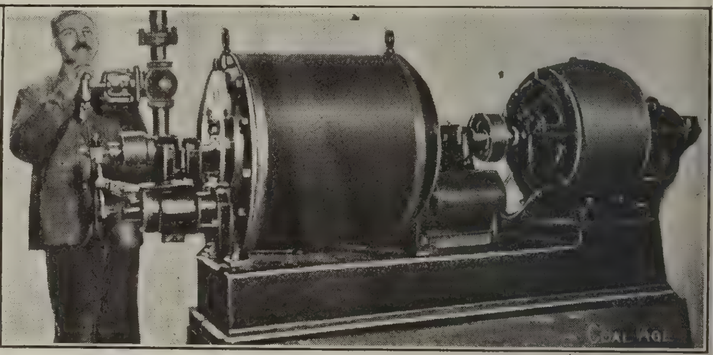

Fig. 2. 35-Kw. Machine at Sunshine, Colo.

In this connection it is worth while to note that a delayed-action circuit-breaker is better than a breaker set to a danger point. Mine overloads and peaks are usually sharp and sudden, but not long lived, and a load may come instantly which is not beyond the capacity of the generator for the time it may be on, but which might readily throw the breaker if it is not provided with some means for delaying the trip. This can be accomplished by the use of dash-pots or other means. Attention to details of this character will insure continuity of operation is cases where the plant would otherwise be shut down temporarily.

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Coal Production of British Columbia

British Columbia stands second among the Canadian provinces in the production of coal, and third in the manufacture of coke. The Coast District produced 1,533,000 tons of coal in 1912, the West Kootenai District, 1,299,000 tons, and the Boundary District, 214,000 tons.

Small Steam Turbines in Coal Mines

Special Correspondence

The increased use of alternating current at collieries has brought the small turbo-generator into considerable prominence. Its compactness, ease of installation and comparative good economy, together with fine running qualities, peculiarly adapts it for the rough service required around coal mines. The accompanying illustration shows two of these small generators.

Fig. 1 is a 15-kw. unit at the Bearcreek Coal Co.'s plant at Bearcreek, Mont. Fig. 2 shows a 35-kw. machine at the Midland Mine, of the Rocky Mountain Fuel Co., at Sunshine, Colo.

In both of these installations the prime movers are Kerr turbines. While the steam consumption of these small machines is not quite as low as that of four-valve or compound engines, their compactness, small installation cost and the fact that a large amount of skilled attendance upon them is unnecessary, is bringing them rapidly into favor.

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Colliery Notes

Great consideration should be given to the valves of an air compressor. Inlet valves should be as large as possible; in practical work they are not more than 15 per cent. of the sectional area of the cylinder. On the other hand the outlet valves should be as small as possible and should open as soon as the required pressure has been reached.

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In mining work, multiple-stage air compression is not of much practical advantage for pressures under 60 lb., but it is increasingly advantageous for higher pressures; in the use of the latter there is a proportionately increased loss from leakage. An additional advantage in stage-compression is gained by intermediate cooling between the cylinders.

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If the initial pressure remains constant while a volume of compressed air is being discharged through a pipe, the loss of pressure is proportional to the length of the pipe. As the air increases, the velocity becomes greater and the friction increases as the square of the velocity. Hence, where compressed air is to be used, large sized pipe is often a matter of economy.

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Unused slack means a waste of from 5 to 50 per cent. of the total output of different mines. Coking slack is easily disposed of. Noncoking, readily caking slack, is good for use under boilers, as it fuses easily and is capable of being burned with but little loss. Medium coking slacks demand specially constructed grates; even then the percentage of waste is higher than when coal is used.

EDITORIALS

The Schaefer Method

In the contest for supremacy between the Sylvester and Schaefer methods of resuscitation, the latter system appears to be winning. The former was adopted by the Red Cross society and was by them engrafted in the rescue service of the Bureau of Mines without the opportunity for extended consideration. At the time there was an immediate demand for action, and deliberation on methods of first aid had to be left to the future.

The Committee on First Aid Methods at the Mine Rescue and First Aid Conference declared that "the Sylvester method of artificial respiration is preferable, provided that no injury to the person to be resuscitated prohibits its use." Evidently the Schaefer method obtained at least a foothold by this declaration of faith. For if the Sylvester system is not always applicable, some alternative treatment will have to be taught, though none except the pulmotor method can be applied alike to all the cases which are amenable to treatment.

The advantages of the Schaefer treatment over the Sylvester are: (1) It is easier to learn; (2) it can be performed by a boy or an adult for an unlimited time without exhaustion; (3) it supplies more "tidal air"; (4) it places the victim so that his tongue naturally falls from the back of his mouth; (5) it enables secretions, excessive or otherwise, and leaking serum to pass away by gravity so that the patient does not need to be rolled in order to prevent him from drowning in his own secretions; (6) it is available even when the muscles of the arms are contracted tetanically; (7) it does not put the man in an unnatural position so as to cause an increase in hemorrhages in the brain and cord.

Against these arguments the advocates of Sylvester's method urge that the face of the victim is apt to be plunged in the mud and some declare, we think wrongly, that the ribs of the patient may be broken by the pressure.

The reasons we have given for preferring the Schaefer method are those urged by Dr. Charles A. Lauffer in his "Electrical Injuries," but we think he has omitted one argument which his lack of knowledge of mining methods has caused him to overlook.

The Sylvester method is a purely external system of operation. The arms are raised. The moving of these pulls on the muscles and raises the ribs which thus produce an enlargement of the chest. Then the arms are lowered and doubled against the ten upper ribs. The chest is thus reduced in size and the "tidal air" is driven out.

In these actions many muscles are brought into play, some indeed which do not have any effect on the dilation or compression of the chest cavity, muscles, for instance, which run from the shoulder and arm to the back of the victim, the extension of which while entirely unbeneficial in the restoration of breathing, may be accompanied by extreme harm to the man being resuscitated.

It is no less essential to remember that whether any thoracic muscle actually tends to produce the heaving of the chest is not important as far as the resulting injury is concerned; an unfunctioning tension or compression is as detrimental as one which performs the objects sought.

It is true that those pectoral muscles (*pectoralis minor*) which are much strained in the Sylvester method lie for the most part below muscles not so strained, but everything outside the chest including the inclosing ribs may be regarded as external and much subject to injury. Consequently, as a general principle, not, of course, without numerous exceptions, we may suspect that a man injured by a blow is not a fit subject for the Sylvester treatment, because the latter utilizes muscles and ribs which may be injured. Furthermore, that method is usually undesirable in case of burns, because it strains and compresses muscles which are likely to have been injured by fire, though the muscles affected do not function most actively in the recovery of the respiratory action.

On the other hand, the Schaefer method utilizes the floating ribs. These are forced inward so as to press the internal organs, the stomach, spleen and liver up against the diaphragm. Thus the chest is crowded into a small space without pressure on any of its parts, other than on the one wall which is not external. Hence, Schaefer's method is an internal operation in comparison with that of Sylvester.

F. L. Hoffman, in our issue of Aug. 9, shows that in the anthracite mines, 5.5 per cent. of the serious accidents affect the "trunk," while 26.7 per cent. affect the shoulder, arms, wrist, hand, collarbone and ribs. A less marked difference is shown in the accidents of the bituminous field of Pennsylvania. There, 10.5 accidents to the trunk occur to 21.4 in the regions of the body moved during the Sylvester treatment.

It must be conceded that the figures given are not used with entire fairness because blows on the arms and wrist are not likely to inhibit the action of the diaphragm and so the lesser number of injuries on the abdominal regions may nevertheless merit the greater consideration.

But, conversely; as it is in burning accidents that asphyxiation occurs, demanding the restoration of breathing, the location of burns is worthy of consideration. It is more important to consider the parts which are most affected by these specific accidents than to enumerate the frequency with which the various parts are affected by injuries in general.

As a miner works with a low shirt and short sleeves and sometimes without any sleeves at all and as his clothes are gathered tightly around his waist by his belt, it is probable that he is burned in even greater proportion in what for brevity of speech we will designate the Sylvester regions.

When a man stands in inflammable gas, the upper part of his body is in a richer mixture than his waist and consequently more severe burns are likely to be found there; moreover, the gas will not be ignited by a hand lamp where the gas accumulation is small unless one of the man's hands is raised to convey the light to the gas. Hence burns are generally in the head, chest and arms.

These considerations make us view the Schaefer method as the one more suited for use in instruction. Where it cannot be used, we fear that all hope is in vain. The man is probably dead, not merely stunned into inaction; he is burned to a crisp or injured internally so that the undertaker has more interest in the matter than the first-aid man.

One further consideration puts the statistical argument more definitely in favor of the Schaefer method: It must be granted that, as Mr. Hoffman has deduced his figures from the reports of the inspectors, the word "trunk" has an uncertain statistical meaning and though it is likely in some cases to mean the abdominal regions, it probably even more often refers to the chest and back. In fact, we are informed that injuries to these parts are included in the enumeration of trunk accidents. Consequently, the ratio between the injuries declared to affect the Sylvester regions and those recorded as involving the "trunk" must be smaller than that existing between injuries of the Sylvester regions and accidents involving the abdominal regions only.

If we figure on the interesting data given by Mr. Hoffman, inadequate as they are for our special purpose, we shall probably err to the disadvantage of the Schaefer method and give those who differ from us the best of the argument. But we quote the figures for what they are worth. The percentage of availability of the Schaefer system in the anthracite region would be 82.9 per cent. and in the bituminous coal fields of Pennsylvania 67.1 per cent. The Sylvester method would be of service, therefore, in only 17.9 and 32.9 per cent. of the cases. Why teach a system so rarely available in mining practice and why declare that its use is to be preferred?

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From Panama to Alaska

That enterprising senator, for the state of Washington, Miles Poindexter, has a brilliant idea which he intends to embody in a bill for introduction into the United States Senate. This new motion of the senator will appeal to the humor of mining men, though we can well conceive that the ordinary citizen, unacquainted with mining and dazzled by modern engineering achievement may believe the scheme feasible. Poindexter desires to utilize the machinery which excavated the Panama canal to mine coal in the Alaska fields.

These coal areas have caused vehement discussion for a long time, and a just solution of this troublous problem would be welcome, except to those who make capital by keeping the debate alive. Of late the coal beds have not figured so prominently on the political horizon as they did a few years ago, and meanwhile accurate knowledge concerning them has been more generally disseminated. But they may now reappear as star performers in the political arena with the senator from Washington as stage manager.

It is apparent to all those interested in mining that the machinery which has been used in Panama is not adapted to underground work. A large steam shovel could not be taken into a mine to work beds such as are ordinarily encountered. Even in some of the seams of Alaskan coal, which are popularly reputed to be one hundred feet thick without a slate parting, it would be difficult to work any large machine on account of the width of the opening necessary and the weakness of the roof.

Much of the coal could be mined with a steam shovel were it only clean, level and safe for such operation, but the last two desiderata are more conspicuously absent in the coal of Alaska, than in perhaps any other known field. The only use for the shovels and excavators would be in the building of the railroad or in open cutting for coal. Just how large a tonnage could be economically obtained by a removal of the surface is doubtful and the demand for coal is not such that the whole Panama paraphernalia could find appropriate use.

Among the many features in this bill is one outlining a profit-sharing plan between the government and its mine employees. It is by no means certain that the federal authorities can with advantage enter the competitive field and sell coal at a profit and the proposal that the government should only mine half the coal, leaving the rest for individual exploitation is an equally questionable policy. Any mining man knows, to state the question in the form of an Irish bull, that one cannot tell what is in the ground until it has been taken out.

A waiter once demanded "which side?" when a finical customer called for an egg fried on one side only. It might be permissible to inquire of Poindexter "which half that hapless operator is to control who takes up the burden of competing with the boundless resources of the government?"

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Coal Shipping on the Great Lakes

We call particular attention to the series of articles dealing with coal transportation on the Great Lakes now appearing in Coal Age. It is our purpose to cover the subject in great detail, so that when completed, the full discussion will form the most exhaustive treatise ever published on this topic.

The importance of this subject will be better appreciated when it is remembered that during 1912, there were over 23 million tons of bituminous coal shipped by way of the Lakes, in addition to some 4 million tons of anthracite. One of the most singular features of the Lake trade, however, is the remarkable rapidity at which it is increasing. A decade ago the movement of soft coal *via* the Lakes was only one-third the present tonnage.

Thus it will be seen that the water shipments have trebled during the past ten years, while the country's production during the same period has only doubled. The inference is plain. Water transportation of bulk freight, where available, has proved an economically sound principle, and will be an important factor in determining the geographical distribution of the coal markets of the future.

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One Way to Avoid Trouble

The crying need of mine management is a greater knowledge of common law. In this issue we have started a "Legal Department" to aid coal officials in mapping out a proper course of action in their everyday work. Study the articles in this new department and thus acquire knowledge that will enable you to avoid annoying collisions with legal obstacles.

LEGAL DEPARTMENT

Are Contracts to Abandon Coal Trade Valid?

By A. L. H. Street*

SYNOPSIS—The decisions, while somewhat variant, agree in endeavoring to insure the purchaser in the possession of the good will purchased. In all decisions it is ruled that the territory over which the restriction is applied must be the same as that over which the trade thus restricted has already been established and in many cases the judges have ruled that the time should also be limited.

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May one previously engaged in the coal trade, as producer or dealer, legally bind himself not to re-engage in business in competition with a person, firm or corporation to whom he has sold his business and good-will? The business advantages accruing to the purchaser from such an agreement are obvious, but the exact limits set by the law on contracts intended to secure those advantages are, perhaps, not generally understood; and the question becomes particularly interesting when it is considered that such an agreement may become wholly void through an attempt to secure greater rights to the purchaser than the law gives him.

Is It Invalid to Sell Good Will?

Formerly it was held uniformly by the courts that any contract whereby one purported to preclude himself from engaging in any legitimate pursuit anywhere or at any time, no matter how limited, was void. The reasoning upon which this holding was based was that the public is entitled to the fullest possible competition between business men in their chosen vocations; otherwise monopolies would be created. But this rule was gradually modified as the courts came to recognize the injustice of permitting one who has sold a valuable good will to deprive the purchaser thereof by reëntering the trade, especially before the latter has had an opportunity to fortify himself against such competition by acquaintance and course of dealing with his new trade.

Accordingly, it has now become a general rule of law that a contract by the seller of a business not to engage in competition with his successor will be enforced by the courts, by awarding damages for breach of the agreement and by enjoining further violation of the contract, if the agreement be limited to the territory in which the seller established his trade; but in some states it is held by the courts that there must, also, be a reasonable limitation as to the time during which the seller's competition is to be barred. The test of validity usually applied is whether the contract is reasonably necessary to secure the purchaser in the enjoyment of the good will of the business bought.

In a case which arose in the coal trade (George & Chapman vs. East Tennessee Coal Co., 83 Tenn. Supreme Court Reports 455), the rule is thus summarized: "A contract not to carry on one's business anywhere is void, but a contract not to carry it on in a particular place, or within certain limits is valid." And, according to a decision of the Minnesota Supreme Court, sale of the good will of an established business, in connection with the sale of that business, is not, if reasonable in other respects invalid because unlimited as to time. (Southworth vs. Davidson, 118 Northwestern Reporter 363.)

On the other hand, the Appellate Division of the New York Supreme Court holds that a contract not to engage in a business, not limited as to time and place, is void as being against public policy (Von Bremen vs. MacMonnies, 122 New York Supplement 1087); and that a contract purporting to obligate the seller of a business not to engage in a similar business will not be enforced, unless the restrictions are limited as to time and territory, and the agreement is necessary in order to give the purchaser the benefit of his bargain. (Fries vs. Parr, 139 New York Supplement 220.) The Michigan Supreme Court has applied a similar test. (Weickgenant vs. Eccles, 140 Northwestern Reporter 513.)

Reasoning along the same lines, the Kentucky Court of Appeals holds that a contract, made upon selling the good will of a business, not to again pursue it in the country, is unenforceable, but that a contract is valid, if it restrains the conduct of the business to such an extent of territory only as is necessary to protect the purchaser. (Linneman & Moore vs. Allison & Yates, 134 Southwestern Reporter 134.) In Louisiana, the rule is thus broadly stated: "One may bind himself never to pursue a particular calling within reasonable geographical limits, or not to pursue such calling at all within a reasonable time." (Louisiana Supreme Court, Moorman & Givens vs. Parkerson, 54 Southern Reporter 47.) In Alabama, such agreements are sustained if limited to the city in which the business sold is conducted, though not limited in duration beyond the time that the purchaser shall remain in the trade. (Alabama Supreme Court, Smith vs. Webb, 58 Southern Reporter 913.)

Contract of Restriction Not Invalid though Entered Into with Several Competitors

The principles above stated, as applied especially to the coal trade, are well illustrated by the following summaries of decisions handed down by the highest courts of the country: A person who owned coal lands, mines and boats sold them to a company, agreeing not to engage within ten years in the business of mining or shipping coal in the territory traversed by the Monongahela, Ohio and Mississippi rivers and their tributaries. This contract was upheld by the Pennsylvania Supreme Court in the case of Monongahela River Consolidated Coal & Coke Co. vs. Jutte, 59 Atlantic Reporter 1088, as being a reasonable contract and not violative of public policy, though the company had similar contracts with a large number of other coal operators who had previously done business in the Monongahela Valley in Pennsylvania.

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*Attorney and Counselor at Law, St. Paul, Minn.

Another contract by a retail dealer, in selling his business at Auburn, Neb., not to reëngage in business directly or indirectly, in that town or in the vicinity thereof, except that if his successor should discontinue a lease on the seller's yard at the expiration of five years, the seller might reënter the trade, was upheld by the Nebraska Supreme Court in the case of Engles vs. Morgenstern, 122 Northwestern Reporter 688, as against objection that the contract violated the statutes of that state directed against combinations in restraint of trade. In a Michigan case, the lessee of a dock upon which he conducted a coal business sold nearby land, on which was located another dock, under agreement that the purchaser should conduct no business that would conflict with the seller's trade. The United States Circuit Court of Appeals sustained the validity of the agreement, as limited to the property sold. (Hitchcock vs. Anthony, 83 Federal Reporter 779.)

The Illinois Supreme Court holds that a contract is not in unlawful restraint of trade by which one agrees to buy the business of a particular coal merchant and then to buy coal at wholesale from the other party to the contract, in consideration of which the latter binds himself not to sell coal at wholesale to any other dealer at the place; it not appearing that the output of any other wholesale dealer or purchaser of coal was in any way affected, or that there is anything to establish the price of coal at that place. (Superior Coal Co. vs. E. R. Darlington Lumber Co., 86 Northeastern Reporter 180.)

AGREEMENTS ON DISSOLUTION OF PARTNERSHIP

As a general rule, the principles above stated are applicable to the sale by a partner of his interest, under agreement with the continuing partner that he will not reëngage in business in competition with the latter. It is, also, held that a seller of a business cannot avoid the effect of a contract of this kind here discussed by transacting a competing business under the name of a third person who was not a party to the contract.

It will be noted that the observations here made are limited to cases in which promises to refrain from competition are made in connection with the sale of a business or property. The writer leaves closely related questions concerning joint-selling arrangements between producers or dealers as the subject of an independent article.

Time for Delivery of Coal Sold

Contracts to sell 600 tons of coal were recently construed by the St. Louis Court of Appeals, in the case of Big Muddy Coal & Iron Co. vs. St. Louis-Carterville Coal Co., 158 Southwestern Reporter 420, with reference to the seller's duties and rights concerning the time of delivery. The first contract bound the seller to ship 300 tons of screened coal for delivery at Illinois points on board cars, "shipments to be made during the following months: July, 20 cars; August, 40 cars; September, 60 cars; October, 80 cars; November, 40 cars; December, 40 cars; and January, 20 cars." The other contract called for the same total quantity, distributed throughout specified months in quantities varying from 20 to 80 carloads per month.

Neither agreement expressly required the buyer to give orders for shipments, nor contained shipping directions beyond specifying the destinations and the railway company whose cars were to be used, but the seller furnished a blank order book to the buyer. It also appeared that the seller was advised that the coal was bought for resale to a third company under contracts, which made the same provisions as to the times for delivery as the contracts above referred to.

DEFENDANT TRIED TO ENFORCE DELIVERY WHEN PRICES WERE HIGH AND REFUSED COAL WHEN SELLING AT A LOW PRICE

Defendant buyer ordered out less coal than was provided for by his contracts, and the quantities so ordered were shipped. When plaintiff sued defendant for the price of the coal delivered, it appeared that 284 carloads called for by the contracts had not been delivered, and defendant counter-claimed for damages claimed to have resulted to it from failure to ship that quantity.

But, on the facts above stated, the Court of Appeals decided that the contracts between plaintiff and defendant should not be interpreted as binding plaintiff to ship the coal, except as ordered out by defendant buyer, and that was admitted to have been done. In other words, the seller was not bound, under the wording of the contracts and the course of dealings between the parties, to tender deliveries in the quantities and during the months mentioned in the agreements.

It was further held that in such contracts the time of delivery is of the essence of the contract, and that the provisions for delivery of the specified quantities each month would be construed to require delivery of that amount upon orders received during the month, and not to permit the buyer to order a less quantity in the earlier months when the price was low, and then require deliveries of the remainder of such quantities just before the termination of the contracts when the price was high, especially where the buyer had written a letter reducing quantities previously ordered, on the ground that former orders had exceeded the amount provided for by the contract for that month.

Legal Decisions

Effect of Bankruptcy of Company on Lease—Where a coal-mining lease provided for payment of royalties to be suspended in the event of strikes, car shortage, etc., and the lessee company became bankrupt and the lessor accepted a surrender of the property, he is not entitled to enforce a claim against the estate of the company for royalties claimed to have accrued after the bankruptcy of the company. (United States District Court, Northern District of Alabama; in re Gallacher Coal Co.; 205 Federal Reporter 183.)

Liability for Injury to Minor Employee—A mining company operating in Pennsylvania is not relieved from liability for injury to a minor employee, due to failure to warn him against a danger, because it employed a certified foreman as required by the laws of that state. (Pennsylvania Supreme Court, Bogdanovicz vs. Susquehanna Coal Co., 87 Atlantic Reporter 295.)

Terms of Payment for Goods Sold—If nothing is said when a contract of sale is made as to when the price is to be paid, it will be presumed that the parties intended that payment should be made by the buyer on delivery, and on his failure to pay then the seller will be entitled to reclaim the property. (Arkansas Supreme Court, Hamilton vs. Rankin, 158 Southwestern Reporter 496.)

Duties of Mine Owners—Under the laws of Pennsylvania, it is the duty of a mine owner to provide proper passageways in tunnels, for the safety of miners, and liability for breach of this duty cannot be avoided by delegating its performance to a mine foreman or other employee. (Pennsylvania Supreme Court, Simmons vs. Lehigh Valley Coal Co., 87 Atlantic Reported 568.)

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 13—I have been greatly interested in the iscussion on the use of mixed lights in mining and, paricularly, in Letter No. 9, by R. Z. Virgin, Coal Age, Aug. 16, p. 244. An experience of 26 years has convinced me that no miner can be trusted with an open light in a mine generating explosive gas; and I fully agree with the statement that no naked light should be allowed in any mines where gas has been detected or may be reaonably expected.

There are two other statements made by Mr. Virgin, however, that I must say most emphatically are contrary o my own experience. He states: 1. The safety lamp has no ill-effect on the eyesight of the miner compelled to use it in his work. 2. A miner using a safety lamp an produce as much coal, in a day, as one using an open ight.

In reference to the first point mentioned, I can speak rom sad experience; and, let me say, my case is by no means an isolated one. In the district where I was born and raised, Hamilton, Scotland, the safety lamp has been used almost exclusively, for many years, and this practice still continues. My use of the safety lamp began at the age of 11 years and continued for a practically unbroken period of 16 years.

The first serious results developed during the fourteenth year of my use of this lamp. I was attacked, in the mine, by a severe vertigo and twitching of the eyeballs. I sought the Glasgow Eye Infirmary and was told by the consulting physician that mine was a well developed case of miners' nystagmus, which was recognized by medical men in that district, as being caused by the constant use of the safety lamp. I was informed that my only salvation was to give up the use of the lamp. The trouble continued to increase from that time. Later, about nine years ago, I came to this country and have worked with an open light ever since. For the past three years I have used the carbide lamp and can truthfully say that my eyesight is much improved, being practically 100 per cent. better than when using the safety lamp, in the old country.

In reference to Mr. Virgin's second statement, that the use of a safety lamp does not lessen the miner's producing power, I would ask if it is sensible to suppose that a man burdened with the care of a safety lamp can compete with another man using an open light hung on his cap. In my opinion, no man who has used both of these lamps would agree with Mr. Virgin in his last statement. That the lamp is a burden to the user no one will deny, as it must be handled carefully and watched continually.

In conclusion, I wish to say that, where conditions demand, safety lamps should be used, unquestionably; but, at the same time, the miner must be made acquainted with the ill effects produced by the continued use of the safety lamp.

John Mac Nicol.

Seanor, Penn.

Mine Development

Referring to the mine map shown on p. 211, Coal Age, Aug. 9, which is a good one, permit me to make one or two suggestions how I think it can be improved.

The triple-entry system, shown on the main entries and the first two pairs of cross-entries, is an important feature; and I would suggest that the next two pairs of cross-entries, inby from these, should also be driven on the triple-entry system, while all other cross-entries can be driven on the double-entry system.

Again, it would greatly increase the output, for the same amount of entry driven, if the cross-entries were driven further apart and rooms turned to the right and left of each pair of entries. This plan would give double the number of rooms and would double the output of coal, for the same cost of entry driving and operation. The rooms should be driven right-hand on one entry and left-hand on the other entry. The tracks in each room should be carried along the straight rib. As soon as the first two or three rooms are driven up, the work of drawing back the pillars should be commenced, so that the rooms can be finished while the tracks and timber are good, which will decrease the cost of moving slate and keeping up track in the rooms. All rooms and entries should be driven on centers, so that the pillars will be of uniform thickness. If the roof is good, the cross-entries can be driven 600 ft. apart, making the rooms 100 yd. deep; but this will depend wholly on the condition of the roof and floor.

It is a good plan to drive the crosscuts as shown at the mouth of each pair of cross-entries; but I would suggest, further, that another crosscut should be driven at, say No. 10 room. This would provide an empty and a loaded track and avoid any loss of time from mules or motors waiting on each other.

In my opinion, all mines should be opened on a plan that will provide for the handling of gas, if this should be found later. Good ventilation should be provided by placing doors, stoppings, regulators and overcasts as quickly as needed. Where gas may be expected, brattices and curtains should be arranged to keep the working face clear.

While the present plan will, undoubtedly, provide for an output of 1000 to 1200 tons per day, this output could be increased to 2400 tons per day, for practically the same expense of entry driving and operation, by turning rooms off both entries, as suggested. While there may be no water to handle in this mine, I believe it is always best to provide a sump for draining; and this should be located between the first two pairs of entries, unless the mine drains naturally. I would also suggest putting a fan at both the right and left entries; that is to say, installing two fans instead of one. This would provide reliable ventilation and guard against a possible breakdown, which is liable to happen at any time.

Samson Smith.

Mineral, Va.

The Training of Miners

Much is written lately on the education and training of mining men, particularly the miner at the working face. Many suggestions of more or less merit have been made in reference to how this work can be best accomplished; and, in this connection, the recent article of State Mine Inspector Nesbitt, Coal Age, Aug. 9, p. 206, has attracted my attention.

Mr. Nesbitt advocates, in his article, placing a safety inspector and instructor in each coal mine, for the purpose of instructing the miners in reference to safety and economy. In my opinion, this suggestion of Mr. Nesbitt does not get at the root of the matter. There is an old and true saying, "Train up a child in the way he should go and when he is old he will not depart from it." This applies as well to mining. The best miners, and, indeed, the only practical miners are those who have been taken into the mines by their fathers and trained in the work.

There is, today, too much "wildcat work" in coal mining. Grown men who have never handled a pick or seen the inside of a mine are employed today as miners. They go into the mine because they cannot get work at any other trade. They are filled with horror and fear and, because of their lack of knowledge of mining conditions, they are wholly incapable of taking care of themselves while at work. Many of them, after working a day in the mine, fail to return to their work, and the next day it is found that they have left their place in bad shape.

There are many things a miner should know before he is permitted to work in a mine. He should understand the principle of the safety lamp and how to use the lamp at his work. He must be taught the practical work of putting up a brattice, hanging curtains, laying tracks, handling cars; and, particularly, how to keep himself safe while at work, by properly timbering his place. He must know how to take down a loose piece of slate and set posts required to make the place safe. He should learn these things when he is young. The way to reduce accidents is to employ more practical miners—men who understand good mining and have mined coal all their life.

The world takes notice of great mine accidents where many lives are lost at a time; but the constantly recurring daily accidents, when a single man, or two or three are killed, excites little interest and the death list grows. Who or what is responsible? It is the insatiate greed for coal and the common disregard for the safety of the worker, for which, in many cases, the inexperience of the fireboss or mine foreman is responsible. Train the miner when young.

SAMSON SMITH.

Mineral, Va.

⁂

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

MINE VENTILATION

The ventilation of a mine, as the term implies, involves the supply and maintenance of a sufficient current of air throughout the mine to render the same healthful and safe.

Requirements of Ventilation—The quantity of air in circulation must be sufficient to comply with the state mining law, and to dilute, render harmless and sweep away the gases that would otherwise accumulate in the mine. The air current must be conducted so as to sweep the entire working face and all void places with a moderate velocity sufficient to remove the gas without danger to the lamps or inconvenience to the workmen.

The Circulating System—In order to circulate a current of air through a mine, it is necessary to provide two separate openings, one for the air to enter, called the "intake opening," and the other for it to leave the mine, called the "return" or "discharge opening." Two distinct air passages or airways are also required, leading from these openings into the mine, in order to conduct the air current to and from the working face. These are called, respectively, the "intake" and "return" airways. These openings and airways form a part of the circulating system in the mine, similar to the arteries and veins of the human body.

Kinds of Ventilation—There are three different kinds of ventilation, in mining practice, known as "natural ventilation," "furnace ventilation" and "fan ventilation," according to the agency employed for its production.

Natural Ventilation—Ventilation is natural when it is produced by any natural agency, such as surface winds, falling water or the natural heat of the mine. The accompanying diagram illustrates the manner in which the natural heat of the mine produces a warm upcast air column, in either a drift mine or a shaft mine.

In the drift mine shown on the left, the warmer air column in the shaft only partly balances the cooler outside air. Above the level of the top of the shaft the two air columns are of equal temperature and equal weight, and, therefore, need not be considered since they balance each other. The same is true in the shaft mine shown on the right, whenever the two shafts have the same elevation at the surface.

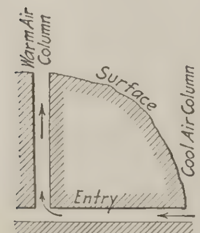


DIAGRAM OF A DRIFT MINE

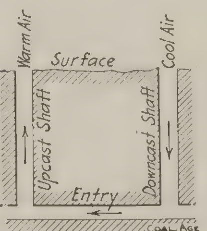


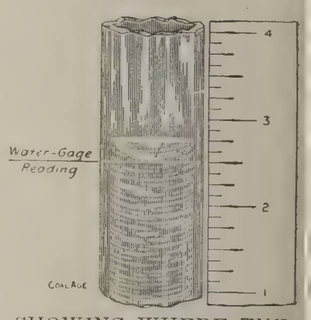
DIAGRAM OF A SHAFT MINE

The Coal Age Pocket Book

Reading the Water Gage—In the common use of the water gage, in mine practice, the scale is not read closer than ⅛ in. In all engineering practice, however, and whenever accuracy is desired the decimal scale, previously shown, is used and the reading taken to hundredths of an inch.

There are several sources of possible error in reading the mine gage. If the gage is not truly vertical the reading will not be correct. Error often occurs from the cupping of the surface of the water in the tube. As shown in the accompanying figure, the reading should be taken at the bottom of the concave or bowl. This will give greater uniformity in the results obtained.

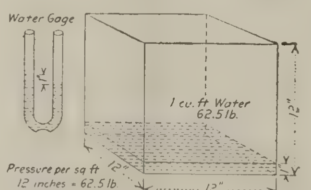
In fan ventilation, especially when the reading is taken in the fan drift, there is a constant oscillation of the water level, which makes it difficult to decide on the true reading. The oscillation is much reduced when the tube of the gage is contracted at the bend. The best gages are provided with a stop-cock in the bend by which the connection between the two arms can be closed. The gage can then be carried to a more convenient place to be read.



SHOWING WHERE THE WATER GAGE IS READ

Unit of Ventilating Pressure—In mine ventilation, the unit of ventilating pressure or the unit pressure producing the circulation is estimated in pounds per square foot. This is calculated from the reading of the water gage by multiplying that reading, in inches, by 5.2.

The accompanying figure shows clearly how the constant 5.2 is derived. The weight of 1 cu.ft. of water is, practically, 62.5 lb. This cubic foot represents a cube that measures 12 in. on each edge; the base of the cube being 1 sq.ft. Since the weight of 12 in. of water, resting on this square foot, is 62.5 lb., the weight of 1 in. of water covering the same area is 62.5 ÷ 12 = 5.2 lb., which represents the pressure, in pounds per square foot, due to 1 in. of water column. The principle involved is that the pressure exerted on a given area of surface depends only on the height of water column the pressure supports.



RELATION OF WATER-GAGE READING TO PRESSURE

INQUIRIES OF GENERAL INTEREST

Another Hoisting Problem

At one of our mines, the opening is a shaft 220 ft. deep. We are using a 1¼-in. cable, which winds on a drum 7 ft. in diameter. We contemplate using a 1⅛-in. cable on one side of the drum, while still hoisting with the 1¼-in. cable on the other side of the same drum. What effect will this have on the hoist?

J. B. Morris,
The Cambridge Collieries Co.

Cambridge, Ohio.

When a cable is wound on a drum, what is called the "diameter of winding," or the diameter measured from center to center of the rope wound on the drum, is greater than the diameter of the drum, by the diameter of the rope. The diameter of the drum, in this case, is 7 × 12 = 84 in., which makes the diameter of winding 85¼ in., for the 1¼-in. rope; and 85⅛ in. for the 1⅛-in. rope. Since the circumference of a circle is proportional to its diameter, the distance of hoist, for the same number of revolutions of the drum, is as 85¼ : 85⅛. The distance hoisted by the 1⅛-in. cable while the 1¼-in. cable is hoisting 220 ft. or the depth of the shaft, is determined by the proportion:

$$85.25 : 85.125 : : 220 : x = 219.67 \textit{ ft.}$$

This shows that while the 1¼-in. cable is making a single hoist of 220 ft., the 1⅛-in. cable will only hoist 219 ft. 8 in., which lacks 4 in. of making the upper landing. This difference is so slight, however, that the stretch of the hoisting rope and some slack will take care of the same. Caution will be needed in starting the next hoist from the bottom, owing to the slack rope. The difficulty can be overcome to some extent by lining the drum with canvas on the side on which the lighter rope winds, or, by shimming the lagging on that side to increase the diameter of the drum.

Method of Working

We are working a 7-ft. seam of coal overlaid with a sand slate from 4 to 7 ft. thick. Above the sand slate is a thin seam of good coal, 21 in. in thickness. The first mining has been done on the room-and-pillar system; the waste has been stored in the chambers. The workings have been extended, in this manner, to the extreme end of the property. The question is now: What is the best method to employ for the extraction of the pillars in the 7-ft. seam and the thin coal overlying the roof slate? What method will give the greatest safety and economy, in drawing back this work? Perhaps some readers have had a similar proposition and can give their experience.

J. H. S.

Bernice, Penn.

Assuming that there is a large area worked out and standing on pillars, in the 7-ft. seam, the question presented is how to draw back the pillars in the lower seam and secure the 21 in. of coal overlying the roof slate, which varies from 4 to 7 ft. in thickness. The size of opening, width of pillars and depth of cover are not given; and the character of the strata overlying the thin seam is not mentioned. These data together with the character of the coal in both seams will determine whether or not it is practicable to attempt to mine this thin seam of coal.

If the coal in the upper seam is an excellent quality, and other conditions are favorable, it may be practicable to undertake its extraction. If, however, the coal is of poor quality or the conditions in the overlying strata are unfavorable the expense attending the mining of this coal will be too great to make it an economical proposition. There may be water overlying the upper seam that would entail a large expense in pumping; or the strata immediately above this seam may be soft and friable, making the expense of working prohibitory. All of these conditions must be carefully considered, before the questions asked by the correspondent can be intelligently answered.

With what information is at hand, the only safe method that suggests itself is to flush the workings in the lower seam, except the entries. Then, beginning at the boundary line, start an upraise to the overlying seam and determine whether or not it will be practicable or possible to mine the overlying seam, independently. If it is practicable to mine this thin seam, the coal can be dropped through openings in the floor to the roadways in the seam below and taken out on these roads.

The feasibility of this method can only be determined by trial. It is probable that the coal in the upper seam will not pay the handling of the intervening 4 to 7 ft. of sand slate; and, for this reason, the upper seam, if mined at all, must be mined independently, by some method similar to that described. The pillars in the lower seam should not be drawn until the overlying seam has been worked back. The work should be conducted on the retreating plan.

Weight of Water in Air Current

Kindly show what weight of water is contained in 100,000 cu.ft. of air at a temperature of 60 deg., assuming the air to be completely saturated.

Pumpman.

Punxsutawney, Penn.

In order to calculate the weight of aqueous vapor contained in this volume of air, it is necessary, first, to know the tension of the vapor at the given temperature, which is found from psychrometric tables to be, for 60 deg., 0.2545 lb. per sq.in. The required weight of water carried in the air current is then

$$w = 100{,}000\left(\frac{0.6235 \times 0.2545}{0.37\,(460 + 60)}\right) = 82.47 \textit{ lb.}$$

This amount of water is equivalent to two and one-half tons per hour.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—When is a safety lamp safe, and why?

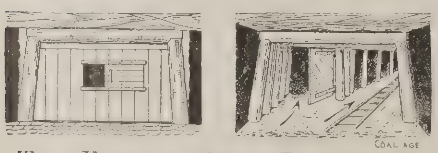
Ans.—A safety lamp of any approved type is only safe when handled by a competent person, in a proper manner. The reason is that the principles on which safety depends must be understood and closely observed by the one using the lamp. The lamp must be held in an upright position, must be kept clean, must not be exposed to a strong blast or current of air, and must be removed cautiously and promptly from a body of gas as quickly as observed.

Ques.—The hand of a Biram anemometer turns 3.75 times a minute. At the point where the reading is taken, the airway measures 5.5 by 9 ft., in cross-section. What is the velocity of the air current, allowing 3 per cent., for the resistance of the instrument?

Ans.—The sectional area of the airway is $5.5 \times 9 = 49.5$ sq.ft. The anemometer is graduated to indicate a velocity of 100 ft. per min., for each revolution of the large hand. In this case, the velocity of the air current is $3.75 \times 100 = 375$ ft. per min. Allowing 3 per cent. for the resistance of the instrument, the actual velocity of the air current is $375 \div 0.97 = 386.6$ ft. per min. The volume of air in circulation is then $386.6 \times 49.5 = 19{,}136+$ cu.ft. per minute.

Ques.—What is a regulator and where can it be used to advantage?

Ans.—A regulator, in mine ventilation, is a device used for dividing the air proportionately between two air splits. The common form of regulator is that known as the "box regulator." This is shown on the left of the accompanying figure. It consists of a brattice or partition of wood or concrete built in an entry, which is generally the return airway of a pair of entries or section of the mine. In the center of the brattice is provided an opening, the area of which can be increased or decreased by moving the sliding shutter or door shown in the figure. By this means, the quantity of air in that split and passing through the regulator can be increased or decreased as desired. The regulator is commonly placed at the return end of that split which naturally takes more air than its desired proportion. The action of the regulator is to decrease the proportion of air in that airway or split, which increases the proportion for the remaining splits.



Two Forms of Mine Regulators for Dividing the Air

Another form of regulator is that shown on the right of the figure, and which consists of a door swung so as to divide proportionately the intake current. This regulator is usually placed at the intake end of the two airways and can be set so as to divide the air in any desired proportion between the two splits.

Ques.—Where would you expect to find nitrogen and carbon dioxide, in a mine? Give their symbols, weights and specific gravities; and state how the presence of these gases is detected in the mine.

Ans.—Nitrogen and carbon dioxide are the two principal products of combustion. For this reason, they are to be found in those portions of the mine where the ventilation is slack and the various forms of combustion are in progress. The burning of lamps, breathing of men and animals, burning of powder, slow combustion of coal and decay of wood, continually taking place in the mine, consume the oxygen of the air and leave nitrogen and carbon dioxide as a result.

The symbols, specific gravities and molecular weights of these gases are as follows. Nitrogen; symbol, N_2; sp.gr., 0.97; mol.wt., 28. Carbon dioxide; symbol, CO_2, sp.gr., 1.529; mol.wt., 44. The presence of these gases is detected by the dimness of the lamps and the difficulty of keeping a light. Carbon dioxide is most apt to accumulate in the low places or swamps and dip workings of the mine.

Ques.—If there is 5000 cu.ft. of air passing per minute through the last cut-through, in an entry, and this current contains 5 per cent. of marsh gas, how much air should be added to the current to reduce this amount of gas to 1 per cent.?

Ans.—The volume of gas in this current is $5000 \times 0.05 = 250$ cu.ft. per min. If this amount of gas is to be 1 per cent., the total volume of gas and air, in that case, would be $250 \div 0.01 = 25{,}000$ cu.ft. per min. Now, assuming that the original current was mixed air and gas, the volume of air required to be added to reduce the gas to 1 per cent. is $25{,}000 - 5000 = 20{,}000$ cu.ft. per min.

Ques.—What are the necessary qualifications to make an efficient mine foreman, outside of those required by law?

Ans.—Beside the mining experience, necessary age and citizenship and the theoretical knowledge of mining principles, required by law, a mine foreman must be a good judge of men and the work they can do. He must be able to handle men so as to maintain the discipline of the mine and produce the daily tonnage at a reasonable cost of operation.

Ques.—In the case of an explosion of firedamp in which 8.4028 lb. of marsh gas are concerned, assuming that all of the hydrogen combines with the oxygen of the air to form water (H_2O); what weight of water vapor will result from this explosion?

Ans.—The chemical equation representing the reaction that takes place and the molecular weights of the several gases are

$$\begin{array}{llllll} \text{Reaction,} & CH_4 & + \; 2\,O_2 & = \; CO_2 & + \; 2\,H_2O \\ \text{Mol.wt.,} & 16 & 64 & 44 & 36 \end{array}$$

Since the relative weights of marsh gas and water vapor concerned in this reaction are expressed by the ratio 16 : 36, the weight of water vapor formed is

$$16 : 36 : : 8.4028 : x = 18.9+ \ lb.$$

BOOK REVIEW DEPARTMENT

RESUSCITATION. A treatise on electric shock, traumatic shock, drowning, asphyxiation from any cause by means of artificial respiration by the prone-pressure (Schaefer) method with anatomical details of the method and complete directions for self instruction. By Charles A. Lauffer, medical director, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn. v + 47 pp. 4x6⅝ in.; 7 ill. John Wiley & Sons, New York. Cloth boards, Price 50c.

This little volume by the American apostle of prone pressure methods of resuscitation; should be read with care by first-aid men and by many others who possibly are not sufficiently well qualified to be entitled to that designation.

Dr. Lauffer is the author of a little volume on "Electrical Injuries." That book did not give such practical details of the prone-pressure method as does this little volume nor did it show the physiologic significance of the system of treatment. This brochure leaves the reader in no doubt as to just what is needed, and it certainly lines out a large field of usefulness for prone pressure. It is valuable to remember that it is available not only for electric shock and for asphyxiation by irrespirable atmospheres or by drowning but is to be recommended in all cases where a shock, such as a blow under the belt, on the jaw or neck or upon the head, has stopped ("inhibited") the movement of the diaphragm. Any shock which "knocks the breath out of a fellow" is a subject for resuscitating treatment if severe enough to need treatment of any kind.

The illustration on page 12 and the description of the bell-jar experiment are both unconvincing. The author could have used the figure in Hermann's "Physiologic des Menschen" with advantage as it is much more complete and illuminating. The other illustrations, which were prepared for another book, do not meet the needs of the author, but still if the reader does not become annoyed by the difficulties in pp. 11 to 22, he will arrive eventually at a clear conception as to the position of the floating ribs and the diaphragm and will comprehend the means by which the pressure on the former is transmitted to the latter.

THE ANALYSIS OF BLACK POWDER AND DYNAMITE—Bulletin 51. By Walter O. Snelling and C. G. Storm. 76 pp. and index. 5¾x9⅛, 5 plates, 5 ill. Paper cover. Bureau of Mines Bull. 51.

The public has long been expecting this bulletin. Its slowness in publication is an evidence of the dilatoriness of the government printing press, overburdened with the duties of reproducing in sheaves the matchless eloquence of the national legislature. The authors have produced, as might have been expected, a careful monograph on the analysis of dynamite and black powder, the first explosive having both precedence and more lengthy treatment, despite the title of the brochure.

Messrs. Snelling and Storm have checked their work with a great deal of care and their methods on the same sample would give concordant results. But they themselves would be willing to admit that concordance and correctness are not synonyms. The figures obtained for moisture are possibly too high in so far as they are raised by the loss in weight, due to vaporization of nitroglycerin yet it is possible that they are too low because complete dessication may not be obtained in 3 days at room temperatures.

We wish now before the reader gets a wrong impression to declare that what is said about this matter, can be paralleled in speaking of any proximate analysis. If we may be pardoned the pun, such a determination is usually not so "proximate" as it is "approximate." As A. C. Fieldner of the Bureau of Mines pointed out in his address before the Coal Mining Institute of America, the chief services of the chemist have been to render proximate analyses of coal concordant rather than determinatory of the actual proximate condition of the body tested. This is the extent of the work done in analysing dynamite. Rough indications are obtained of the moisture content and probably more accurate determinations are made of the quantity of nitroglycerin.

These results for any two samples of the same dynamite when in the same condition are made to check just as the traverse of a survey can be made corroborative of the accuracy of the measurements, even when the temperature of the uncompensated tape is known to be 100 or 105 deg. F. and the tape is only correct when the heat is less severe.

We cannot agree with the authors that moisture determinations of samples can be made with accuracy whenever atmospheric conditions are normal, seeing that the authors show that when the dynamite is stirred for 10 min. in an atmosphere 75 per cent. saturated, the determination is raised 14 per cent. higher than when the saturation is 19 per cent. The result at the lower saturation is equal to the correct moisture content according to the authors. Therefore the other result in an atmosphere 75 per cent. saturated must be too high and such a saturation of the atmosphere is fortunately for the mining industry, very common in the United States. Thus at normal saturations, the moisture content is apt to figure too high if the sampling is not executed with dispatch. The lower saturation is common in certain restricted parts of Colorado and the arid West and possibly is not uncommon in office buildings in the winter.

We do not wonder that the introduction of nitroglycerin into the dessicator produces no influence on the results. It is unlikely that the space in the apparatus is 100 per cent. saturated with nitroglycerin by this system. Moreover the fluid was introduced at the same time as the dynamite and could not have had any effect at early stages even if the vapor tension of nitroglycerin were abnormally low. But the experimenters appeared to have followed the recognized practice and amply showed that the introduction of nitroglycerin failed to modify the results.

It seems that a measurement of the increment in weight of the dessicating substance would give a more accurate determination than a reweighing of the dynamite if a dessicator were chosen which would not combine or dissolve nitroglycerin or nitrogenous fumes. Perhaps P. Litherland Teed's system of gaging the moisture in coal could be duplicated with dynamite and a slightly higher temperature of dessication adopted. The drying could take place in a vacuum, and the evaporated bodies drawn through a dessicating tube heated to a higher temperature than the dynamite so that they would not condense. The increase in weight of the dessicator would measure the moisture evaporated.

Nitroglycerin has the following formula, $C_3H_5(NO_3)_3$. There are other bodies known as nitro-substitution compounds $C_3H_5\ (NO_3)_2OH$ and $C_3H_5(NO_3)(OH)_2$. These bodies are formed in the manufacture of nitroglycerin and may not be wholly eliminated. Moreover there is a possibility that some nitroglycerin may replace a molecule of NO_3 with OH. It is to guard against this that the potassic iodide tests are made and the stabilizers are added. In case either of these less nitrified bodies were formed, a determination of the NO_3 content in the "nitroglycerin" of the dynamite will not connote the quantity of glycerin compounds. For instance, if it was all mononitroglycerin the result will be one-third as large as it should be. Of course the error would be normally small especially in a good article which has been well handled but it is not such dynamites which it behoves us to eliminate.

Doctors Snelling and Storm have prepared a bulletin of great value. The difficulties faced perhaps cannot be met by any refinement of method. It is not too much to hope that in a few years the shadow now thrown on the proximate analysis will be removed by the earnest work of enterprising chemists.

THE HISTORY OF THE E. I. DU PONT DE NEMOURS POWDER COMPANY. 224 pp., 6x9¼ in., copiously illustrated. "Business America," New York, Fabricoid boards.

The writer of this most readable and valuable record of powder manufacture withholds his name. The reader who follows his narrative from one end of the volume to the other will agree with him that he has recorded a century of success and will concede that he has made that success as interesting as it is remarkable. The du Ponts built their first mill in America in 1802 and since their venture commenced, the stories of powder and of the du Ponts have been identical. The book is essentially historical and does not venture on technical ground, but incidental reference is made to all the many lines, in which powder is used. Originally an instrument of war, it is today an important agent in every civil development.

COAL AND COKE NEWS

Washington, D. C.

Some interesting orders relating to rates on coal have been issued by the Interstate Commerce Commission within the past few days. One of the most important relates to an application which requested permission to establish a rate of $2.85 per gross ton on prepared sizes of anthracite coal all-rail from mines to various points in Massachusetts while maintaining a higher rate to intermediate points.

In the application it is stated that the New York Central & Hudson River R.R., in connection with its Boston & Albany division, is about to establish a rate of $2.85 to Allston and Newton Lower Falls. Dealers located at the latter points are in competition with those located at Newton Upper Falls, Needham, and Needham Heights, and it is stated that unless the New Haven road can name as good a rate to the points in its line these dealers will be forced to go out of business. Some time after the filing of this application the Commission was notified that the New York Central did not propose to put in the rate of $2.85, and that, therefore, the New Haven road desired to withdraw its application with respect to Newton Upper Falls, but desired to have the application stand with respect to Needham and Needham Heights.

It was also stated that coal reached Boston at a lower rate than the rail carriers published, and was carried from tidewater by automobile trucks to Needham and Needham Heights at a rate less than $3, and to meet this competition it was proposed to put in effect the rate of $2.85. The Commission denied this application under Fourth Section Order No. 230, stating that sufficient justification had not been shown for the relief sought.

Since then the Commission has conducted a hearing with reference to this application, at which the New Haven road and the hard-coal dealers of Boston were represented. Substantially the same reasons were advanced at the hearing as were set forth in the application, but with more detail.

The rail-and-water rate from the anthracite regions to Boston is $2.55; the all-rail rate $2.65. Coal dealers of Boston who receive coal by water at the $2.55 rate make deliveries by automobile trucks in the suburbs of the city, including Needham, Needham Heights and Newton Upper Falls, and the carriers allege that the present rate of $3 per ton is not sufficiently low to meet this competition, and the testimony so indicates.

In this connection there was also filed with the Commission applications setting forth the effect of water competition at Boston as justifying a lower rate than exists at interior points. In consequence the Commission has finally issued the following order covering the situation complained of:

> Application No. 774 asks, among other things, for authority to continue to charge lower rates on anthracite coal from points in the anthracite coal region of Pennsylvania to Boston, Roxbury, Boylston Street, Forest Hills, and Mount Hope, Mass., and other points adjacent thereto taking the same rates, than the rates concurrently effective on like traffic to intermediate stations;
>
> Application No. 5301 asks for authority to establish a rate of $2.85 per gross ton on prepared sizes of anthracite coal, all-rail, from mines in the anthracite region of Pennsylvania located on the rails of the Pennsylvania R.R. Co., the Central R.R. Co., of New Jersey, Philadelphia & Reading Ry. Co., New York, Ontario & Western Ry. Co., Erie R.R. Co., and Lehigh Valley R.R. Co., to Needham and Needham Heights, Mass., lower than rates concurrently in effect to intermediate points;
>
> A hearing having been held upon these applications, in so far as they relate to rates on anthracite coal from and to the points hereinbefore described, and full investigation of the matters and things involved having been had, and the Commission having, on the date hereof, made and filed a report containing its findings of fact and conclusions theron, which said report is hereby referred to and made a part hereof:
>
> It is ordered, That Fourth Section Order No. 230 be, and it is hereby, vacated.
>
> It is further ordered, That the petitioners herein be, and they are hereby, authorized to continue to charge as at present lower rates on anthracite coal from points in the anthracite coal region of Pennsylvania to Boston, Roxbury, Boylston Street, Forest Hills, and Mount Hope, Mass., and other points adjacent thereto taking the same rates, than are concurrently in effect on like traffic from the same points of origin to intermediate points; and to maintain higher rates to intermediate points, provided that the present rates to said intermediate points are not exceeded; and provided further, that the rates to Needham, Needham Heights, and Newton Upper Falls, Mass., shall not exceed the rate to Boston, Mass., by more than 20 cents per gross ton.
>
> The Commission does not hereby approve any rates that may be continued or established under this authority, all such rates being subject to complaint, investigation, and correction if in conflict with any other provision of the act.

The Prospects Are Good

According to all information received here, the prospect for Fall trade in coal is of the best. General trade during the summer, it is reported by those who are looking into the situation for the Federal Government, has been entirely healthful, while it is the opinion of the investigators that demand has on the whole been tolarably well supplied. The prospect however that Fall and Winter demand will add to prices for coal and the consequent necessity of filling orders early if all demand is to be gratified has, however, caused continuous anxiety on the part of those who do not wish to see the matter remain a political issue.

Representative Murray continues his demand for a thorough inquiry into the coal situation, with a special view to ascertaining why the requirements of Massachusetts have not been fully met and at lower prices. The general coal situation is causing in another way fresh demands for Government action as it is now insisted that the proposed Alaskan railway, to be built with public funds appropriated for that purpose shall be constructed at an early date in order that full advantage may be taken of this source of supply by shipments through the Panama Canal.

HARRISBURG, PENN.

The tri-district executive board of the anthracite region adjourned on Thursday, Aug. 21, after a lengthy discussion of plans to submit to the operators a demand that the "check-off" system be established throughout the region.

It is understood that sub-committees were appointed as part of a plan to submit the demand in the routine and orderly way, taking the matter up with the representatives of the companies with whom they have heretofore negotiated for the settlement of local colliery grievances.

The "check-off" system has never been employed in the anthracite region, though it is in force in the bituminous field of this state. Under its operation the companies collect dues from the members of the organization and turn the money over to the union officials. It has been indicated that the proposition will be opposed by the operators.

The importance of the demand and its far-reaching effects prompted National President White of the United Mine Workers to counsel delay, and is deemed responsible for his message, received shortly before adjournment, saying he would confer with the board at its meeting in Shenadoah during September. It is intimated that, pending the arrival of the head of the organization only a perfunctory demand will be presented, through the usual channels, the outcome to determine future action.

The Lenker dockage bill was also discussed at the meeting. The most salient features of this bill are the provisions which declare that the operators shall not dock the men for refuse, which is part of the natural formation broken down with the coal, and that the cars must be accounted for inside the mine instead of at the breaker or other outside points. The bill, however, provides that practices already in vogue will not be affected and that agreements may be entered into between the operators and the miners regarding the latter point. The enforcement of the law is being opposed by the operators on the ground that it interfers with existing agreements. The miners' leaders themselves are not particularly anxious to push this measure, as it threatens to annul some of the advantages which the men now enjoy.

Action Against Mine Cave Bill

The action instituted in the Scranton Courts against the "Davis Mine Cave Bill" was not unexpected, as this measure has a vital bearing upon the future mining of anthracite coal. The Davis bill is far less drastic than the Catlin bill, which was vetoed by Governor Tener. The Davis Bill provides that municipalities shall have the right to regulate mining under the highways for their protection. Since the highways cover a large part of the area of a municipality that safeguard is of considerable importance. In order to protect the highawys it would be necessary to leave surface support under adjoining property to prevent lateral sliding. In that case a large part of the private property in a municipality would have to be protected in order to carry out the provisions of the bill.

The controversy is different from that involved in the protection of private property from cave-in damages, as the public can claim rights and immunities which a private person may not urge. The highways are used by public utilities for running street cars, wires, gas and water pipes, etc., and in view of this the bill may be sustained.

There is a possibility that the courts may decide that surface support must be provided under streets that were laid out and accepted before the coal under them was secured and mining begun, but that the municipalities took the risk when they laid out the streets over coal that had already been contracted, with a waiving of damage claims.

The remedy proposed by the Mine Cave Commission appointed by Governor Tener has fallen flat. All that remains is a decision of the Supreme Court denying property owners the right of redress in case of damage. There is a strong sentiment through the region that the Commonwealth should invoke the police powers, but a suit along these lines has never been tried out in the courts.

PENNSYLVANIA

Anthracite

Hazleton—The miners of this region are making a determined effort to have President Kennedy of the district union appointed to membership on the board of trustees of the State Hospital. A mammoth petition is being circulated, for this purpose, and pressure is being brought to bear upon Governor Tener to make the appointment from among the miners.

The Dodson Coal Co. has posted notices at its Beaver Brook Colliery stating that work will be suspended until further orders, and thus about 1200 men and boys are idle. This is the first time that the colliery has been idle in the past eight years, and many of the men claim that the shutdown was ordered because the employees had intended to start a button strike.

Scranton—Seven hundred miners went on strike recently at the Peckville colliery of the Laskawanna Coal Co., because the company contracted with outside men for the removal of pillars. The officials of the union tried to prevent the men from walking out because such action is in violation of the agreement signed with the operators. The vote to strike was unanimous. The agreement between the mine workers and the operators makes it imperative that the companies pay a certain minimum wage for the removal of pillars, but does not state that the work must be done by the members of the miners union.

Wilkes-Barre—What promises to be another important lawsuit is the tresspass action filed by the trustees for the proprietors of Kingston Township against the Kingston Coal Co., in which $300,000 is asked in damages for coal mined under land in certain sections of the township. The case is similar to that of the trustees for the proprietors of Kingston Township against the Lehigh Valley Coal Co. for mining coal under 34 acres of land in Forty Fort, for which the township secured a verdict for $101,000, and a retrial of which has been ordered by the Supreme Court, and which suit comes up in October. The suits date back to 1769, nearly 150 years ago.

Carbondale—Sinking to his waist line while playing in the vicinity of the Watt-Scurry mine fire zone, a six-year-old boy was nearly burned to death when the crust caved beneath him. This tract has been ablaze for the last 10 years, and an appropriation was made by the last legislature to extinguish it, but Governor Tener vetoed the measure.

Shamokin—Alaska Colliery, of the Philadelphia & Reading Coal & Iron Co., is showing signs of being flooded and has been shut down until further notice as a protection to employees. The condition has arisen because a fire is burning in the Enterprise mine, further down stream. To quench this Shamokin Creek was turned into the Enterprise slope, and it has been discovered the water was escaping through the 50-ft. barrier pillar which separates the two mines. Danger exists of a sudden flood sweeping through all the Alaska workings, and it is not practical to keep pumping the water, for it must go into Shamokin Creek, and thence into Enterprise mine again.

Bituminous

Latrobe—Robert McGinnis of East Latrobe was killed by an explosion of dynamite in front of Superior Mine No. 1 of the Latrobe-Connellsville Coal Co. on Aug. 21. He was carrying a quantity of dynamite and caps and also had a battery in the package. Just how the explosion was caused is not known.

Kittanning—The Allegheny River Mining Co. has discovered two veins of coal which are considered to be unusually thick on the Fleming Farm in East Franklin Township. Some time ago a seven-foot bed of coal known as Upper Kittanning was found on this farm and lately at the same place, an eight-foot bed of Lower Kittanning was discovered.

Morrellville—E. W. Tuge, of Johnstown has opened a new mine at this place.

Carnegie—The coal industry in this vicinity is brisk this summer and almost every mine in the Chartiers Valley and the Panhandle district is beiog pushed to its utmost capacity to supply the demand for coal from the Northwest and Canada. The prospect now indicates steady work throughout the entire Fall and Winter.

Punxsutawney—Coal is once more being taken from the old No. 7 mine at Horatio which was abandoned two years ago. This coal is being taken from the fanway and is being mined at the rate of about a car load per day. Six or seven months will be required to finish up.

WEST VIRGINIA

Charleston—The case of J. H. Kidwell versus the Piney Mining Co. was decided by the arbitrators on Aug. 21. The decision reached by the Board of Arbitration was to the effect that miners should be paid at least twice monthly, that is: That the wages of employees earned up to the 15th of any month shall be paid in full not later than the last of the same month.

That miners in the New River fields who struck pending the adjustment of a grievance are violating the contract made with the operators July 1, is the substance of a statement recently made by Governor Hatfield. Several New River operators called upon the Governor and made complaint that at several mines the men refused to work pending the arbitration of their claims of unjust treatment. The Governor points out that one of the clauses of the agreement provides that miners shall remain at work pending the settlement of a controversy.

Bluefield—The Winding Gulf Colliery Co., has just opened a new shaft and tipple at Winding Gulf on the White Oak branch of the Chesapeake & Ohio R.R. The shaft is the only one on Winding Gulf, all other mines in that field being worked by drift. The steel tipple has a capacity of 2000 tons in eight hours, is equipped with the most modern machinery including automatic cut-off and self dumping cages. Electric power is furnished from another plant on the Winding Gulf.

TENNESSEE

Covington—The city of Covington has filed with the Interstate Commerce Commission a complaint against the Illinois Central R.R., in which it is represented that the railroad discriminates unjustly against Covington in the matter of freight rates on bituminous coal from Beaver Dam, Central City and western Kentucky points. It is alleged that the rate from western Kentucky mines to Memphis is $1.10 a ton, the shipments passing through Covington, which is 38 miles closer to the mines than the larger city, although the rate to Covington is $1.35 a ton. An adjustment is asked.

KENTUCKY

Hazard—Hazard is working hard for the proposed government hospital which is to be located in that section of the state to aid in the treatment of trachoma, which has become prevalent in several of the mountain counties. The growing importance of the city as a coal-mining center is expected to weigh heavily in its favor, as the disease is said to be economically important on account of its effect on industrial workers.

Pineville—The offices of the Wallins Creek Coal Co., which have been located at the mines in Harlan County since the company was organized, have been moved into Pineville, in charge of F. D. Wood, president, and S. G. Gray, secretary-treasurer of the company.

OHIO

Columbus—Smith M. Comley, receiver for the Carding Coal Co., of Columbus, has filed a report with the court showing receipts of $22,148 and disbursements of $19,503, leaving a balance of $2645 to be distributed among the creditors.

McArthur—Dayton Dickson has leased the coal rights on the Dana farm, near this place, and will start at once to drive an entry to develop the property which contains a good vein of coal.

Athens—Steps are being taken by the residents of Athens and vicinity to stop the flow of poisonous mineral waters from

Bellaire—The largest tipple in this county is in course of construction at the No. 6 mine of the Rail & River Coal Co. a few miles west of this city. During the improvement at this mine which is a part of the large improvement now being effected, the mine is idle and will remain so until all outside work is completed. It is thought it will be the 1st of September before this is done.

INDIANA

Linton—The Monon Coal Co. will sink a new shaft six miles southwest of Linton.

Sullivan—Unofficial announcement has been made that the Vandallia Coal Co. will take over the holdings of the Sunflower Coal Co. near Dugger and will open up a number of mines which have been partly abandoned.

Petersburg—After five months of steady pumping the S. W. Little Coal Co. owner of the Blackburn Mines which were flooded during the March freshet has cleared the mines of water and they will be opened early in September with the employment of something over 300 men. The Hartwell mine in the southern part of the county after an idleness of several years will also open about the same time giving employment to about 250 men.

Indianapolis—Jacob P. Brown, smoke inspector, is trying to induce the railroads owning round houses within the city limits to follow the practice recently started by the New York Central Lines at the Chelsea round house of firing locomotives with coke and oil soaked shavings instead of coal. Since the new system of firing has been started at the Chelsea St. round house conditions have been improved greatly and the smoke inspector says that he has received no complaint from persons residing near the place.

Jasonville—It is said that the Island Valley mine of the United Fourth Vein Coal Co. will resume operations shortly. This mine has been closed since March. It is one of the best equipped mines in this field and gives employment to about 200 men.

ILLINOIS

Springfield—The Jefferson mine, which has been closed for some time, will reopen soon, as a force of men are at work cleaning up the same. This mine is located southeast of Springfield and is the property of the O'Gara Coal Co.

Livingston—The mine known as No. 1, of the New Staunton Coal Co., located at Livingston, Madison County, Ill., made the following daily hoisting averages since July 1, 1913: July 1 to 15, 4132 tons; July 15 to 31, 4179 tons; Aug. 1 to 15, 4200 tons. The above mine produced 848,715 tons of coal from July 1, 1912, to July 1, 1913, and from the present indications this is the largest production for the year and it is believed the largest amount of coal ever produced from one mine in Illinois in a year.

Cardiff—The village of Cardiff will soon pass out of existence. The owners, the Cardiff Coal Co., have sold the various mine buildings including the tipple, to R. W. Powell and Fred G. Snow, who will remove them to Kankakee. The mine has been closed for several years following an explosion of gas in which a number of miners lost their lives. The bodies of these men are still in the mines.

Chicago—The first National coal trade Golf Tournament will be held at the Homewood Country Club on Sept. 8 to 10, 1913. Make your entry as early as possible.

IOWA

Des Moines—The Norwood-White Co. of Des Moines is opening a new mine at Burwick, Ia. This will be electrically equipped and will be one of the largest in output in the state. Power will be purchased.

ALABAMA

Birmingham—The Maryland Coal & Coke Co., which recently began operating on a large tract of land in the Sipsey Valley on the Black Creek Seam, reports that it is getting about 400 tons per day, which will be increased to 800 tons by December.

ARKANSAS

Russellville—A Coöperative Co. has been formed for the purpose of working the old Humphrey-Smith coal mine north of Russellville after an idleness of several years. The new concern will be known as the Acme Anthracite Coal Co., and will operate the mine under lease.

Midland—The Mammoth Coal Vein No. 6 located at Midland has resumed operation after being idle for a period of 18 months. This mine has given employment to over 40 miners and its resumption is welcome news to Midland.

TEXAS

Flatonia—A lignite deposit has been discovered on the H. Harrison farm, three miles north of the city. The discovery was made during the sinking of a well at a depth o 23 ft., the deposit proving to be five feet thick. Mr. Harrison at once made investigations relative to the area of th deposit and a number of wells were sunk at different place This showed that there are about 20 acres underlain wit lignite of a workable thickness.

San Antonio—Two beds of what is said to be a hard grad of bituminous coal are reported to have been struck o property belonging to the McMullen Townsite Co. One vei 40 ft. below the surface is 15 ft. thick. The other lies 80 ft down and is five feet thick, both, however, are considere paying veins. The property is situated only 12½ mile from Crowther where there is oil in paying quantities.

COLORADO

Trinidad—An indorsement of the efforts now being made by the United Mine Workers of America to procure the recognition of the coal operators in District No. 15 was embodied in an emergency resolution passed by the Colorad State Federation of Labor Aug. 19.

WASHINGTON

Kopiah—Fifteen men are now at work on the 200 acres of coal land recently bought by the Monarch Coal Co. on the line of the Eastern Railway & Lumber Co. and one mile west of Kopiah. The management is erecting bunkers and putting in switching facilities and expects to be shipping 10 tons of coal per day as soon as these improvements are completed, which will be inside a month.

Mendota—Much development work is being done at the old mine here and new timbers are being put in place. The mine has been idle for a number of years but much money is now being spent in development work, under new ownership.

Spokane—The Mcgillvray Creek Coal & Coke Co., having its headquarters in Spokane marketed 135,912 tons of coal during its last fiscal year, according to a report just issued by E. W. Cullen, secretary of the company. The mine worked 256 days. The product was sold in Alberta, Saskatchewan, Washington and Idaho. In addition to this quantity sold, 264,650 tons were made ready for immediate production.

Harrington—In drilling a well at Harrington, Wash., Bart Schmidtz has encountered a large vein of high-grade coal. Further developments will be made.

OREGON

Portland—The Monarch Coal Co., of Portland, which has just begun the development of a mine eight miles east of Centralia, Wash., in the Hannaford Valley district, expects to take out 50 tons of coal daily after Oct. 1. The spur is now being built to the mine and bunkers are being constructed. The tunnel is driven where the coal outcrops and hence the operation is not a difficult one. The coal is soft and of good grade.

Coos Bay—Smith-Powers mine, recently opened, is on Isthmus Inlet, a navigatable arm of Coos Bay, and the management can load direct into vessels or on cars. The mine is equipped with electrical machinery, for mining and handling the output, and is prepared to supply coal cheaply. The mine is owned by the C. A. Smith Lumber Co.

FOREIGN NEWS

Vancouver, B. C.—John Place, socialist member of the British Columbia parliament, Arthur Jordan, secretary of the Naniamo coal miners local, and Joe Angelo, leader of the foreign element in the strike at Naniamo, were arrested Aug. 18 with about 40 other men implicated in the strike disturbances.

PERSONALS

At a meeting of the directors of the Maryland Coal Co. of West Virginia, President Ziegler proffered his resignation which was accepted.

Jones Moore, one of the best known coal men in the Birmingham District, has announced his candidatecy for sheriff of Jefferson County, Alabama.

A. Kauffmann, formerly assistant to the president of the Link Belt Co., has been made General Manager of the Philadelphia Works at Nicetown, Philadelphia, Penn.

H. McKean Conner, who recently has been general superintendent in charge of all operations and engineering for the Continental Coal Corporation has severed his connection with that firm.

H. N. Starnes, Jr., has been appointed general sales agent of the Tune Coal Co., mines at Carbon Hill, and the John Henry Coal Co. mines at Jasper, and has opened an office in the American Trust Building, Birmingham, Alabama.

Thomas H. Shaw recently closed down Mine No. 1 on the Smedley lease near Midland, Ark. This mine was in a dangerous condition with poor air supply, and several practices being pursued which were in open violation of the state laws.

George Best for 12 years president of the Best Manufacturing Co. has severed his connection with that concern, and with his son, George H. Best, has organized the Best Pipe Engineering & Supply Co. The office of the new firm will be at No. 3026 Liberty Ave. Pittsburgh, Penn.

CONSTRUCTION NEWS

Hynes, Iowa—The Smoky Hollow Coal Co. is sinking a new shaft at Chisholm, Iowa. This will be Mine No. 9.

Peoria, Ill.—It is announced that the Big Creek coal mine plant, recently destroyed by fire, will be rebuilt at once.

Sharon, Penn.—The Shenango Furnace Co., operating three blast furnaces at Sharpsville, has acquired recently considerably more land near its property. This is taken as further proof that a big coking plant is to be erected soon.

Bluefield, W. Va.—The new all-steel coal tipple which the Jewell Ridge Coal Corporation, of Richlands, is erecting at the head of Big Creek, is expected to be complete about Sept. 1. This is one of the most modern and uptodate coal mine equipments in the Clinch Valley district.

Stone, Ky.—Colonel L. E. Tierney, of the Tierney Mining Co. at Stone, Ky., has awarded to the Link Belt Co. of Philadelphia, the contract for a complete tipple equipment and retarding conveyor. This equipment is especially complete in all respects and practically every combination of the various coals as well as the separate sizes can be produced.

Cordova, Ala.—The Oak Leaf Coal Co., began grading on Aug. 18 a three-quarter mile extension of track preparatory to making two new openings into the main body of its coal. The two openings will be on either side of the valley, and connected by a twin tipple. It is believed that this work can be sufficiently completed to run coal from both openings by the first of the coming year.

Weyanoke, W. Va.—The Weyanoke Coal & Coke Co. is putting in the concrete foundation for a new tipple. This tipple, which is to have a capacity of 1500 tons per day, is to take the place of the present structure, which is no longer able to handle the increasing tonnage. This coal company has 1150 acres of land in Mercer County on the famous Pocahontas No. 3 seam, which so far as developed in this property averages 4½ ft. in thickness.

NEW INCORPORATIONS

Pittsburgh, Penn.—The Pennsy Coal Co. and the Buckingham Coal Mining Co., of Franklin, Penn., have been consolidated into one organization, known as the Pennsy Coal Co.

Chicago, Ill.—The Illinois Commercial & Mining Co. has been recently organized to deal in coal, coke and other products. The incorporators are Geo. J. Clare, Edward Corlet, and others.

Chicago, Ill.—The Middle States Coal & Coke Co. has been organized with a capital stock of $10,000 to engage in the mining and sale of coal. The incorporators are Geo. N. Beek, Wm. G. Beek, and F. D. Brenner.

Indianapolis, Ind.—The Otter Valley Coal Co. has been organized with a capital stock of $100,000 to mine and sell coal, and other minerals. The directors are Wm. B. Smith, Wm. E. Lenton, and Lauren A. Hilligoss.

INDUSTRIAL NEWS

Hobson, Ohio—The Calvin-Essex Coal Co. has just closed a contract with the Roberts & Schaefer Co. for equipment for a 200-ton per day modern tipple, which will be immediately built at Hobson.

Philadelphia, Penn.—The Lehigh Coal & Navigation Co., which operates canals in eastern Pennsylvania in connection with its coal properties, anticipates the purchase of 21 steel canal boats. These will be about 90 ft. long and will weigh 70 to 75 tons each.

Kempton, W. Va.—The Davis Coal & Coke Co. plans to open a new mine at Kempton and equip it for a daily capacity of 1500 tons. The development will include the construction of a mining town and a ¾-mile branch railroad from the Western Maryland, from Henry to Kempton.

Uniontown, Penn.—George F. Titlow, of this place made a profit of $50,000 on a coal deal recently consummated. A tract of land, which consists of 261 acres on Roberts Run in Wayne Township lying in Greene County was purchased by Titlow eleven years ago for $13,500 and sold for $65,000.

Connellsville, Penn.—Fire on the night of Aug. 20 did some slight damage to the coal tipple in the Baltimore & Ohio yards. It first started about nine o'clock and was supposedly extinguished, but revived again about eleven, when the city department was called out. The damage done was not great.

Camden, Ark.—Dr. George W. Kimball, of Chicago, who discovered the vast lignite and clay deposits in this county, is erecting a factory in the suburbs of this city for the manufacture of byproducts from the lignite. Among these byproducts are a fireproofing fluid, a strong creosote oil, a high grade of carbon, and a number of medicinal chemicals.

Patton, Penn.—Interest surrounds the activity of the Manor Real Estate and Trust Co., which has taken an option on a 400 acre tract of coal extending from Patton to Frugality. The tract is situated in the Beaver Run field which has been the bone of contention for a long time between the New York Central and Pennsylvania R.R. Both roads have easy access to this district by the construction of short spurs of track.

Washington, Penn.—A miner charged with changing coal checks in the Marianna mine of the Pittsburgh-Buffalo Co., recently had the unusual experience of having the presiding judge in his trial act as his attorney. The foreigner had no counsel. No attorneys were present in the court room and the judge stated he would act not only as judge but counsel for the miner. The Court cross-examined witnesses, and after hearing the evidence the jury acquitted the defendent but placed half the costs upon him.

Connellsville, Penn.—The Interstate Commerce Commission has issued a second supplemental order in connection with the decision of May 29, in the case of the Connellsville Coke Producers Association against the Baltimore and Ohio and other roads. The decision is modified to the extent that it relieves the Baltimore and Ohio and the Erie from maintaining a rate of $2.30 a ton on coke from the Connellsville region to Newark, by way of Mount Jewett, and leaves in effect the old rate of $2.35 a ton.

Morgantown, W. Va.—The Morgantown & Kingwood R.R. has closed a deal by which it has leased from the Central Iron & Steel Co. 40 big steel hoppers for use in transporting both coal and coke. These cars have been delivered at the company's Sabreton shop and are now being restenciled with the railroad name. The cars are of extra large size, and will be a material addition to the road's rolling stock. The leasing of extra cars was made necessary by the increase in output of the Elkins mine, the company shipping a considerable amount of coal to the East.

Bremerton, Wash.—Tests of Alaska coal are to be conducted abroad the armored cruiser "Maryland." If the results prove that the Alaskan coal is of a steaming quality sufficient for the needs of the navy it will result in the saving of hundreds of thousands of dollars every year. At the present time, coal used in the boats on Pacific waters is shipped around Cape Horn from Norfolk, Va. The supply for the tests has been obtained, and the coal is available at Controller Bay. This coal, which is now being tested, was mined in the Bering River coalfield, brought on sleds over snow and ice to Bering River, where it was transported to the coast on light barges. The mining was done under the direction of experts from the Bureau of Mines.

COAL TRADE REVIEWS

GENERAL REVIEW

Hard coal uniformly dull except for water shipment out of New York Harbor. Some storing and no immediate improvement anticipated. Bituminous quiet but showing no weakness. Heavy production being well absorbed. Increased pressure for coal from the Northwest. Prices firm.

The demand for water shipments of hard coal out of New York harbor is the only active branch of the anthracite trade. Down East points, particularly those where navigation closes, are taking all the possible coal they can get. Otherwise the trade is dormant and orders are difficult to obtain. Some of the smaller sizes are going into storage, including pea, although indications are that there will be a severe shortage of this latter grade within sixty days.

The abnormal tension in the bituminous market has been materially relieved, although no important weakness has developed except possibly on occasional odd tonnages of the off qualities. The export business is falling off, but coastwise shipments are heavy and the West Virginia coals are moving forward in a good volume. Most of these tonnages are applied on contracts, but some companies are actively seeking an outlet for odd lots of prompt coal and as a result the demand has slacked off. Vessel tonnage is scarce, due to the continued heavy movement of anthracite. Prices are holding up well, particularly on the better grades, which are showing a stiffening tendency, but there is rather less inquiry than has prevailed.

Increased pressure for coal, due to the heavy demand from the lakes, has been the feature of the Pittsburgh market. Prompt tonnages can be obtained only at a substantial premium, and there appears to be little available even then. The car and labor shortage are steadily becoming more severe, and as a result the market is maintaining its full strength without any difficulty. Loading at the Ohio docks is up to full capacity, and both the steam and domestic grades are strong. Quotations have stiffened up still further on reports of a further tightening in the car situation, the inadequate supply of which is also interferring with the lake shipping to some extent.

The movement of coal through Hampton Roads has been heavy, but prices continue firm at the previous level with some agencies still short. There has been a large demand from the foreign trade and also in the New England markets. The railroads in the South are storing heavily in anticipation of an acute car shortage, the situation already being so tight that production is seriously curtailed. The demand for both steam and domestic fuels is excellent, and prices as a whole are entirely satisfactory. Business in the Middle Western markets is improving generally, and prices are better maintained. The car shortage, which had a noticeably stimulating effect upon the market is materially improved, but still rather severe. The September circular will probably show some further advances.

BOSTON, MASS.

Hampton Roads coals easy at the season price, but no prospects of any concessions. Consumers are taking tonnage liberally and will continue doing so until stocks reach the maximum. Little interest in spot coal. Pennsylvania grades less firm and Georges Creek in better supply. Anthracite market in good shape; another "advance" rumored.

Bituminous—Aside from small local labor troubles in the New River district the situation is generally easy with regard to supplies for September. The West Virginia coals are coming forward in such volume that the demand for other grades is beginning to slacken. Several shippers are actively seeking business for spot coal but buyers are rather slow responding. With the market so quiet it is hard, in late August, to get up much enthusiasm and when the $2.85 figure is considered over against the $2.70 of a year ago the operating and selling interests have much to be thankful for in the course of the season's business thus far.

There are few weak places in the price situation; while now and then are heard rumors of 5c. less than the contract price for Pocahontas and New River, they are usually traced to the less favorably known operations, and sales have been made within a week at $2.90 f.o.b. Receipts at this end continue heavy but with not as much effect on car prices as was looked for. So far most of the tonnage has been applied to contracts and no doubt will continue so until stocks are well beyond what New England manufacturers have come to regard the safe point, which means the utmost they can store. That keeps the larger agencies well supplied with orders for some weeks to come and close observers will be much surprised if they are not enabled to go through the next two months with $2.85 a reasonably firm price.

Georges Creek shipments to tide have been heavier the past week than at any time this year and the sales offices are quietly looking over the market to see where it shall go. One of the factors in placing this grade as well as those from Pennsylvania is the unexpected dearth of barges for Philadelphia loading. The demand for anthracite keeps up so well that almost no water transportation is being released to the bituminous trade, and that acts as a setback to shipments of those coals to this market.

Prices on the Pennsylvania varieties continue firm but with rather less inquiry than a week ago. Quotations on all grades are somewhat off but operators still profess to be apprehensive over labor and car shortage during late fall and winter. All-rail the trade is brisking up a little and the outlook for September is favorable.

Anthracite—The companies appear to have ample business in hand for current output and the Eastern ports that close to navigation in late November are showing a renewed interest in getting supplies forward. The steam sizes are also in good request and the trade as a whole seems in excellent shape. There are rumors once more of an advance in the company barge rate from New York to Boston points. For 15 years or more this has been fixed at 50@55c., depending on the loading port, and if this charge is increased it will be still another of the many "lifts" the New England trade has had to meet the last few years. It will be interesting to see how this phase develops.

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.50	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.40@2.75	2.60@2.90	2.92@3.02	
New York*	2.70@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.80@3.85
Providence†				3.90@4.00

*F.o.b. †On cars.

NEW YORK

Soft coal dull but not weak. Some large railroad contracts pending. Production heavy. Demand for water shipments out of New York Harbor the only active branch in hard coal.

Bituminous—The softening tendency noted in our last report still continues, although without having developed any direct weakness. Consumption continues large, the demand heavy and operators generally are pushed to meet their contract obligations. The market is temporarily dull but not weak. Several important railroad contracts involving large tonnages are still pending and continue to be one of the principal features in maintaining the market; indications point to the railroads being important buyers in the spot market, as has been the case during the past few years.

There is not much coal at tide and business there is also slow. In the line trade orders are coming in more freely. Car supply as a rule is fairly good, only occasional shortages being reported at some sections on the Pennsylvania R.R. The insufficiency of miners is one of the greatest uncertainties in the market at the present time. Not only are men scarce and difficult to obtain, but production has been further restricted by a seemingly unprecedented succession of holidays, such as "Old Home Week," Labor Day and religious holidays, not to mention countless picnics, county fairs, etc.

Production is up to full rated capacity with the exception of some small tonnages which the producers have refused to place in the contract market, keeping these free for use in the spot market during the winter activity; such tonnages are necessarily difficult to move at present and require a certain restriction in production. We now quote the New York soft-coal market on the following basis:

West Virginia steam, $2.60@2.65, fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85;

best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The trade locally is dormant, there being little activity in anything except stove, the demand for which is only moderately good. Mines are only working four to five days a week and it is a question at the present moment when the situation will improve, but certainly not before there is some evidence of cold weather. The consumption is not sufficient to absorb the production and orders are difficult to obtain, particularly by those agencies who are charging the new Pennsylvania State tax on hard coal. Pea and buckwheat are going into stock, but it is expected that the winter will see pea one of the short, if not the shortest sizes.

One of the most encouraging conditions in the local hard-coal market is the heavy demand for all grades from down East points. Shipments in that direction are running well ahead of last year, for this same period, but this does not give a consistent comparison for the reason that shipments were light last year, due to the strike. However it is indicitative of a heavy shipment into that section. In anticipation of the suspension the first part of next week, due to Labor Day, the mines will probably be pushed for a little larger production, than has been the case for several weeks past, when it was found necessary to restrict the output.

We quote the New York market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken..............	$4.90	$4.90	$4.85	$4.85
Egg.................	5.15	4.95@5.15	5.10	4.90@5.10
Stove...............	5.15	5.15	5.10	5.10
Chestnut............	5.40	5.25@5.40	5.35@5.15	5.35
Pea.................	3.50	3.35@3.50	3.45	3.30@3.45
Buckwheat...........	2.75	2.50@2.75	2.45@2.70	2.15@2.60
Rice................	2.25	2.25	1.95@2.20	1.70@2.20
Barley..............	1.75	1.75	1.70	1.30@1.70

BALTIMORE, MD.

Export business has fallen off, but coastwise charters are numerous. Slack and coke both show advances, and the rest of market is holding firm. Car shortage becoming more acute. New mines to begin shipping soon.

That August will show a decline in the amount of export business seems undoubted, as the past two weeks has seen a considerable let up in the number of charters announced for foreign delivery. On the other hand, the domestic coastwise trade is in excellent shape and all the piers here have been busy with loadings both north and south. Charters announced the past week for the coast trade include a number to Boston and other points Northeast while Southern charters are principally to Savannah, Galveston and Port Tampa. There has been some talk that the drop in export figures is attributed largely to the unsettled state of affairs in Mexico, which may have curtailed the coal movement in that direction.

The principal features of the local market for the week have been slack and coke, both of which have strengthened. Slack was selling at the mines easily at from 80 to 85c. West Virginia coke, under an increasing demand, has risen to from $2.20 to $2.50, and Connellsville grades are quoted at from $2.40 to $2.65. The balance of the coal market has held firm, and, indeed, some of the better grades are scarcer than ever. A growing car scarcity has not been conducive to an easy supply. While there have been days when cars were fairly plentiful, there were also periods when few, if any, were delivered.

That the producing end is satisfied that good times are ahead is shown by the rapid opening of new properties. Following the announcement that Hite and Rafette will open a new mine in West Virginia on the line of the Western Maryland R.R., comes the statement that the Elkhorn Fuel Co. leases will begin first shipments from the Kentucky properties of that corporation within the coming month.

Anthracite business is slowly showing increased signs of activity. There is plenty on hand of all grades, however, and the main business just now is in rounding out affairs for the fall trade.

PITTSBURGH, PENN.

Mines working at full capacity, with fair supply of labor and cars but fears of car shortage later. Hardly any free coal available, and then only at premiums. Slack output well absorbed. Slight flurry in Connellsville coke quotations, market righting itself later. Production and shipments slightly increased.

Bituminous—The pressure upon the mines has slightly increased, the Northwest apparently being ready to take all the coal that can possibly be shipped. Car shortage has also increased, and while no serious difficulty is expected it is recognized that the capacity of the railroads will be tested throughout the next two months. Labor supply is fairly good, and Pittsburgh district mines are working practically at capacity, and turning out very close to the maximum tonnages ever reached.

Free coal can be secured only in exceptional cases, and on a few divisions, commanding substantial premiums in such cases, while contracts cannot be closed at regular prices except for shipment beginning not earlier than Nov. 15 or Dec. 1. Slack is usually bringing the full season price, concessions being light and obtainable only on a few divisions. We continue to quote regular prices as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

Connellsville Coke—A little flurry was caused early in the week by a prominent merchant firm offering furnace coke for spot shipment at various prices from $2.40 down to $2.25, presumably with a difference in quality. This was in a market of no absorbing power, and it appears that none was sold. Later demand appeared and the best that could be done was $2.50, which was paid on about 2000 tons for shipment over the balance of the month, so that the market is regarded as well established as at any time.

The next demand of importance will be for September, from a few furnaces not already covered, and there seems to be little question that this will be covered at the full price. In view of the further declining tendency of prices in the steel industry, making improbable any important advance in pig iron, a fresh question is raised as to whether the $2.50 price on Connellsville furnace coke can be indefinitely maintained. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $3; contract foundry, $3, per ton at ovens.

Production in the Connellsville and lower Connellsville region in the week ended Aug. 16, as reported by the "Courier," was 398,617 tons, an increase of 3792 tons. Figures for recent weeks have shown a slight progressive increase, though blast furnace operations have been on the decline. The coke rate is now only some 25,000 tons below the average rate in the earlier months of the year.

BUFFALO, N. Y.

The unusual strength in bituminous continues unabated. Car and labor shortage the two worst features of the market. Prices firm with occasional premiums offered. Heavy shipments of hard coal up the Lakes.

Bituminous—The market shows undiminished strength with many sales being made at a premium which is an unusual condition at this time of year and is accounted for mostly by the heavy lake business. Were it not for the scarcity of miners the operators would have little to complain of, but coupled with the large demand there is also a curtailment of output. Advertising for men and solicitation in the labor markets, generally meets with little success. More is being heard right along of a scarcity of cars, especially gondolas. The railroads are cautioning their patrons to keep cars moving and not to use them for storage purposes. The outlook is for a tie-up of motive power and equipment this winter and a consequent difficulty in moving coal. From now until the arrival of cold weather an increasing car shortage is looked for. From the extent of contracting during the summer, it is apparent that buyers wish to be sure of coal this fall and winter.

Bituminous prices remain strong and sometimes reach a premium, the quotations being as follows: Pittsburgh lump, $2.90; three-quarter, $2.80; mine-run, $2.65; slack, $2.15; with Allegheny Valley about 15c. lower.

Coke—The coke market is firm, with a somewhat better demand on account of the starting up of furnaces. Nevertheless, the trade cannot be called active in this territory. Quotations remain on the basis of $2.65 for best Connellsville foundry.

Anthracite—There is only the usual quiet midsummer trade in hard coal. Retailers apparently will not buy in any quantity until the weather becomes colder. Their supplies continue fair, but with the approach of chilly weather there will no doubt be the sharp demand that is almost always present. The main outlet for coal is up the lakes and that trade is continuing on a large scale. August is likely to run almost equal to the unprecedented figures of July, and may possibly exceed them. For the past week the shipments dropped off as compared with the previous week, but at the same time the total was large, amounting to 158,000 tons.

TOLEDO, OHIO

Loading docks for Lake coal being worked up to full capacity. Car supply fair so far. Domestic trade good. Prices strong and will probably increase as the season advances.

The coal trade continues active in Toledo especially at the docks where machinery and men are having difficulty in taking care of cargoes. During the week just past 154,590 tons of coal passed through. Thus far in the month of August more than 700,000 tons of coal were sent to the uplake ports from Toledo. The demand for steam coal continues undiminished and Pocahontas is also very strong and is improving steadily.

The traffic situation here is the best and no complaints of car shortages have been heard although railroads are occasionally asking dealers to take hopper cars. This is only in occasional instances, however, and has not by any means become general. Toledo dealers are somewhat opposed to the hopper cars as they are not equipped for unloading this class of cars and find themselves at a disadvantage. Rumors of car shortages are heard now and then from the north but have not as yet reached an acute stage even there. Toledo is exceptionally well equipped for taking care of traffic which will in a measure off-set the difficulties attendant upon a Michigan car shortage.

Work is being pushed on the new Hocking docks and it is confidently expected that this mammoth piece of construction will be finished by the opening of navigation next season, to the great advantage of Toledo. The domestic trade here is good for this season of the year. There are still occasional cars of coal being sold here at concessions from the list but this is invariably coal on track being moved to avoid demurrage and left on dealers' hands through some unforeseen mishap. Prices are being well maintained and dealers are all confident that coal will be even stronger later in the season, than now.

Prices as quoted on this market follow:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.
Egg	2.25	1.20	2.50	1.50	2.50	....	....
Nut	1.80	1.20	2.25	1.50	2.50	....	....
$\frac{7}{8}$ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.50	1.10	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

The car shortage has appeared and production is restricted. Prices well maintained and the tendency is upward. A new circular effective Sept. 1 shows advances in all grades.

The coal trade in Ohio during the past week has been at the mercy of the car supply to a large degree. As a result of a worse condition in that respect, strong quotations prevailed in every grade. The demand ruled good and taking it all in all the tone of the market was excellent.

The lack of cars was most noticeable in the Eastern Ohio field where the B. & O. and other roads have had trouble to keep mines in operation. It is estimated that the output in that district was 65% of normal. In the Pomeroy Bend district the car shortage was also bad and the production was considerably curtailed. In the Hocking Valley the output was about 75% of the average and the same percentage prevailed in the domestic fields.

The Lake trade is still active, although somewhat hampered by the car shortage. The demand for tonnage from the Northwest continues good and activity is expected to prevail right up to the close of navigation. Boats are still being chartered for September and October.

Domestic business is increasing in volume although the weather has not been the most favorable. Dealers are trying to accumulate stocks to guard against a car shortage. Consumers are ordering steadily and retailers are busy making deliveries. Operators are not inclined to book orders for domestic grades to be delivered in the future and the result is that all dealers are buying a great deal in the open market. Retail prices are strong and at a level higher than last year at this time.

Steam trade is also active and manufacturing establishments are consuming a large tonnage; in fact there appears to be an increase in their requisitions. Iron and steel concerns especially are good purchasers of steam tonnage while railroads are using a great deal of fuel to move the freight of the country. Steam contracts, when they expire, are being renewed at a higher figure than last year.

A new circular, effective Sept. 1, will advance domestic lump to $1.75 and three-quarter inch to $1.60. Mine-run in the Hocking Valley and Pomeroy Bend will be $1.40.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump	$1.70 @ 1.65	....	$1.70 @ 1.65	$1.70 @ 1.65
3-4 inch	1.55 @ 1.50	$1.30 @ 1.25	1.45 @ 1.40	1.50 @ 1.40
Nut	1.30 @ 1.20	....	1.35 @ 1.30	....
Mine-run	1.35 @ 1.25	1.20 @ 1.15	1.30 @ 1.25	1.20 @ 1.25
Nut, pea and slack	0.70 @ 0.65	....	0.70 @ 0.65	0.65 @ 0.70
Coarse slack	0.60 @ 0.55	0.75 @ 0.70	0.60 @ 0.55	0.55 @ 0.50

HAMPTON ROADS, VA.

Coastwise and foreign shipments fair. Prices firm with a normal accumulation of coal at Tidewater.

Shipments from Hampton Roads during the past week have been fairly heavy. Some large cargoes have moved to the New England market as well as to foreign ports. Prices for New England and foreign shipments have ranged from $2.85 to $2.95 and even $3 has been asked by some of the suppliers, but so far as can be ascertained there have been no sales at this latter figure. Quite a number of the agencies are still short of coal and are only taking care of contract business.

There has been a fair demand from inland buyers for Pocahontas and New River coals, but little inquiry for gas splint, etc. In addition to coastwise and foreign cargoes loaded from Hampton Roads the U. S. Collier "Brutus" took a cargo of 4000 tons from Sewalls Point for use on the various vessels of the Atlantic Fleet.

LOUISVILLE, KY.

Almost a typical fall market already. Car shortage becoming more pronounced daily. Operators conservative on future business. Strike rumors also influencing the situation.

With the demand for coal steadily increasing and the supplies as consistently decreasing, the local market resembles conditions in December rather than the last of August. Normally at this time of the year the car supply is plentiful and the operators experience no difficulty in producing more than sufficient coal to meet all requirements, but now the car shortage is reaching serious proportions which, together with other difficulties, is making it difficult for the producers to meet the demand, with the result that the situation is already moderately tight.

The shortage of equipment is becoming more pronounced almost daily. There are already rumors of embargos being declared against Chicago and other Northern points, due to the difficulty in getting cars returned. There has been a heavy movement in that direction this summer and there is already a noticeable shortage of rolling stock. The situation is being further aggravated by the absolute refusal of many consignees to accept the new hopper bottom cars of the L. & N. R.R.; the tipple equipment at many of the mines is also not adapted to loading these cars. It is estimated that there are 2000 more local cars in the Northwest than last year, and that this, together with the general dissatisfaction with the new hopper-bottom equipment, accounts for the tight situation, and indications are that it will become steadily worse as the season advances.

Persistent rumors regarding the possibility of a strike in the eastern Kentucky field are also having an important bearing on the situation. Operators in that section are inclined to take a conservative attitude toward future commitments and are generally refusing to accept orders for the September delivery. The difficulty may reach a climax at any time or may drag on until winter, when the situation would be even more acute than at present. Organization among the miners there has heretofore met with prompt action by the operators, but it is understood that the unions are bringing more than ordinary pressure to bear in this instance.

Steam coal is probably the strongest branch in the local market while prices generally are at about the same level, 90c. being the prevailing quotation on Straight Creek, nut and slack, which is rather scarce; in western Kentucky nut and slack sells easily at from 50 to 55 cents.

DETROIT, MICH.

Market strong in every particular. Car shortage having a sharply stimulating effect on the situation. September circular will probably show some advances.

Bituminous—Both domestic and steam business have been active during the past week and the outlook for the future continues as encouraging as ever. The principal difficulty facing the producers at the moment is the impending car shortage which is, however, being anticipated in every way possible.

The steam consumption continues heavy, railroads requiring a large tonnage in order to take care of the excessive freight movement and manufacturing establishments are showing no disposition to decrease their demand. The steam trade is undoubtedly the strong feature in the local situation and the indications are that it will continue so indefinitely. The domestic business is also good, the large retail dealers ordering heavily in order to replenish their stocks; because of the heavy demand from their customers these are seriously depleted in many instances and in addition to this the dealers are anxious to anticipate the probable car shortage as much as possible. Prices for September delivery have not yet been arranged and there is some uncertainty over business for that month. It is believed that a slight advance on the domestic grades will become effective Sept. 1. The Lake business continues as active as ever.

The local soft-coal market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.75	....	....	$2.75	$2.50
Egg...........	1.65	....	1.75	....	....	2.75	2.50
Steam lump....	1.50	....	....	....	....	....	....
-in. lump......	1.25	$1.25	1.25	$1.25	$1.25	....	....
Mine-run.......	1.15	1.15	1.15	1.15	1.15	1.50	....
Slack..........	0.90	0.90	0.65	0.70	0.70	....	....

Anthracite—While apparently dull and featureless on the surface there are many indications of strong latent possibilities in the hard-coal market. Quotations on all grades are holding firmly at the circular with premiums of 25c. being demanded on some sizes. The indications are that the market will be firm throughout the season with the possible exception of a few isolated cases where some independent coal has accumulated.

BIRMINGHAM, ALA.

Demand good for all grades. Prices holding up well. Car shortage still handicapping operators, with no prospects of improvement. Pig iron firm with slightly better sales.

The operators in this district report that the demand for both steam and lump coal is exceptionally good, and that the prices are entirely satisfactory for this season of the year. As is generally the case, the higher grade coals, both steam and domestic, feel a depression less than the lower grades, but due to the fact that several of the railroads are storing a large quantity of fuel in anticipation of a serious car shortage this fall and winter, even the lower grade coals are moving as rapidly as cars can be obtained. The Louisville & Nashville R.R. is supplying their mines with cars exceptionally well, but the 'Frisco, Illinois Central, Queen & Crescent and Southern Railway are seriously affected, mines on their lines running only about one-half time. The railroads are holding out no hopes for a better car supply, and are sending out letters of warning to all shippers and consumers asking that they coöperate in loading and unloading all cars as fast as possible.

There is practically no change in the coke market over last week, either furnace or foundry. Sales of pig iron are slightly larger this week, with prices about the same, or possibly a shade better.

ST. LOUIS, MO.

Market advancing and coal moving freely with a good demand. Shortage of cars will have a steadying influence from this time on. Standard coals weak. No demand for anthracite, smokeless or coke.

Conditions are continuing to get better locally, and business in the country is exceptionally good. Prices on all coals, excepting Standard, are advancing and things are looking better for the operator. The Standard market, however, is dragging because of the overproduction. The future does not look exceptionally good for the Standard field, but other than that everything indicates high prices and a good demand.

The car shortage is not as pronounced this week as last, the mines getting not less than three days and in many instances four days. As usual, the coals with a trade name are bringing a premium of from 10 to 15c. a ton. There is absolutely no demand for smokeless, and very little coming in. The falling off is accounted for largely by the cheapness of anthracite, of which there is an abundance. The same applies to coke.,

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump.............	....	....	....	$1.00@1.05
3-in. lump.............	....	....	$1.30	....
6-in. lump.............	$1.40 @ 1.60	....	1.40	1.25@1.35
Lump and egg..........	1.50 @ 1.60	$2.10	1.40	....
No. 1 nut..............	1.20 @ 1.30	....	1.05	0.87½
Screenings.............	0.55	....	0.40	0.85
Mine-run...............	1.50	....	....	0.75
No. 1 washed nut.......	1.50	....	....	....
No. 2 washed nut.......	1.30	....	....	....
No. 3 washed nut.......	1.20	....	....	....
No. 4 washed nut.......	1.10	....	....	....
No. 5 washed nut.......	0.60	....	....	....

PORTLAND, ORE.

Some notes on the appearance of Coos Bay coal in the Pacific Coast markets.

The Southern Pacific interests announce that, their main source of immediate revenue from freight hauled over the railroad being built from Eugene to Coos Bay will be from coal. It is stated that the railroad company will put in large bunkers at the principal cities and towns in Oregon to be supplied with Coos Bay. Coal for Eugene, Salem, Roseburg, Medford and other Oregon towns is supplied from Wyoming and Utah mines and as a result it retails at from $10 to $14 a ton. Coos Bay coal can be sold for much less.

PRODUCTION AND TRANSPORTATION STATISTICS

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for July and first seven months of this year and last year in short tons:

	July 1913	July 1912	Seven Months 1913	Seven Months 1912
Anthracite................	719,944	952,741	6,138,175	5,525,010
Bituminous................	4,551,528	3,655,387	28,833,947	26,175,168
Coke......................	1,183,070	1,077,047	8,569,978	7,451,340
	6,454,542	5,685,175	43,542,100	39,151,518

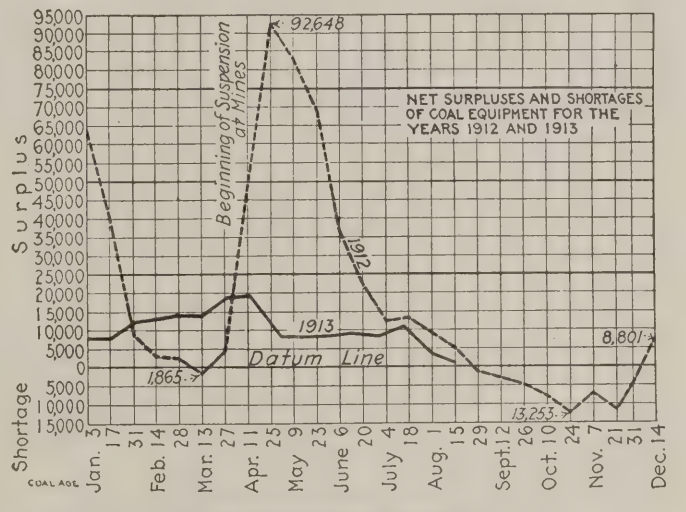
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Aug. 15, as follows:

	Surplus	Shortage	Net*
New England Lines........................	10	185	175
N. Y.; New Jersey, Del.; Maryland; Eastern Penn..	1,789	693	**1,096**
Ohio; Indiana; Michigan; Western Pennsylvania....	200	2,152	1,952
West Virginia, Virginia, North & South Carolina....	674	2,490	1,816
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida.	125	916	791
Iowa, Illinois, Wis., Minn.; North & South Dakota..	1,345	126	**1,219**
Montana, Wyoming, Nebraska................	300	0	**300**
Kansas, Colorado, Missouri, Arkansas, Oklahoma...	1,833	339	**1,494**
Texas, Louisiana, New Mexico..............	265	0	**265**
Oregon, Idaho, California, Arizona............	1,752	137	**1,615**
Canadian Lines............................	0	0	0
Total.....................................	$8,293	$7,038	**1,255**

	Feb. 15	Mar. 15	Apr. 15	May 15	June 14	June 30	July 15	Aug. 1
Surplus........	12,243	17,867	21,845	12,267	11,098	11,055	13,203	8,810
Shortage.......	7,196	3,776	2,196	4,226	2,033	2,821	1,826	4,029
Net*........	**5,047**	**14,091**	**19,649**	**8,041**	**9,065**	**8,234**	**12,377**	**4,781**

*Bold face type indicates a surplus.



SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for June and the first six months of the years 1912 and 1913:

State	June 1912	June 1913	Six Months 1912	Six Months 1913
Missouri.................	153,363	187,723	1,490,145	1,421,534
Kansas...................	274,141	412,371	2,457,547	2,668,364
Arkansas.................	88,304	145,306	906,835	862,916
Oklahoma.................	156,535	255,481	1,380,230	1,663,849
Totals................	672,343	1,000,881	6,234,757	6,616,663

NORFOLK & WESTERN RY.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of June, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas.......	1,294,506	14,323	1,308,829	1,318,002	88,063
Tug River.......	215,912	2,278	218,190	181,578	36,612
Thacker.........	264,113	12,710	276,823	198,160	78,663
Kenova..........	70,815	8,512	79,327	68,039	11,288
Clinch Valley				149,624	13,863
	1,845,346	37,823	1,883.169	1,915,403	228,489

NORFOLK & WESTERN RY.

The following is a statement of the tonnages shipped over this road during July 1913, and for the seven months ending July 31, as compared with corresponding periods of 1912 in short tons:

	July		Seven Months	
Destination	1912	1913	1912	1913
Coal				
Tidewater, foreign	116,339	155,762	950,893	1,032,082
Tidewater, coastwise	305,515	321,340	2,119,813	2,224,658
Domestic	1,577,396	1,666,790	5,994,907	10,318,604
Coke				
Tidewater, foreign	9,197	4,358	50,101	27,199
Domestic	88,030	106,351	789,338	924,152
Total	2,096,477	2,254,601	13,905,052	14,526,695

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for June, 1912-13, and for the twelve months ending June 1911-12-13, in long tons:

	12 Months			June	
Imports from:	1911	1912	1913	1912	1913
United Kingdom	13,458	6,846	9,398	155	648
Canada	1,452,146	1,082,522	1,336,387	119,489	80,533
Japan	14,481	13,168	79,072	3	260
Australia & Tasmania	276,279	195,713	150,150	13,447	9,325
Other countries	4,846	1,993	3,257	1	....
Total	1,761,210	1,300,242	1,578,264	132,095	90,766
Exports:					
Anthracite	3,146,288	2,979,102	4,625,481	301,969	420,665
Bituminous,					
Canada	8,627,963	10,671,982	11,981,443	1,058,763	1,418,113
Panama	508,979	511,802	483,974	40,740	40,725
Mexico	619,447	344,712	443,884	38,640	37,635
Cuba	944,394	1,121,580	1,273,945	89,048	106,264
West Indies	513,368	692,534	601,431	42,657	51,376
Other countries	623,948	1,367,237	1,298,424	90,641	237,458
Total	11,839,099	14,709,847	16,083,101	1,360,489	1,891.571
Bunker coal	6,507,162	7,092,255	7,350,404	567,162	633,910

FOREIGN MARKETS

GERMANY

The following is a comparative statement of production for June and the first half of this year and last year:

	June		Half-year	
	1912	1913	1912	1913
Coal	13,888,848	15,929,858	84,706,380	93,577,987
Lignite	6,217,498	6,858,699	39,480,142	41,900,158
Coke	2,315,126	2,610,818	13,454,682	15,944,237
Coal briquettes	426,025	490,067	2,488,763	2,878,665
Lignite ditto	1,508,075	1,727,160	9,123,691	10,303,617

Production, Consumption, Imports and Exports for the half year were as follows:

	Coal		Lignite	
	1912	1913	1912	1913
Output	84,706,380	93,577,987	39,480,142	41,800,158
Imports*	4,553,826	5,364,127	3,685,486	3, 601 407
Exports*	19,176,907	21,836,212	584,553	998,034
Consumption	70,083,299	77,105,902	42,531,075	44,503,531

* Including coal the equivalent of coke and briquettes.

BELGIUM

The following is a comparative statement of the Belgium production for the first six months of the last two years:

Hainaut:	1913	1912
Couchant de Mons	2,147,000	1,782,820
Centre	1,691,030	1,648,730
Charleroi	4,001,800	4,227,270
Liege:		
Liege-Seraing	2,396,420	2,471,510
Plateau de Herve	582,500	602,780
Namur	402,800	402,180
Totals	11,221,550	11,135,290

GREAT BRITAIN

Aug. 15—Work has not yet been fully resumed in the coalfields and supplies are limited for prompt loading. In consequence prices are firm. There is a fair enquiry for forward loading. Quotations are approximately as follows:

Best Welsh steam	$4.98@5.04	Best Monmouthshires	$4.20@4.26
Best seconds	4.74@4.86	Seconds	4.02@4.08
Seconds	4.62@4.74	Best Cardiff smalls	2.70@2.82
Best dry coals	4.32@4.56	Seconds	2.46@2.58

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 23:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	83	83	83	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	32½	31	31	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	205	195	195	....	....
Island Creek Coal Com	52½	52½	52½	52½	47¼
Island Creek Coal Pref.	84½	83½	83½	82	80
Pittsburgh Coal	20½	19	19	24⅜	14½
Pittsburgh Coal Pref.	84⅞	84½	84⅞	95	73
Pond Creek	21⅝	20	20	23¾	16½
Reading	162	159½	161⅛	168⅞	151⅜
Reading 1st Pref.	...	....	86	92½	86
Reading 2nd Pref.	88¼	88¼	88¼	95	84
Virginia Iron, Coal & Coke	41	42	41	54	37¼

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	93½	97	95½	July '13	93⅝	99⅛
Colo. F. & I. gen. 6s	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83	83¾	83	83	77½	85
Cons. Ind. Coal Me. 1st 5s	76	79	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	85⅞	86½	June '13	86	87⅛
St. L. Rky. Mt. & Pac. 1st 5s	73	80	80	Aug. '13	73	80½
Tenn. Coal gen. 5s	..	99¼	98½	98½	98½	103
Birm. Div. 1st consol. 6s	100⅝	102	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	93	92	Aug. '13	92	98

No Important Dividends were announced during the week.

COAL FREIGHT DECISIONS

Suspension Docket No. 181—Rates from West Virginia and Kentucky to points in Wisconsin.

Soft coal originating on the lines of certain of the defendant carriers and destined to points beyond Milwaukee, Manitowoc and Kewaunee, Wis., has, for 10 or more years, moved over the across-lake routes to those points at the Chicago rates. By the tariffs under suspension the carriers undertook to close certain of the routes and cancel the rates applicable to them because of a failure to arrive at agreements following a demand on the part of the delivering carrier for an increase in its division; **Held**, That the suspended tariffs must be withdrawn and the present routes kept open. An advance of 10 cents per ton in the rates is permitted. **Opinion No. 2335.**

I. C. C. No. 4773—Montana Railroad Commissioners vs. Denver & Rio Grande R.R.

Rate of $5 per ton charged by defendants prior to Dec. 27, 1911, for transportation of coal in carloads from Sunnyside, Utah, to Helena, Mont., not shown to have been unreasonable. Increase of 10c. per ton in the rate as of the date mentioned found not justified by defendants and therefore unreasonable. **Opinion No. 4377.**

I. C. C. No. 3811—Consolidated Fuel Co. (Utah) vs. Atchison, Topeka & Santa Fe Ry.

1. The Denver & Rio Grande Ry. Co. in competing commercially in interstate coal markets, through the operations of a coal company owned by it, not only violates the commodities clause of the act, but is guilty of an unjust rate discrimination against the complainants, in that the group rates apply only from its junction with the industrial lines of the complainants, while they are applicable directly from its own mines on its own branch lines, the latter being operated under general conditions substantially similar to those surrounding the operation of the industrial lines of the complainants.
2. Without entering an order, several forms of relief which the complainants may have under the circumstances of the case are indicated on the report, and the tariffs in question are required promptly to be adjusted in one form or the other, the rate situation as readjusted to be maintained so long as the Denver & Rio Grande competes commercially in interstate markets with the complainants.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

olume 4, No. 10
ssued Every Saturday
ill Publishing Company

NEW YORK, SEPTEMBER 6, 1913

Ten Cents per Copy
Contents, First Page
Advertising Index, Last Page

PLANT NO.1 WHERE HESS BRIGHT'S ARE MADE
THE HESS-BRIGHT MANUFACTURING CO. PLANT No 2.
PLANT NO.2 FOR DISTRIBUTION IN AMERICA

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BALL BEARINGS

FOR YOUR MINE LOCOMOTIVE MOTORS

TRADE MARK

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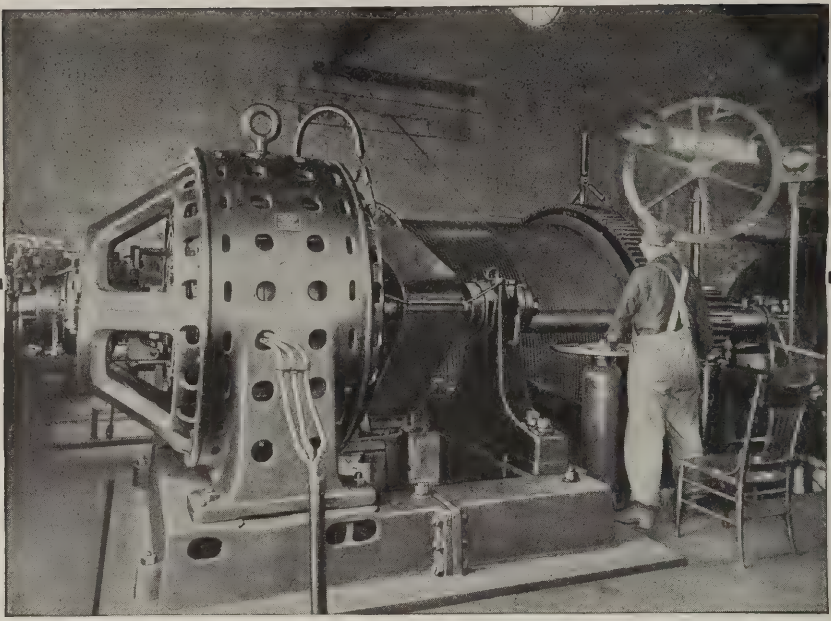
YOUR MANUFACTURER WILL FURNISH THEM IF YOU SAY THE WORD

THE HESS-BRIGHT MANUFACTURING CO.
FRONT ST. AND ERIE AVE., PHILADELPHIA, PA.



400 H. P. Westinghouse Motor for Driving Mine Hoist.

Westinghouse Motors for Mine Hoists

are made to withstand, without injury, the heaviest overloads encountered in normal service. They have been designed with the knowledge that any accident to the hoisting equipment will not only halt production until service is re-established but may also cause damage of the most serious nature.

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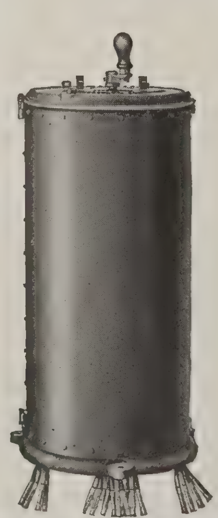

Westinghouse Controllers for mine hoist motors can be furnished in several types to meet various requirements. Selection of the most suitable type for a given installation will be made upon request.

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada.

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This installment takes up the situation at the head of the Lakes. The "Twin Harbors" last year handled some 40 million tons of freight, or more than the total foreign commerce cleared from the six leading Atlantic ports. Coal shipments for the current year will approximate 10 million tons. The docks are equipped with the most elaborate unloading machinery in the world, in addition to which there are large cleaning, screening and briquetting plants. I. C. Cuvellier. COAL AGE, Vol. 4.

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CIRCULATION OF THIS ISSUE 12,250

None sent free regularly, no returns from news companies, no back numbers

How Advertising Has Become A Necessity

The Weekly Ad-Talk Page

A very curious case came to our attention the other day. It was so unusual that we believe you, too, will be greatly interested in it.

A few years ago *Rubifoam* was a national tooth wash. Our sisters, our cousins and our aunts used it. It was sold practically all over the country. And the girl with the *Rubifoam* smile was as well known as—well, say as well known as a Vice-Presidential nominee before his election.

But suddenly this girl disappeared. Her dazzling smile no longer lighted up magazine pages, glorified billboards, burst forth from newspapers. Rubifoam was no longer advertised.

A coterie of advertising men got together and decided to go after the manufacturer of Rubifoam and find out the why and wherefore of Miss Rubifoam's retirement.

This manufacturer lived up in New England.

"What's the matter—lost your nerve; didn't the advertising pay you?" asked the advertising men when at last they confronted the manufacturer.

He shook his head, smiled. "Yes, it paid me. I believe in it—thoroughly."

Naturally his questioners were dumbfounded. "Well, what—"

"You see, gentlemen, it's this way." I've built up this business entirely by myself. I have no one to whom to leave it. I have no idea how it would be managed after my death—no idea as to whether the standard of the product would be kept up. I want to guard against its deterioration. So I've simply let the advertising drop and the business is slowly dying. I figure by the time I'm ready to pass in my checks the business will be about finished, too."

The advertising men, when they had sufficiently recovered from their astonishment, told him it was his duty to the community to continue advertising, that he was throwing his employees out of work and tried a host of similar arguments. But the manufacturer refused to give up his peculier views regarding the matter.

It would cause an earthquake like a hundred panics combined if all advertisers should suddenly make a decision similar to this which the manufacturer of Rubifoam made.

Imagine the quandry you'd be in. Where would you buy the things that are absolutely essential to you?

There was a time when man was almost entirely independent of other men.

He tilled his own ground (or rather his wife did), raised the vegetables and fruits he needed and killed the meat and clothed himself with the skins of the animals he killed.

But year after year, century after century, that kind of independence has slowly gone. Modern man is dependent upon his fellow men.

Like a huge net this dependence of ours upon each other stretches through the fabric of life.

Today we look to others for the bed we lie in, the house we live in, the clothes we wear, even the food we eat. Others look to us for that one small thing which is our product.

New York City, shut off from its food supplies, would have a starving population within 48 hours.

Advertising is the means by which men offer their product to as many other men as possible—hundreds of men, thousands of men where before they could only reach individuals.

Advertising enables men who manufacture the machinery you use to come direct to you with their product no matter where you are.

The advertisers, of course, depend upon you but you also depend upon the advertisers.

Think about it as you read over the Selling Section this week.

COAL AGE

ol. 4 NEW YORK, SEPTEMBER 6, 1913 No. 10

Everyone must admit that the miner at e working face, in most mines, can load ean coal if he wants to. It is true that in any seams, this would require great care on e part of the miner, and would reduce his ssible tonnage earnings considerably, but e fact still remains that he *could* load clean al, if he so desired.

Now, that being the case, why shouldn't e see to it that he does load clean coal?

"We try to do that very thing;" says one perintendent, "but we have about decided give it up as a bad job." When you hear man talk that way, you may depend upon that he has centered all of his activities on dockage system, and in the end he has nd that the tighter he draws the deduction les, the dirtier his coal becomes.

In contrast to that man's method, let us amine another operator's system: When s manager found that his markets were dually slipping away from him, because of ty coal, he began to install various menical devices. His product began to prove somewhat, but his working capital ldenly threatened to disappear altogether, l he realized that if the mechanical pickers uired further nursing, it would soon be up his creditors to furnish the nurse.

Then the thought suddenly came to him, t he had begun his experiment at the ng end. He immediately employed several scientious inspectors, and with them he de a careful study of conditions inside the e.

hey found that with very little extra rt the miners could load clean coal. Then they calculated the loss, due to the fact that the coal was not being properly loaded. They considered: (1) interest on special equipment (pickers, separators, etc.); (2) wages of picker boys; (3) reduced price of the coal due to the excess dirt that it contained, in spite of all the mechanical equipment; (4) losses due to coal absolutely rejected after shipment. They divided this total loss by two, and made the miners a proposition to increase their digging price per ton by that amount, if they would agree to clean the coal. The miners jumped at it, *and they loaded clean coal.*

We realize that this is a broad question. In many seams, it might be cheaper to load dirty coal, and depend upon mechanical devices or washers to clean the product, rather than pay the increased mining rate that would be required. But even under such conditions, proper supervision at the working face will work wonders.

Investigations as to what constitutes reasonably clean coal in any seam are only successfully handled by practical men, and herein probably lies the explanation for the scarcity of such investigations.

Managers whose experience had its beginning in the engineering department, are easily interested in mechanical devices of all descriptions (the improvements in coal washers, screens, picking tables, etc., worked out by these men during the past few years, are truly remarkable), but the possibilities for improving conditions by instructing men, are often unappreciated by them—"More's the pity."

IDEAS AND SUGGESTIONS

Facts about Gas Poisoning

By L. K. Hirshberg*

Dr. Morris Fishbein, of Chicago, recently, while testing the blood of a man fatally poisoned by the inhalation of illuminating gas, studied the effect of formaldehyde on the carbon monoxide. By the use of chemical examinations, as well as the spectroscope, he investigated the blood of individuals poisoned and afterward embalmed in formalin, normal blood, normal blood in which formalin was present, and normal blood through which gas was passed, and the blood of tissues suspected to have been killed by carbon-monoxide poisoning.

By boiling blood with CO, it is known that a brick-red mass is formed. Healthy blood becomes brown-black. Formaldehyde in the usual amounts does not interfere with this test. Blood with formaldehyde or carbon monoxide does not clot as readily as normal blood.

Doctor Fishbein found that old spots of suspected blood must be diluted with lots of water to make a fair examination.

Dilution of the blood is advisable in order that a clear spectrum may be observed. Whenever carbon monoxide is present, the spectrum may be observed after a little practice, the presence of small amounts of formaldehyde having no effect. Formaldehyde in larger quantities acts as a reducing substance, and when the quantity of carbon monoxide present is not large, the spectrum of reduced hemoglobin may be found. In the case of normal blood, various quantities of formaldehyde produce the various spectrums of oxyhemoglobin, some of which are distinguishable only with great difficulty from the spectrum of carbon-monoxide blood, until sufficient formaldehyde is added, when the spectrum of reduced hemoglobin is produced.

In view of the fact that formaldehyde was found to modify more or less completely all the chemical tests, and to act as a reducing agent when present in large amounts, so as to interfere also with spectroscopic examinations, it was thought best to make a brief report of these examinations. From Doctor Fishbein's experience with the various tests under these conditions, it would seem that the test, namely, dilution of the blood one part to four parts with water and shaking with three times the volume of 1 per cent. tannic acid, whereby normal blood becomes gray and carbon-monoxide blood remains red, is most reliable and trustworthy in the presence of formaldehyde. In case no formaldehyde is present, the addition of four volumes of lead acetate will be found to yield satisfactory results. Spectroscopic observations are of little value unless preceded by many observations on the various forms of hemoglobin.

Dr. Fishbein records the conditions in the following instances of gas poisoning:

The patient, subjected for several hours after exposure to the action of the pulmotor, which has seemed to be of great efficiency in many cases, remained comatose. (admission to the Cook County Hospital, 12 oz. of blo were withdrawn and intravenous transfusion of saline s lution was made. During a period of four days, norm saline solution by the drop method was given practi ally continuously. The patient remained unconscio throughout. The condition gradually grew worse and died, nearly five days after the exposure to the gas.

Carbon monoxide was demonstrable in the blood the various tests, chemical and spectroscopic. This of special interest in view of the fact that many autho ties hold that carbon-monoxide blood loses its charact istics when exposed to the air, whereas, in this case, it w found even though the person lived five days after moval from the gas. Ordinarily, if the patient lives, t carbon monoxide is eliminated within a few hours, though carbon monoxide in the blood seven days after t exposure to the gas has been mentioned. Few such reported; probably a further study would show many stances of this nature.

⁂

Holding Men

By West Virginia Superintendent

The principal of a preparatory school was receiving his office a call from the father of two boys who had b suspended from school for a short time on account some violation of school discipline. The old gentlem had been a miner for many years, had saved his mon leased a small tract of coal, opened a country ba hired a miner to help him dig, and, from this beginn had hired more men, built shanties, houses and n buildings, installed equipment and prospered.

As is usually the case, having little school traini himself, he was anxious that his boys should become e cated in the shortest possible time, and was much out that there was to be any interruption. He wan the boys cowhided, put on short rations, denied p ileges—any of the list of school punishments save s pension. The principal was firm, or perhaps stubbo and after much argument the father gave up, sayi "Professor, maybe you are right. I don't know nothi about teaching, but in my business I have always made a rule never to give the men nothing they ask for.

"Sometimes they may be reasonable, and then ag they may be unreasonable, but it's all the same, I ne give in to nothing. Sometimes they say the rent is high. Then I say, 'When I built them houses I lef hole in the side to come in by and to go out by, and wh you think the rent ain't right, you can just go out that hole,' and," he concluded, justifying his poli "they all love me like a brother."

This latter statement was more nearly the truth th one might suppose from the outline of his policy, a thereby hangs the reason for this lengthy introducti By loving him like a brother, the old man meant th he had no trouble keeping men, that they were satisf and felt that they were getting a square deal, in other words, having dug coal himself, he anticipated the needs of his employees and was a keen judge of the merits of a "kick." His men undoubtedly liked him, and he held them in his employ.

---

*Baltimore, Md.

Another Type of Manager

There is another type of mine manager who, imagining that all men are "kickers" and that all complaints are alike, attempts to follow the policy of refusing all requests, and does not succeed in getting himself loved like a brother, but loses his men and gets such a reputation for himself that no new men apply.

The next superintendent, hearing him cussed and discussed, sets about correcting the mistake by being so easy that his concessions beget inequalities and make his refusals seem arbitrary and partial. He is beset daily with trivial complaints and ends by losing control of discipline, and is literally "run off the job."

Then comes the "liar." He promises with no intention of fulfilling his word. Possibly he intends to look into complaints and requests, but his intentions are not serious enough to make him remember. Of all types he is the most exasperating. Possibly he makes good a sufficient number of his promises to keep men thinking that perhaps their particular requests may fall under the one sometimes granted, and they hang on for a while.

Some managers of men even advocate the "promise system." They say, "Why, hell, yes, always promise. What is the use of arguing? Agree to everything and then do as you please." Strange to say, once in a long while you will find a man of the Ananias type who is wonderfully successful. He has been so consistent in the failure to fulfill his promises that his men do not expect anything, and take his jovial assurances much as the refusals of the old man whose men loved him like a brother. The secret of his success is the same as in the former case. He is a good judge of a "kick," and knows when a man is working at a disadvantage.

The New Superintendent

Then there is the new superintendent, who imagines he has come to correct the faults of his mine foreman. He begins by granting requests that the mine foreman has refused, and soon he is beseiged with, "My place no cut"; "water in my place"; "no gotta turn"; "driver no good"; "too much push for car"; "all time slate come down"; "no car to clean up my place"; "lika new buddie my place"; "no catch nothing for clay vein"; "short six cars this time"; "right away finish."

If the superintendent is really going to arbitrate these cases, he must have the same means of judging them as has his mine foreman. Possibly the complaints are genuine, and the foreman may, or may not be in touch with the various situations. Anyway, it is taking a long chance for a superintendent to attempt to judge independently. But, if he is a good inside man, he may be invaluable in helping keep a check on the cause of dissatisfaction, and by assuming certain responsibilities, take much worry off of his foreman.

In these days of machine coal, when a miner's kit consists of a pick and shovel, and his family is in the old country, it takes only a shade of difference in management to send him on his way to another mine, and it is not so much the granting of requests and privileges that holds men as it is the maintaining of a condition that does not admit of privilege. The best-paid man on the job quits, not because he is not paid enough, but because someone else has an advantage over him. It may be easier to keep a mine full of diggers where there is a uniformly unfavorable condition than where some of it is good and some bad; nor need this principle be confined to miners alone.

Overcoming Difficulties with Machinery

An agent for a hoist for cars on steep room pushes recently made the statement that the steep push was the greatest hindrance to holding men in the low-vein coal, arguing that his hoist would overcome this difficulty. But there is a question whether the inequality of working conditions brought about by installing a limited number of hoists in steep rooms would not leave the situation the same as before. Of course, we are not talking about the impossible grades. A room with a hoist, if it presented an advantage, would present also an inequality, and the inequality is what makes men refuse to work. We have all had the experience of having a butt of steep rooms worked up until some rooms show a lighter grade, and then it is all off. It is difficult to get the two grades worked side by side.

Some student of economics might say, "Yes, but why not pay a better price for the steeper rooms?" The miner himself knows that it would be harder for him to set a price on a room grade that would make it equal to some other grade than it would be to change the dip of the coal. He might just as well advocate rain for the just and drought for the unjust, or guess at the conditions the next cut will reveal. Probably the best way to make the conditions equal is to drive rooms off along the strike from another room.

Roller-bearing wheels might lighten the push for everyone and would be a distinct advantage for the whole, but it would not adjust the inequality. I am not sure but that if each superintendent and manager knew exactly what salary the other was getting, there might be as great a dearth of material for these positions as exists at the mines presenting unequal working conditions. Men do things because "everybody's doing it." A mine with one rate and equal working conditions would be too good to be true, but to hold men at any given mine, seems to be a question of approaching such an ideal rather than giving fancy prices for bad stuff, wet rates where ditching could be done, and yardage where good service to the miner might make his working condition better.

The old fellow whose miners loved him like a brother may have met this problem in his own crude way, but he held men without handing out a lot of "sugar."

⁂

The points to be considered when laying out a haulage system are: (1) nature of the roof; (2) output per day; (3) grade; (4) number of branch roads and their distance from the shaft; (5) initial expense. Where the roof is good, double tracks are practical, and the endless-rope system gives good results, as there is a constant supply of loaded cars at the shaft bottom and empties in the chambers, which means a large output. This system permits the working of any number of branches together or separately. It can be used where the grade is steep as well as on the level. While the initial cost is high, the long life of the rope, the use of small engines, the low per cent. of accidents, and the increased ventilation tend to render this system efficient, durable and cheap.

The Atlas Co.'s Plant at Burgettstown, Penn

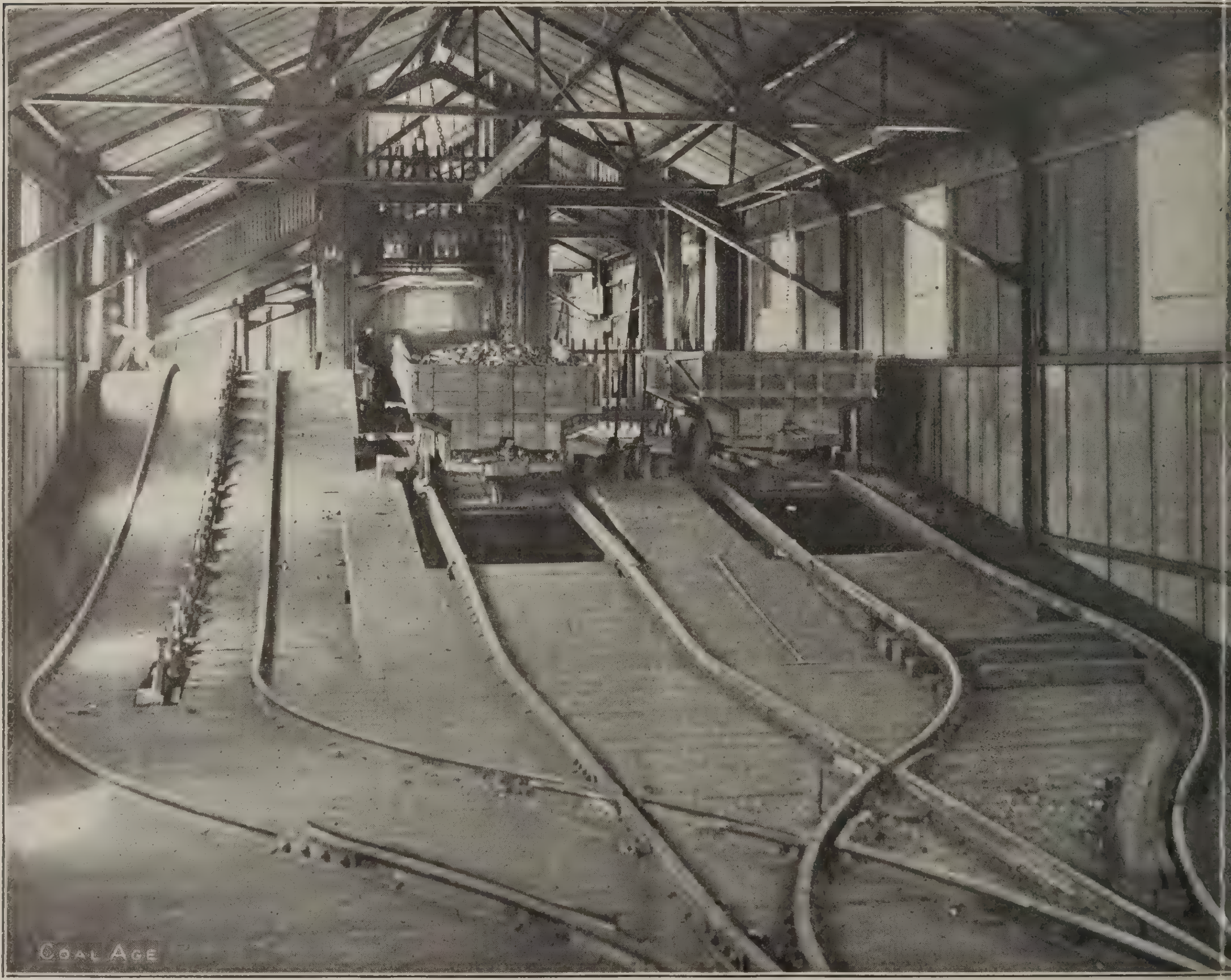
By Lee Llewelyn*

SYNOPSIS—The first of two articles on this interesting plant. It is one of the newest operations in Pennsylvania and the equipment is modern in every respect. This installment takes up the general conditions prevailing in the field and outlines the scheme of operation.

⁂

This operation is located on Raccoon Creek, about four miles from Burgettstown, and has connections with the Pan Handle railroad. The officers are: George Z. Hosack, president; James B. Haines, Jr., vice-president; John A. Bell, Jr., secretary-treasurer; and W. A. McBride, superintendent. The engineers for the company are Smith and Lewis, Oliver Building, Pittsburgh, Penn., who were engineers in charge of the construction of the entire plant.

The company owns 1700 acres of coal and 300 acres of surface, upon which the plant and town are built. The name adopted for the town is Atlasburg. There are two seams of coal. One is the famous Pittsburgh seam, which is from 5 to 6 ft. thick and 270 ft. belo the surface. The other is what is known as a "Rooster seam and is peculiar to that particular field; it is abou 4 ft. thick and lies immediately above the Pittsburg seam, some 4 to 5 ft. of strata intervening. It is th company's intention to work both seams.



View of Dumps and Chain Haul for Returning the Empties

The arrangement is such that one man and a helper can handle the full capacity of 3000 tons per day.

Shafts and Surface Equipment

Both shafts are 12x24 ft., the air shaft being locate 1000 ft. distant from the main shaft. Tracks are pro vided at the main shaft bottom for 200 loads and 20 empties. The cars operate by gravity at this point an require but two men.

The main hoisting engines are two 26x36 in. Vulcan direct connected to 7x9-ft. conical drums. The air-shaf engine is a double 15x24 Vulcan, direct connected to 7-ft. cylindrical drum. The cage operating in the ai shaft is counterweighted and is used for hoisting me and supplies, but coal was hoisted during the constructio of the main tipple.

The building housing the power plant is 45x120 ft.

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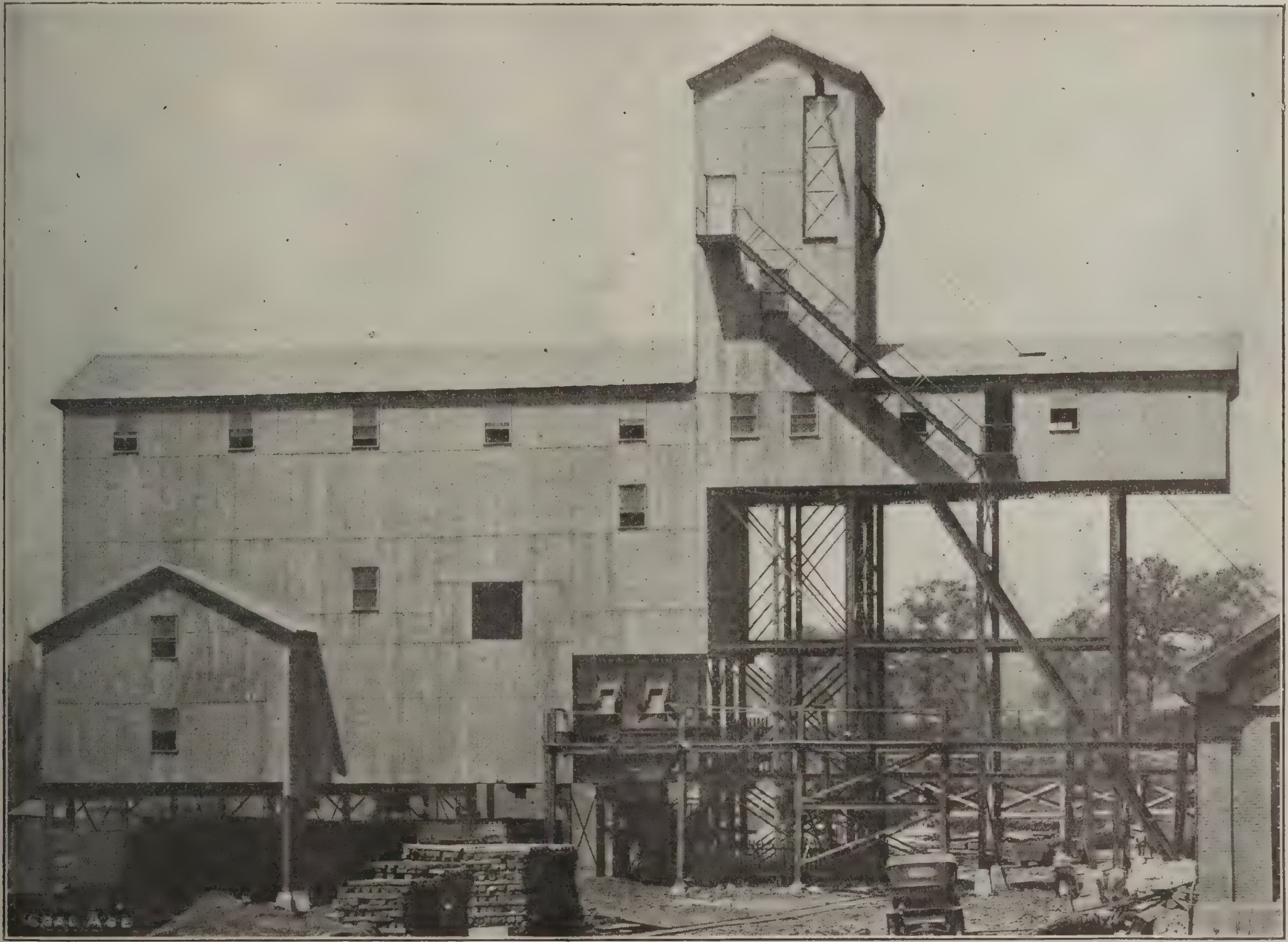
*Chief engineer, Pittsburgh Coal Washer Co., Pittsburgh, Penn.

with a partition separating the boiler room from the engine room. It is of brick construction, with concrete floors. The boiler room contains four 300-hp. Erie City watertube boilers, equipped with Jones underfeed stokers, two Epping-Carpenter boiler-feed pumps, and a Hopper's feed-water heater of 2000-hp. capacity. The boilers operate under 150-lb. steam pressure. The engine room contains two 250-275 compound-wound generators of the General Electric make, driven by two 17x24-in. four-valve, Erie City engines.

The shop building is 45x75 ft., of brick construction, and is equipped with forges, hammers, pipe machine, drill presses, etc., for making the necessary repairs.



View of Tipple, Showing Boiler-Coal Bin with Trestle and Electric Larry

Vertical doors in the headframe are to admit the sheaves and large opening in the side of the tipple is for the rock trestle now being constructed.

The mine fan is of the Jeffrey type, 16x5 ft., and driven by two 17x21-in. four-valve Erie City engines, and will have an ultimate capacity of 300,000 cu.ft. of air against a 6-in. water gage when operating at 160 r.p.m.; it is inclosed in a steel, concrete and brick building of pleasing design.

The motors are the General Electric type, equipped with cable and crab reels. Cutting machines are of the chain type and were manufactured by the Goodman Electric Company.

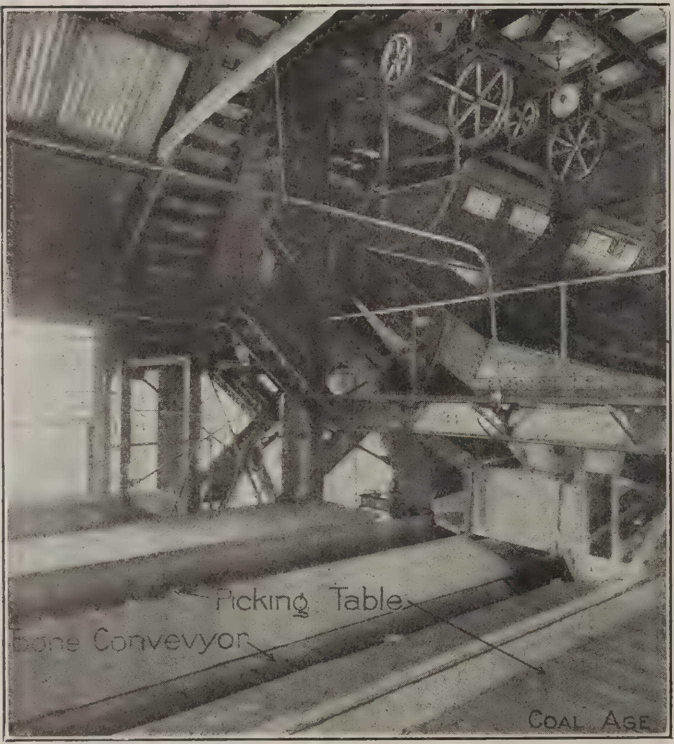
Owing to the advantageous location, and also the great care and expense gone to by the company, the town is one of the most excellent mining towns in the Pittsburgh district. No expense was spared in providing the employees with comfortable homes. The houses are single and of different designs and are located on lots 60x150 ft., with 60 ft. streets. The store building, which is a handsome brick structure, is 45x100 ft. and two stories high. This building also contains the post office and superintendent's offices.

Scheme of Operation

Mine cars of three-ton capacity are hoisted from the coal seam to the tipple floor on platform cages, operating in a two-compartment shaft. The cages are provided with hinged bottoms, which are level while hoisting, but a separate set of landers are provided so that when the cages come to rest the hinged bottom is tilted to such an angle as will allow the loaded car to run off by gravity. The loaded cars gravitate to a Phillips crossover dump, of which there are two placed side by side, and are dumped into one of two sets of gravity-screen rigs. The empty cars pass on over dumps to a kickback and return by gravity, on one side of the tipple, to a chain haul, which elevates them sufficiently to run them to a second kickback behind the hoistways. From this kickback the cars gravitate to spring horns located behind each cageway. When ready to admit the car to the cage the operator presses a foot treadle which releases the horns and the car runs onto the cage for return to the mine.

There are two dumps, two screen rigs, two feeders, and two picking tables, with the dumps setting opposite to each other. The run-of-mine coal is dumped into a chute equipped with a set of standard screen bars having 1¼-in. spaces. The screened coal passes to weigh baskets, where it is weighed and then deposited in a chute common to both weigh baskets, terminating in two hoppers fitted on the bottom with plate feeders for feeding the coal to the two picking tables running parallel to the railroad tracks.

The bone is picked from the coal by pickers walking on the tables, and thrown onto a pan conveyor, located between and running parallel to the two tables, conveyed to the back end of the picking house, and discharged onto a similar conveyor running at right angles, which in turn conveys the material to a roll crusher. The crushed bone is then elevated to a storage bin, from which it is taken by an electric car to the boiler house for use in boilers. The picked coal passes from the picking tables to cars over the special loading chute arranged for loading cars 8 ft., 10 ft. and 11 ft. 6 in. high.



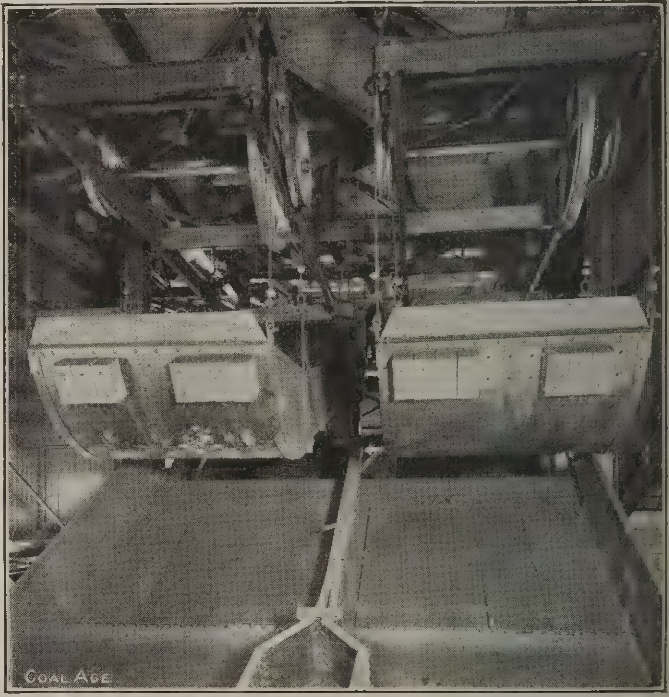
Showing Weigh Baskets, Feeder Hopper, Picking Table and Bone Conveyor

The 1¼-in. screenings from each rig, drop onto a set of nut-bar screens having ¾-in. spaces, where separation into nut and slack takes place. Each product is collected in chutes, common to both screen rigs, and loaded in railroad cars on their respective tracks, the chutes being fitted with proper gates for stopping the flow of coal when shifting cars.

Provision is made for two egg screens in the hopper under the weigh baskets, so 3-in. egg coal may be made on both rigs and loaded on the nut track, separate, or mixed with the nut, or with the nut and slack. The upper end of each slack chute is a short section of perforated screen for taking the real fine dust out of the slack coal. This dust is collected in a chute and passes to a cross-bone conveyor, thence to an elevator leading to the storage bin for boiler-house use.

When desired, the nut coal, or the nut and slack mixed, from either screen rig, may be put on their respective picking tables, producing either ¾-in. lump or run-of-mine, the fine coal being loaded on the tables underneath the lump to facilitate picking. With these screen rigs it is possible to make the following loading combinations:

1 ¾-in. lump on either lump track.
2 1¼-in. lump on either lump track.
3 Run-of-mine on either lump track.
4 Nut on nut track.
5 Nut and slack mixed on nut track.
6 1¼-in. lump on nut track.
7 ¾-in. lump on nut track.
8 Run-of-mine on nut track.
9 Egg on nut track.
10 Special run-of-mine (consisting of egg, nut and slack) on nut track.
11 Nut and egg mixed on nut track.
12 ¾-in. or 1¼-in. slack on slack track.



The Weigh Baskets (with the Egg Screens below) and Chutes to the Feeder Hopper

Of the above combinations, Nos. 6, 7, 8, and 12 may be loaded without operating the picking tables. Provision is made in the upper end of the screen rigs for bypassing room cleanings to the bone conveyor, and rock to the rock bin under the dump, from where it passes to the rock car.

Principal Parts

The principal parts entering into the construction of the tipple and air hoist are as follows:

Two special cages for main tipple.
One counterweighted cage for air hoist.
Four sets of landers for main tipple.
Two sets of landers for air hoist.
Two head sheaves for main tipple.
Two head sheaves for air hoist.
One empty car haul.
One system of tipple tracks.
Two Phillips cross-over dumps.
Two gravity screen rigs.
Two plate feeders.
Two picking tables.
Two bone conveyors.
One bone crusher.
One bone elevator.
One storage bin.
One main headframe and tipple.
One air hoist headframe.
One 3-ton electric traveling car and runway.
Two car-releasing mechanisms for shaft bottom.

The cages are of the platform type and provided with hinged bottoms. They are built to conform to the new mining laws of Pennsylvania and equipped with Lepley's patented steel-wedge safety device with double springs. They have forged-steel rope sockets 16-in. long, forged-steel safety clamps, 1-in. bridle chains, ¾-in. safety chains, and horns to secure the car when hoisting and receive the empty car when caging it. These horns remain in position until released by the operator to allow the loaded car to run off the cage, and then return automatically to their initial position for receiving the empty car. Steel side plates, ¼ in. thick by 4 ft. high, run the full length of the cage. Hand rails are provided on either side and safety chains across both ends. A steel canopy top is provided, with one side hinged to turn up for accommodating long material.

Cages were built by the Connellsville Manufacturing & Mine Supply Co. from plans furnished by the Pittsburgh Coal Washer Co. This same company also furnished the head sheaves, which are 10 ft. in diameter and heavy pattern, bicycle-spoke type, mounted on an 8-in. hammered-steel shaft, supported in heavy cast-iron, babbitted pillow-blocks equipped with adjustable sole plates.

The tipple tracks are constructed of 30-lb. American standard rails and are secured to the 3-in. oak floor by standard railroad spikes. Back of the hoistways a special automatic switch is provided for diverting the empty car to the proper hoist. The empty car going onto the cage sets the switch for the next car.

The dumps are of the Phillips extra heavy crossover type. Special dumping rings are provided for operating the car doors, which are of the lifting type. The rings are operated automatically by the in-going loaded car, thus relieving the dump operator of the extra work of handling them. The car haul is on about 40-ft. centers and consists of a 12-in. pitch steel-link chain, which has cast-steel pivoted dogs inserted in it every 2 ft. for engaging attachments on the bottom of the car.

(To be continued.)

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Waste-Heat Losses in the Connellsville Region

E. W. Parker, statistician of the U. S. Geolo. Survey, has compiled the following* interesting memorandum concerning waste-heat losses in the Connellsville region:

The production of coke in the Connellsville and Lower Connellsville districts of Pennsylvania in 1911 amounted to 16,919,749 short tons, to produce which in retort ovens would require about 9300 such ovens. These operated as "waste-heat" ovens would produce approximately 180,000 boiler horsepower per hour.

Through the courtesy of the late R. N. Durborow, general superintendent of motive power of the Pennsylvania R.R. Co., the writer has received estimates of the quantity of drawbar horsepower developed by some of the locomotives of that company during 1910. Mr. Durborow states that it required about 32,358 drawbar horsepower as the average during the month of March, 1911, to haul the freight trains over the portion of the Pennsylvania system between Pittsburgh and Harrisburg. For the passenger trains 9762 drawbar horsepower is required, the total drawbar horsepower developed per day being 42,120. The efficiency of transmission from the power house to substations on the line would be about 82 per cent. for the distance between Pittsburgh and Harrisburg, and for 42,000 drawbar horsepower. The efficiency of the distributing system between the substations and the locomotives would be about 85 per cent., and the efficiency of the locomotive itself would be about 75 per cent. The power that would reach the drawbar of the locomotive and thus be available for a train would, therefore, be about 52.3 per cent., this being the product of 82 by 85 by 75 per cent. Assuming, therefore, that 42,000 drawbar horsepower is 52.3 per cent. of the power-plant horsepower, sufficient to move the traffic, 80,000 hp. would be required at the power house.

HORSEPOWER DEVELOPED BY DIFFERENT CLASSES OF LOCOMOTIVES

Mr. Durborow was kind enough to submit the following tables, giving the estimates of the horsepower developed by the different classes of locomotives, hauling freight and passenger trains, during the month of March, 1911, from which the foregoing estimates have been deduced:

FREIGHT TRAINS, MONTH OF MARCH, 1911

No. of trains per month	Average running time (hours)	Locomotive class	Average horsepower.	Total horsepower hours per month of 31 days
Altoona and Harrisburg, eastbound:				
686, slow	10.80	H-8	650	4,815,720
439, preferred	8.85	H-6	600	2,331,090
Altoona and Harrisburg, westbound:				
608, slow	11.36	H-8	650	4,489,472
393, preferred	8.35	H-6	600	1,968,930
Altoona and Pittsburgh, west and eastbound—all freight trains:				
1851	8.76	H-6	600	9,728,856
130	8.76	H-8	650	740,220
Total trains 4107	....	....	...	24,074,288

744 hours in 31 days; $\frac{24,074,288}{744}$ = 32,358 horsepower required any instant.

PASSENGER TRAINS, MONTH OF MARCH, 1911

Altoona and Harrisburg, east and westbound:				
1777		3.03	E	2,423,828
	533		3.03	K
533	3.03	K	630	1,066,000
Altoona and Pittsburgh, east and westbound:				
1247	3.30	K	660	2,715,966
712	3.30	E	450	1,057,320
Total trains, 4269	....	....	...	7,263,114

$\frac{7,263,114}{744}$ = 9762 horsepower required at any instant.

From the foregoing it appears that the quantity of power which might be obtained from the coking operations in the Connellsville and Lower Connellsville districts by substituting nonrecovery retort ovens for the beehive ovens would be more than twice the quantity of power necessary to move every train on the Pennsylvania R.R. between Pittsburgh and Harrisburgh.

This estimate is, of course, roughly calculated as the efficiency of a power plant will range from one-half horsepower per boiler horsepower in a small simple noncondensing engine to three horsepower in the best compound-condensing engines. The power used on the railroad is not uniform, the rate of fuel consumption varying during all hours of the day and from day to day. Moreover, the conversion of boiler horsepower per oven into dynamometer (drawbar) horsepower may differ considerably in practice, but, allowing for all possible errors and variations, the enormous waste of energy now obtaining in the coking districts of Pennsylvania is glaringly apparent.

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*"The Manufacture of Coke in 1911." Government Printing Office, Washington, D. C.

Coal Shipping on the Great Lakes

By I. C. Cuvellier*

SYNOPSIS—This installment takes up the situation at the Head of the Lakes. The "Twin Harbors" last year handled some 40 million tons of freight, or more than the total foreign commerce cleared from the six leading Atlantic ports. Coal shipments for the current year will approximate 10 million tons. The docks are equipped with the most elaborate unloading machinery in the world, in addition to which there are large cleaning, screening and briquetting plants.

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Duluth is a city crowding the 100,000 mark and stretching for twenty-five miles along the rugged, rock-bound coast of the Head of the Lakes. Shipping during the season of 1912 aggregated 41,474,776 tons of freight, 8,585,039 tons being coal, enough to fill an order of 161,000 cars placed end to end, making a train 1900 miles long, or long enough to reach from Duluth to Portland, Oregon.

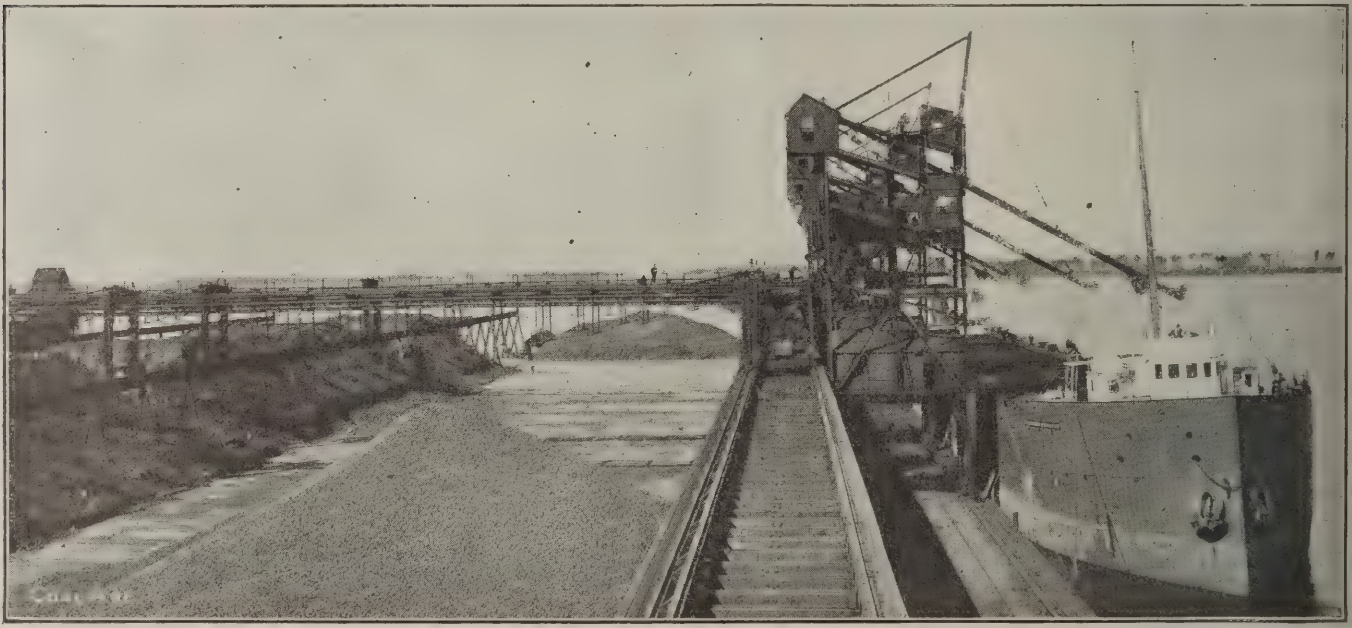
Inseparably connected with Duluth, is the thriving city of Superior on the opposite side of the harbor. It is not at all disparaging to Duluth to say that Superior receives the larger amount of coal. A glance at the contour of the harbor, as can be seen by the accompanying map, shows the confluence of the St. Louis River with the Duluth side of the harbor forms what is known as Connor's Point, all of which is on the Superior side and extends into the bay proper, forming a most advantageous location for coal docks. Here are located many of the large coal-handling plants.

Natural-Harbor Advantages

There are harbor advantages here not enjoyed by any other port. Large vessels must necessarily seek freight where they can be accommodated and operated economically. At either entrance to the Twin Ports the largest steamers can enter, dock, unload and depart under their own steam and without the use of tugs, which in many other ports forms a heavy item of expense.

With the modern coal-handling equipment in use, unloading is done here with the maximum dispatch, the boats then passing directly to some one of the mammoth ore docks or grain elevators and taking on a fresh load. This situation always insures a line of the best and fastest vessels plying on the Great Lakes. The immense freight carriers, some of them as long as two ordinary city blocks, push their way through the channel entrance and land at some ore or coal dock without ceremony. It takes but a half hour to accomplish this and almost immediately the process of loading or unloading begins.

A further study of the accompanying map indicates again how wisely nature had provided for this harbor. Stretching from the Duluth shore to the Superior side the sharp end of the Lake is cut off by a natural breakwater. This is a sand bar of sufficient width and heighth to make a more effective breakwater than could possibly be constructed by artificial means.



Unloading and Storage Plant of the Northwestern Fuel Co., at Superior, Wis.

The docks located on the Superior side of the harbor received last year, from May to December, 5,680,288 tons of coal out of a total of 8,585,039 tons received at the Twin Ports. During the 235 days' open season in 1912, the net registered tonnage entering and clearing the Superior Harbor exceeded that in the foreign commerce of the ports of New York, Philadelphia, Baltimore, New Orleans, Boston and Charleston all combined.

Lake Shipping in the Early Days

In 1855, the date of the opening of the Soo Canal, the records show 1414 tons of coal passed through the canal that year, shipped in small lots, most of it going

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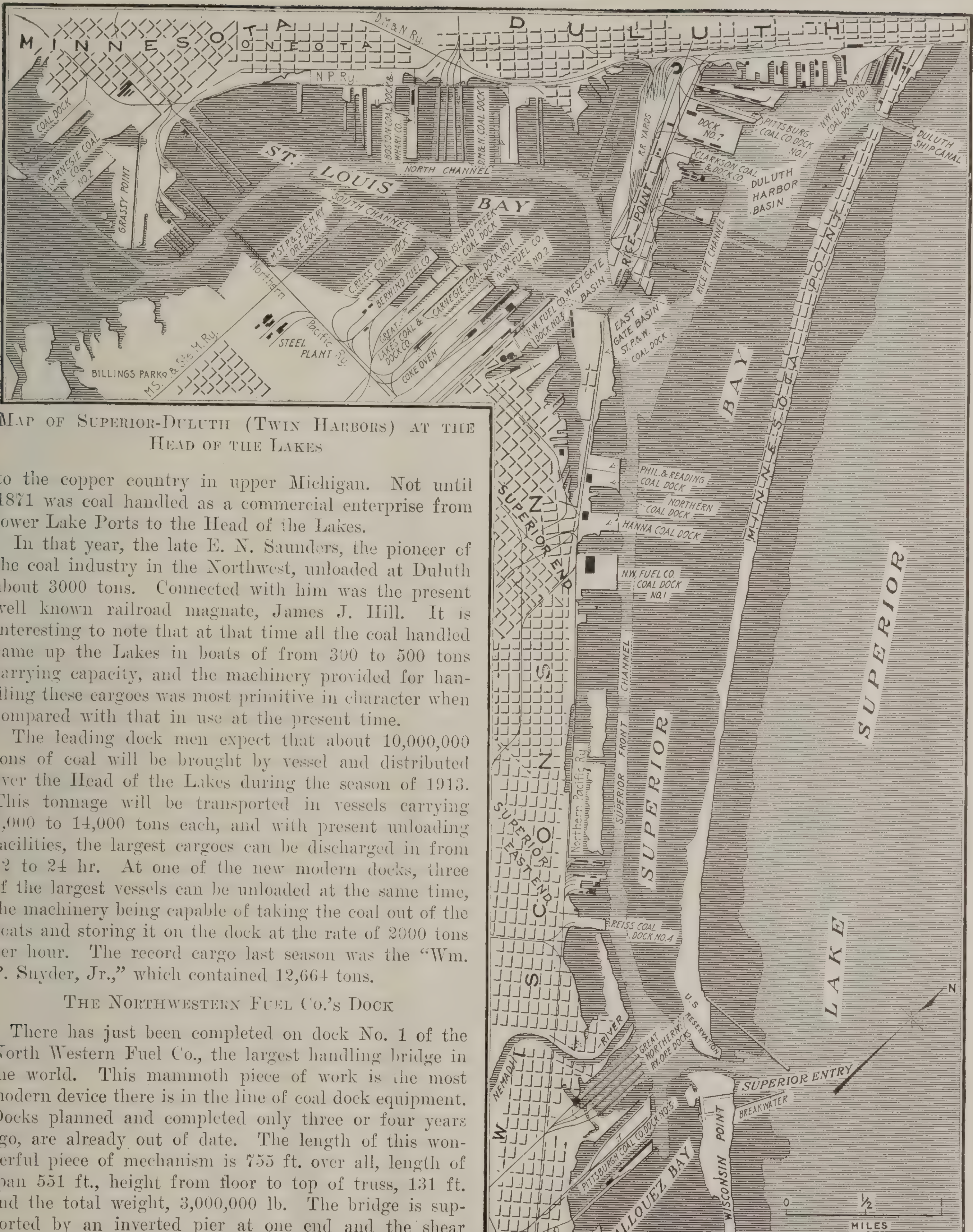
*Editor "The Coal Dealer," Minneapolis, Minn.



Map of Superior-Duluth (Twin Harbors) at the Head of the Lakes

to the copper country in upper Michigan. Not until 1871 was coal handled as a commercial enterprise from lower Lake Ports to the Head of the Lakes.

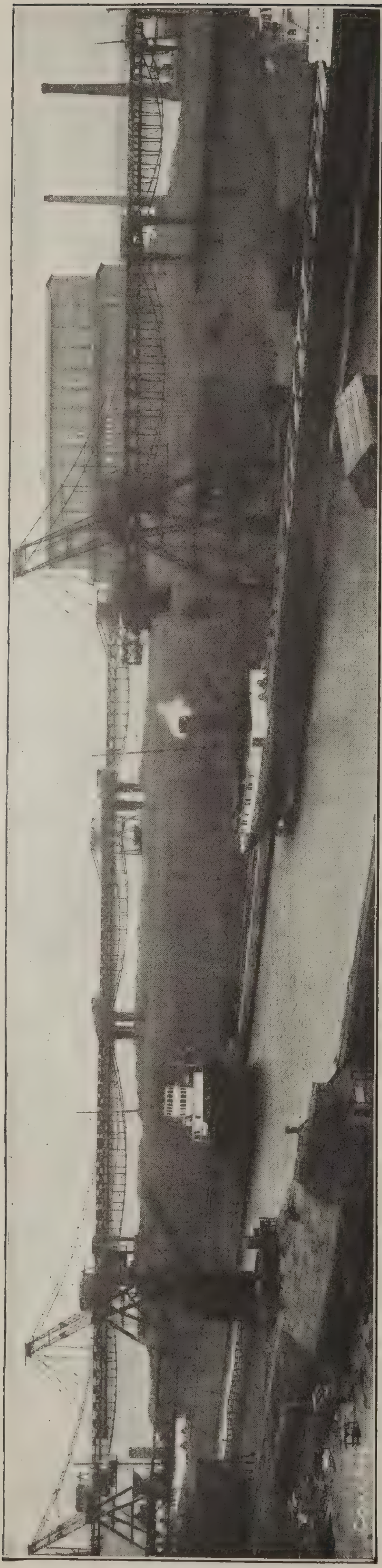
In that year, the late E. N. Saunders, the pioneer of the coal industry in the Northwest, unloaded at Duluth about 3000 tons. Connected with him was the present well known railroad magnate, James J. Hill. It is interesting to note that at that time all the coal handled came up the Lakes in boats of from 300 to 500 tons carrying capacity, and the machinery provided for handling these cargoes was most primitive in character when compared with that in use at the present time.

The leading dock men expect that about 10,000,000 tons of coal will be brought by vessel and distributed over the Head of the Lakes during the season of 1913. This tonnage will be transported in vessels carrying 8,000 to 14,000 tons each, and with present unloading facilities, the largest cargoes can be discharged in from 12 to 24 hr. At one of the new modern docks, three of the largest vessels can be unloaded at the same time, the machinery being capable of taking the coal out of the boats and storing it on the dock at the rate of 2000 tons per hour. The record cargo last season was the "Wm. P. Snyder, Jr.," which contained 12,664 tons.

The Northwestern Fuel Co.'s Dock

There has just been completed on dock No. 1 of the North Western Fuel Co., the largest handling bridge in the world. This mammoth piece of work is the most modern device there is in the line of coal dock equipment. Docks planned and completed only three or four years ago, are already out of date. The length of this wonderful piece of mechanism is 755 ft. over all, length of span 551 ft., height from floor to top of truss, 131 ft. and the total weight, 3,000,000 lb. The bridge is supported by an inverted pier at one end and the shear leg at the other, thus taking up the least possible space. The entire structure is mounted on wheels which are driven by electric motors by which means the bridge is moved at the rate of about 200 ft. per minute, while traveling from hatch to hatch of a boat being unloaded, or from one point to another on the dock when loading the coal into cars.

The most modern type of man-trolley electrically operated and equipped, with complete air system for braking, will operate on the bridge, using a specially designed bucket for digging the coal out of the hold of the vessel and another for scraping it together in a pile and cleaning up the bottom of the hold.



Pittsburgh Coal Co.'s No. 7 Dock at Duluth, Equipped with Brownhoist Machinery

Coal Receipts, According to Different Grades, at the Twin Ports for the Current Season to Aug. 1

Month	Harbor	Anthracite	Yough.	Hock'g	Pocah's	Splint	Cannel	Smithing	Unclassified	No. 8 Ohio	Total soft	Month	Harbor
Apr.	Duluth	28,720	81,224	7,293	....	7,220	....	2,774	....	....	98,511	Apr.	Duluth
Apr.	Superior	....	77,349	7,028	....	12,903	....	....	....	....	97,280	Apr.	Superior
May	Duluth	42,716	267,760	49,397	11,976	19,556	....	....	....	10,818	359,507	May	Duluth
May	Superior	201,357	256,332	132,681	78,434	57,840	1373	816	180,537	77,430	713,443	May	Superior
June	Duluth	87,492	335,681	62,345	27,556	39,894	4334	1,530	9,283	45,903	526,526	June	Duluth
June	Superior	160,607	362,846	143,199	107,952	84,943	....	3,075	96,526	78,795	877,336	June	Superior
July	Duluth	56,833	334,100	77,421	35,550	86,173	....	4,450	....	94,356	632,050	July	Duluth
July	Superior	249,760	413,280	107,739	100,621	54,522	3631	....	46,497	54,997	781,287	July	Superior
	Totals	909,933	2,128,572	587,103	362,089	363,051	9338	12,645	260,843	362,299	4,085,940	Totals	

The digging bucket is of the clam-shell type and has a spread of 24 ft., while the clean-up bucket has a spread of 27 ft. The huge clam shell raises 10 tons of coal each trip and places it in the stock pile. In the early days this used to be considered a big car load. Heretofore six tons has been the limit of clam-shell capacity on the docks. This clam shell stands 17 ft. high, and four men standing on top of one another just reach the top. With this equipment the dock can unload a 10,000-ton cargo in 18 to 20 hr., which formerly would take 40 hours.

In the accompanying illustration is shown the coal-handling equipment of the Northwestern Fuel Co., installed several years ago by the Brown Hoisting Machinery Co.

As will be noted the equipment consists of four fast unloaders, three bridge tramways, and two electric-transfer carriages. The coal is unloaded from the vessels by means of grab buckets from which it is dumped into the hoppers on the piers. The pier spans two railroad tracks so that the coal may be either loaded directly from the hopper into railroad cars beneath, or into self-dumping tubs located on the transfer carriages. Each one of the bridge tramways consists of three spans covering the entire storage yard, and they are all equipped with a man trolley fitted with a 4-ton shovel bucket which is used in reloading the coal.

The self-dumping tub is picked up by means of the man trolley and conveyed to the desired place in the storage yard, where the coal is held for future shipment. The fast plants, transfer carriages and bridge tramways are all electrically operated and self-propelled along their respective tracks.

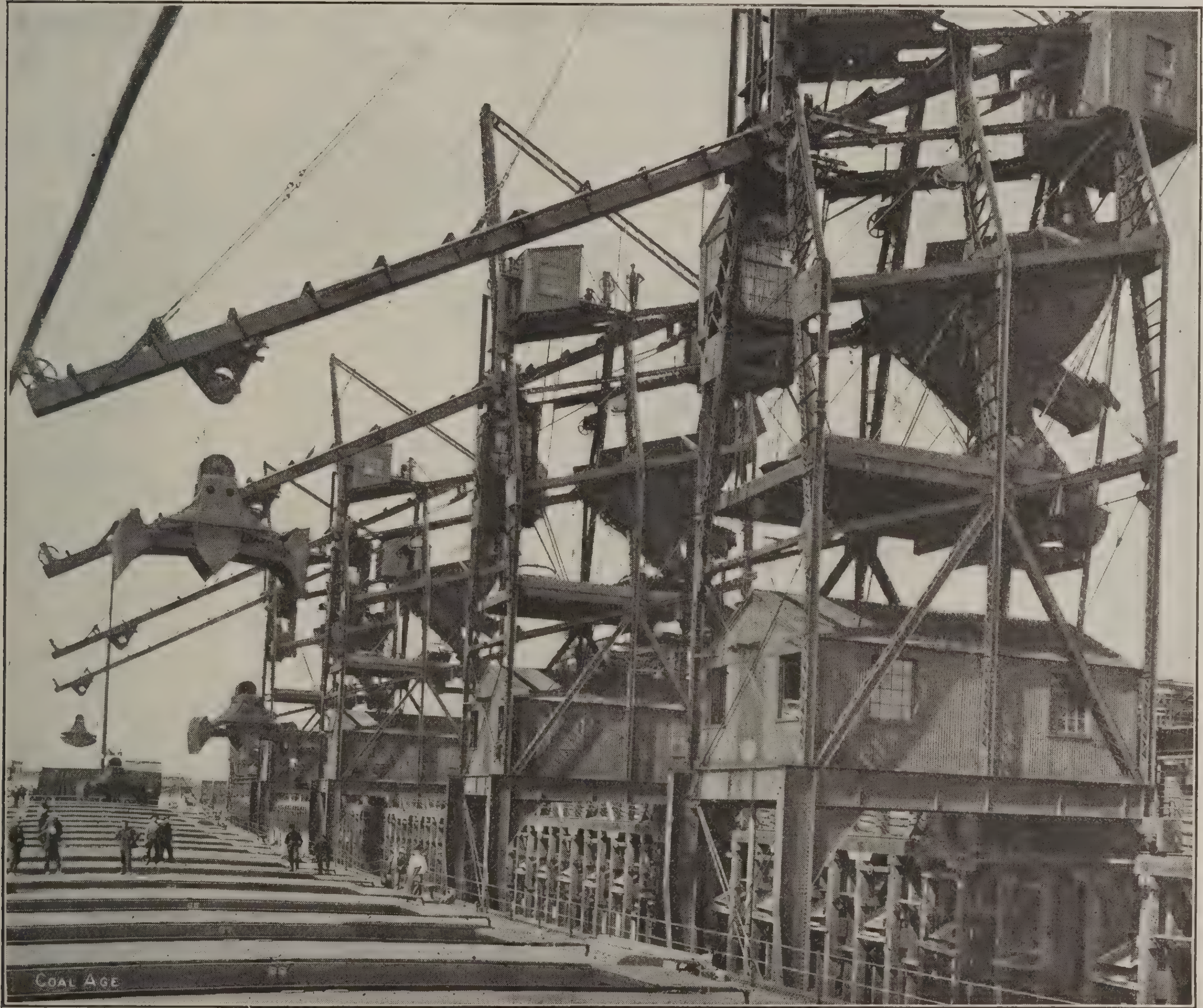
Growth of the Lake Shipping

A glance backward over the tonnage handled in former years indicates a healthy increasing demand year by year. The records show receipts of both anthracite and bituminous at the Duluth-Superior docks as follows:

1909	5,662,707
1910	8,171,644
1911	8,434,905
1912	8,585,039

It is estimated by those intimately acquainted with coal distribution in the Northwestern territory that there is a yearly increasing demand of about 10 per cent. On the basis of last year's receipts this would mean a tonnage for 1913 of approximately 10,000,000 tons. With the improvements completed and under way, dock storage will be close to 10,000,000 tons, which means a possible handling capacity of over 15,000,000 tons. During the active season, much of the coal does not go into the stock pile; after unloading from the boat it passes through the screening operation and direct to cars for shipment to dealers' bins in the country. When there is a large tonnage going to the storage bins of the trade in the early part of the fall, when cars are plentiful, it gives the docks a chance to bring up a sufficient supply and store it for the heavy demand during the close of navigation.

Until about five years ago, the distributors of coal from the Head of the Lakes were the Northwestern Fuel Co., the Pittsburgh Coal Co., the Lehigh Valley Coal Sales Co., the Philadelphia & Reading Coal & Iron Co., the Zenith Furnace Co., the M. A. Hanna Coal Co., the Northern Coal & Dock Co., and the St. Paul & Western Coal Co., distributors of Sunday Creek Hocking. Practically all of these have rebuilt their docks and put on modern handling equipment and substantially increased their handling capacity. Others have come in with modern dock facilities, such as the Berwind Fuel Co., making a specialty of Pocahontas Smokeless; the Carnegie Fuel Co. have also made rapid strides, having recently completed a large modern structure, and the latest addition is the fine new dock of the Island Creek Coal Sales Co., which is devoted exclusively to their product.



Brownhoist Unloading Apparatus on the Northwestern Fuel Co.'s Dock at Superior, Wis.

Briquetting and Variety of Coal Handled

The Stott Briquette Co. about five years ago started manufacturing anthracite screenings into merchantable briquettes, while the Berwind Fuel Co. has been successfully operating a large briquette plant, using their smokeless screenings. They are now putting up a duplicate of their briquetting plant. Other dock companies operating here are the Great Lakes Coal & Dock Co., who are about to make extensive improvements, the C. Riess Coal Co., of Sheboygan, Wis., operating a chain of docks along Lakes Superior and Michigan, and the Clarkson Coal & Dock Co., who operate a dock at Ashland, Wis.

Formerly, the principal soft coals handled were Ohio Hocking and Youghiogheny, but now the West Virginia smokeless and splint coals form a large percentage of the tonnage, and of late years a strong demand has come for the high-grade coals from Kentucky-Tennessee, and large quantities of these are stored on the docks regularly. Ohio Hocking still has a firm hold on the consumer. It has been a popular domestic coal for many years, and in spite of the crowding in of others, the yearly tonnage holds about the same.

The territory reached from the Head of the Lakes is commonly designated as dock territory, reaching into the upper part of Wisconsin, all of Minnesota, northern Iowa, northwestern Nebraska, South Dakota, North Dakota and Montana. More dock coal from the Head of the Lakes is going into the Canadian Northwest every year. There is a point, however, where rates on dock coal equalize with all-rail coals from Illinois, Indiana and Kentucky, and below an imaginary line where that division occurs, competition between dock coal and all-rail coal is always keen.

Preparation of the coals has developed in the West to such an extent that often the best preparation is the deciding point. The better grades of Illinois coals obtained a foothold in dock territory solely on their excellent preparation. Dock men at one time never thought of giving their soft coal any sizing or screening, but they finally had to come to it, and today all modern docks are equipped with expensive screening plants and are effecting a splendid preparation.

RAILROAD FACILITIES

No port has better railroad facilities for the distribution of the coal tonnage handled over the docks than Duluth. The vast amount of ore, grain and merchandise brought here to be transhipped by water insures a steady and abundant car supply. The grain fields of Minnesota, South Dakota, North Dakota and Montana practically empty their entire harvests into the Head of the Lakes elevators during September, October, November and December at a rate that taxes all the railroads having their terminus at the Twin Ports. This brings a stream of cars loaded with grain to Duluth-Superior and when emptied they are switched to the docks for loading with coal and within a day are back on their way to the interior.

The Northern Pacific, the Great Northern, the Soo and the Omaha have all greatly improved their terminal facilities and are as much interested in keeping transportation from becoming congested as the dock companies. Since the congestion several years ago, there has been no serious blockade or car shortage. There need not be any if the buyer will do his part in ordering supplies forward in the early summer. If, however, ordering by the country trade is delayed until late fall, the handling of the immense tonnage during the three months time becomes a physical impossibility.

(*To be Continued*)

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Wyoming Coal Production in 1912

The coal production of Wyoming in 1912, according to E. W. Parker, of the U. S. Geological Survey, amounted to 7,368,124 short tons valued at $11,648,088, an increase of 623,260 short tons in quantity and $1,139,225 in value over the figures for 1911. With the single exception of the year 1910, the output of 1912 was the largest in the history of the state. In 1910, however, conditions were abnormal, a shortage of fuel caused by a six months' strike among the coal miners in the central and southwestern states having caused an unusual demand upon the coal-producing districts of the Rocky Mountain states. The production in 1911, while less than that in 1910, showed a normal gain over 1909, and that of 1912 exhibited a normal increase over 1911.

The region supplied by Wyoming coal was blessed with bountiful crops in 1912 and the metallurgical and other industries were in a prosperous condition, which was reflected not only in the increase in production over 1911, but in an advance in the average price per ton from $1.55 to $1.58.

Coal mining in Wyoming gave employment to 8036 men for an average of 238 days in 1912, against 7924 men for an average of 230 days in 1911. The labor efficiency in Wyoming is among the highest in the country, usually showing an average production per man per year of over 900 tons. In 1912, this average was 917. According to the United States Bureau of Mines, there were 34 deaths by accident in the coal mines of Wyoming during 1912, an increase of one over 1911.

Probably more than half of the entire area of Wyoming is coal bearing. Coal is believed to exist in every county of the state, although in some portions it lies under so heavy a cover as to be unworkable under present conditions. The reserves are estimated at approximately 424 billion short tons, a supply exceeding that of any other state, with the possible exception of North Dakota. The coals of North Dakota, however, are almost entirely lignite, with a small amount of sub-bituminous, whereas those of Wyoming range from sub-bituminous to medium-grade bituminous. Some of the Wyoming coals go to markets as far distant as the Pacific Coast.

The coalfields of Wyoming are numerous; some of them are large and contain many beds, some of which are very thick. One bed in the southwestern part of the state is about 90 ft. in thickness; the largest coalfield is the Powder River field in the northeastern part of the state. At least 11,000 of the 15,000 sq.m. contained in this area are underlain by coal beds of known workable thickness.

OUTCROPPINGS

Most great edifices are supported by stones hidden in the ground.

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Nothing astonishes men so much as common sense and plain dealing.

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A newspaper in a Mississippi valley town recently printed the following concerning a possible coal development in that vicinity:

> About 19 years ago, Mr. ———— was digging a well on his farm when he struck the coal vein at a depth of about 40 ft. He at once had competent chemists examine the coal, and they stated that it would take about 20 years from that time for the coal to be in condition to mine profitably, as it was then in the process of making a paying vein.
>
> Mr. ———— is now an old man, and he says that he has waited 19 years and believes that it is time for him to again investigate the matter, etc.

As authorities agree that it has taken many thousands of years to form our present coal measures the "competent chemists" above mentioned must have been highly desirous of allowing Mother Nature to put the last finishing touches upon that particular deposit.

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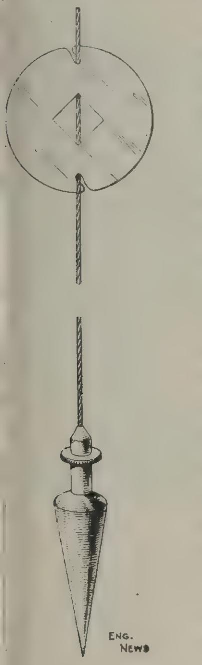
It is not exactly good taste for a paper to blow its own horn. If a journal is accomplishing something, others will soon find it out, and the good deeds will forthwith be heralded broadcast. However, the following letter from J. W. Bischoff of the Davis Colliery Co., in West Virginia may carry a suggestion to other mine managers and superintendents in various fields:

> Am inclosing you copy of letter sent from this office. We have, for some time, been greatly interested and pleased with the sentiments expressed in your forewords along the line indicated in that of June 21.
>
> Believe that too little attention has been paid to the "Human Element" by those having to deal with it. We ourselves have made a study of this and have tried to impress our ideas in our own weak way upon our associates, and feel encouraged that such a medium as "Coal Age" has seen fit to take the matter up.
>
> We are sure you are doing mining interests an almost inestimable favor by treating these subjects in the way you do.

The above is only one of numerous letters received by "Coal Age," and all going to prove that coal men are as human as any other class of individuals in any other industry. The pages in "Coal Age" devoted to the "human side" of mining have proved a great success, and if we are to believe our friends, this class of literature has been both interesting and beneficial.

A Plumb-Line Target

As a rule, suggestions from engineers in other branches, n methods in underground surveying, are usually somehing old to the colliery engineer, or embody some unractical refinement that will not stand the test of hard, practical usage. However, the *Engineering News* has come forward with a simple device, which should be of value in underground work. It is described as follows:



The accompanying illustration is self-explanatory. The target is made of white celluloid. It is of convenient size to carry in the pocket and is readily attached or detached to the plumb-bob line by slots shown in the illustration. It is claimed to be most appreciated when sighting in dark or shady places, or toward dusk when the light is failing. In such cases a match held behind the cut in the target will enable the transitman to quickly locate the plumb line. It is also claimed to be particularly serviceable where the background is dark as is the case of grass or foliage. The only possible objection we can see to its use is the resistance it would offer in a breeze and hence make it more difficult to center the bob. This device is alled the "Fulton" pocket target and is made and sold y Kolesch & Co., 138 Fulton St., New York City. The rice is 35c. each, or $3.50 per dozen.

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Mine Inspection in Arkansas

Following are copies of letters, recently sent out, by Iine Inspector Thomas H. Shaw, to the mine owners and perators, and to members of the U. M. W. A., in Arkansas, in an earnest endeavor to secure their coöperation or the betterment of mining conditions in the state:

To Mine Owners and Operators

Gentlemen: I am anxious to bring about an improvement f coal mining in this state; I feel both miner and operator vill coöperate with me, and realize that my intentions are to ring about safer conditions under which coal will be mined. therefore respectfully call your attention to the following onditions which I find to be the most common causes of anger.

Ventilation—Under Acts 1905, Act No. 225, you are reuired to furnish 200 cubic feet of air to the working face. Our Supreme Court has passed on this question in the 75 rkansas, p. 76.) To comply with this, you will have to gure the amount of air consumed by various sources; for nstance, it is estimated each mule will consume 500 cubic eet. Figure your air supply accordingly. Air must be conucted to the working face.

Entries, Air Courses and Crosscuts—Article 7, Act 225 eads as follows: "Two entries, parallel with each other, must e driven for the ingress and egress of the air, and crosscuts ust be made at intervals not to exceed 40 ft. apart. Where as exists, they shall be driven 30 ft. apart, or a crosscut e made at any other place ordered by the management to o so. No room shall be turned inside the last crosscut."

Refuge Holes and Dusty Entries—Section 5534 of Kirby's igest requires refuge holes to be made not more than 30 t. apart. Dusty entries must be cleaned up and sprinkled.

Escapement Shaft—Must be kept in good repair and steps igged with banisters.

Duty of Miners—Miners must make entries, air crosses, nd crosscuts not less than 7 ft. wide. And must burn pure ard oil in lamps. I hope to have your hearty coöperation in bringing about a betterment of mining conditions in this state. I do not wish to work hardships on operator or miner, but must insist on the mining laws being lived up to. Trusting that these suggestions will meet with your approval and prompt compliance, I am,

Very truly,
TOM SHAW,
State Mine Inspector.

To Members of the U. M. W. A.

Gentlemen: I am trying very hard to place the working of mines on a safer basis, and in order to do this I must have the hearty coöperation of all the miners in the state. It is impossible to bring about the improvements that are necessary in the mines unless the miners do their part, and you cannot expect the mine owners to live up to the laws unless you, also, live up to the laws.

The principles of the U. M. W. A. are and always have been for justice and a square deal. I mean to see that every miner has a square deal from the operator, but in turn it is only fair, that the operator is given a square deal from the miner. And if you expect a strict compliance of the mining laws from the operator, it is necessary for you to also comply with these laws. The law makes several requirements of the miners. The following rules and regulations I wish to call to your specific attention, and would like to have your local take it up and discuss it with a view of seeing that the following rules are strictly complied with.

All drill dust must be moved from the vicinity before shots are fired. All entries, air courses, and crosscuts must be made not less than 7 ft. wide. They must be kept clean and cleared from dirt. All miners must burn pure lard oil in lamps. See that shotfirers fire no shots where dust has been left, and that all dusty entries are left until they are cleaned and sprinkled. Also, see that no shot is fired that is considered dangerous.

I will appreciate information at any time of the violation of any of the mining laws, either by the operator or individual. I trust, in this effort to bring about safety in mining, that I will have the active coöperation of every miner and every local within the State of Arkansas.

Very truly,
TOM SHAW,
State Mine Inspector.

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Coal in Southern Manchuria

According to the Daily Consular and Trade Reports, the exportation of coal from Newchwang only began to appear in the Customs returns in 1907, and has grown steadily, reaching 193,125 tons in 1912. The supply comes mainly from Fushun near Mukden, but also from Penhsihu on the Mukden-Antung Ry., and from Yent'ai, near Liaoyang. In another direction, northwest of Chinchow, good coal is found at two places, named Peipao and Hsinch'iu, and it has been partly in the hope of providing an outlet for these mines that the harbor works at Hulutao have been commenced, and the railway from Chinchow toward Aigun projected.

COMING SOCIETY MEETINGS

First Aid Meet., Philadelphia & Reading Coal & Iron Co.—The annual meeting of this company will be held at Lakeside Park, East Mahanoy Junction, Penn., Sept. 20.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremen's Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

American Mine Safety Association—The second meeting of this society will be held at the Bureau of Mines, Pittsburgh, Sept. 22-24. H. M. Wilson is chairman.

American Mining Congress—This society meets for its 16th annual session at Philadelphia, Oct. 20-24; the secretary is J. F. Callbreath, who has opened quarters in the Land Title Building.

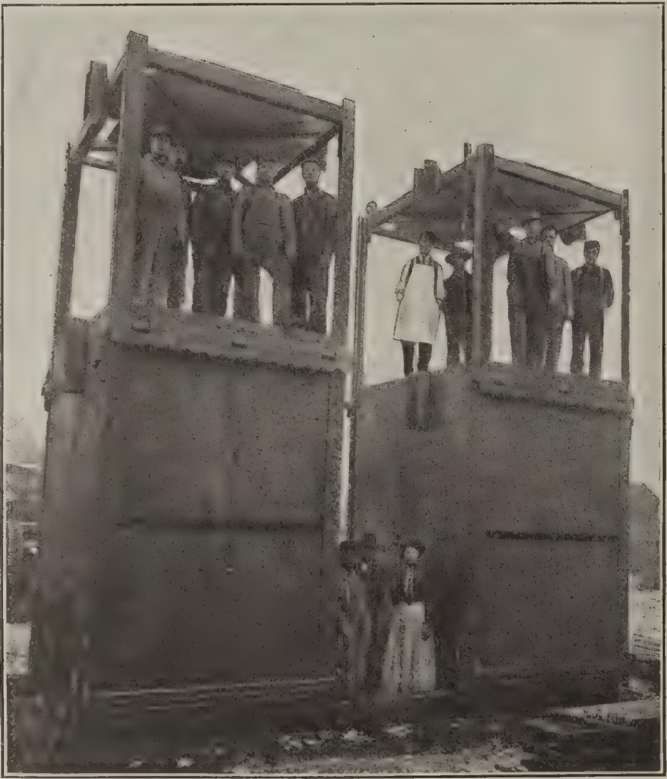
Coal Mining Institute of America—Winter Session meets Dec. 4 and 5 at the Fort Pitt Hotel, Pittsburgh, Penn. C. L. Fay, secretary, Wilkes-Barre, Penn.

A New Coal-Hoisting System

In shaft mining it seems to be an all but universal practice to hoist the loaded car of coal out of the shaft before dumping. Furthermore, most cages are equipped to hoist only one car at a time. In many mines the amount of time thus lost in the transit of the cars up and down becomes a considerable quantity.

Mr. Andrew Flesher, of Taylorville, Ill., has devised a scheme which renders it unnecessary to move the car from the shaft bottom, and at the same time considerably increases the amount of coal which may be handled in a given length of time.

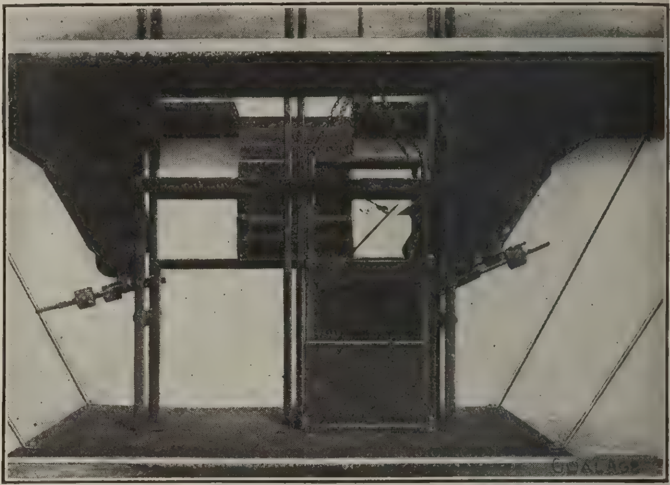
Briefly stated, this system consists of two automatic dumps at the shaft bottom discharging into hoppers which communicate, by means of a suitable gate, to either compartment of the hoisting shaft. Instead of placing the ordinary cages upon the hoisting rope, large steel buckets of suitable size and shape are provided. These are so arranged that when lowered to the bottom of the shaft they automatically operate the gates of the coal hoppers above mentioned, one bucket, of course, operating the gate of the hopper upon one side of the shaft, and the other bucket operating that located upon the other side. The two buckets are arranged precisely as the ordinary cages, one traveling up, while the other moves downward, and while one is filling at its underground hopper, the other is discharging its load in the tipple in the ordinary manner.



These Cages Have a Record of Hoisting 497 Tons in One Hour

These buckets may be made of any desirable size, but are usually constructed to carry from six to eight tons, thus having a considerably larger capacity than the ordinary mine car, while the time required for filling or discharge is reduced to a minimum.

It may readily be seen from the foregoing that a mine properly equipped with a pair of these buckets for hoisting will have a capacity equal to the same mine equipped with double or triple-deck cages. Furthermore, that when the buckets are employed hoists can be made with greater rapidity, as no time is lost in either caging the cars or dumping them, and the output of the mine will be governed largely by the ability to keep the loading hopper supplied with coal. Furthermore, no time will be lost in raising or lowering cars, since, as quick as a car is dumped, it is immediately run back into the workings ready to be loaded again.



A Cage at Shaft Bottom, Showing Operation of Chutes

We understand that this system has received a practical test in operation at one of the mines in southern Illinois, and that a pair of buckets, together with a pair of hoppers suitable for operation with them, are on exhibition at the works of the Foundry & Machine Co., at Taylorville, Ill.

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Covering the Blowoff Pipe

Every engineer knows how bothersome it is to protect blowoff pipes inside the boiler setting. I have found a new way to protect mine, says W. E. Chandler, in *Power* of Aug. 26, 1913. Instead of bothering with cast-iron sleeves which seldom fit, or brick covers that split and fall down, to say nothing of filling the space in the combustion chamber, I simply cover the blowoff pipe from the boiler to the wall with $\frac{7}{8}$-in. asbestos rope. I then make a plaster of equal parts of asbestos meal and fireclay and add one pint of fine salt to a 16-qt. pailfull of plaster, using just enough water to make a stiff mass. This is plastered over the rope with the hands and crowded in between the strands

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Dipping coal seams should usually be ventilated by the ascensional system of ventilation, that is, the intake or fresh air should be conducted as directly as possible to the lowest part of the workings; and then made to circulate through the working places, starting with the lowest levels and gradually passing up the pitch toward the mouth of the mine. By this method the return air, which is commonly warmer and lighter than the intake, will be always rising toward the mouth of the mine and will, at the same time, be carrying the gases away from the men, so that the possibility of forming a dangerous mixture is constantly less.

POWER DEPARTMENT

A Modern Compressor Plant

By Frank H. Kneeland

SYNOPSIS—Where the underground conditions preclude the employment of electricity, compressed air is the next best medium of power transmission. The plant here described is a representative of a good type of compressor installation.

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So strong has been the trend of practice toward the employment of electric transmission in the construction of mining power plants during the past few years, that the mention of such a plant immediately brings a vision of a collection of steam turbines or high-speed engines direct-connected to revolving-field generators of high voltage. Conditions, however, frequently alter cases, and present difficulties in the way of safety, which may render the employment of electricity underground, in the judgment of certain state mine inspectors at least, scarcely less than suicidal.

Under such circumstances, there appears to be no alternative, but to revert to the older and less efficient, albeit the safer method, of power transmission in gaseous mines, namely, compressed air. Such is the case at Marianna, Penn., and the type and quality of the machinery employed show well the possibilities of this mode of storing and transporting energy.

At this plant electricity is employed only upon the surface. All operations performed underground, requiring the use of power, are accomplished by means of compressed air, and as a consequence a compressor plant of arge capacity is required.

The power plant as a whole consists of two parts, the boiler house and the power house proper. The latter building is approximately 50x111 ft. inside. It is a steel-frame structure inclosed in brick with steel roof trusses and a concrete slab roof reinforced with wire netting. The floor is of concrete, neatly grooved to represent tile.

Upon coming in at the main entrance of the building the first machine encountered is a 26x46-in. Mesta simple Corliss engine, direct-connected to a 500-kw., 300-volt Westinghouse direct-current generator, operating at 100 r.p.m. The flywheel of this machine is of large size, beng approximately 20 ft. in diameter, with a rim of about 12x14 in. cross-section. This is the only generator upon the main floor of the building, and is operated to accommodate the day load, which consists of all tipple machinery (23 motors), all coke larries (3), the machine shop, chain car haul, the electric lights in the mine, and in the repair shop, and when necessary the street lights and those in the houses of the town.

The second machine is an Ingersoll-Rand cross-compound, two-stage air compressor, operating at 75 r.p.m. The steam end has a modified Corliss valve gear, and the compression is what is known as straight line. The high- and low-pressure steam cylinders are 24 and 36 in. n diameter, respectively, the air cylinders being 20 and 34 in. in diameter, while the stroke is 30 in. This machine compresses to 100 lb. pressure per square inch, and has a plate-steel intercooler. The high- and low-pressure air-admission valves are mechanically operated, while the discharge valves are automatic in action.

The next machine is a Mesta low-pressure cross-compound Corliss straight-line, two-stage air compressor. The high- and low-pressure steam cylinders are 22 in. and 36 in. in diameter, respectively; the air cylinders are 20 in. and 34 in. in diameter, while the common stroke is 48 in. This machine operates at 75 r.p.m., and compresses to 100 lb. pressure. The air valves are similar to those of the machine above described, in that the inlet valves are mechanically operated, and the discharge valves are automatic. Both steam and air cylinders are, however, upon the same side of the shaft. Both of the above compressors have automatic air governors controlling the air pressure within a 2-lb. limit.

The next machine is a high-pressure duplex straight-line Corliss, three-stage air compressor. The steam cylinders are 29 in. in diameter, and the air cylinders are 21 in., 15 in. and 6¾ in. in diameter, while the stroke is 24 in. The machine operates at 75 r.p.m., and compresses to 1000 lb. pressure. The air cylinders are tandem triplex, six cylinders in all. There are two intercoolers and one aftercooler on each side of the machine. All air valves, both inlet and discharge, are automatic in action.

The next machine is a Mesta high-pressure, duplex, cross-compound, Corliss, four-stage air compressor, with eight air cylinders in all, four on each side. The high- and low-pressure steam cylinders are 22 in and 34 in. in diameter, respectively. The air cylinders are 29 in., 16 in., 7½ in., and 5¼ in. in diameter, while the stroke is 36 in. This machine runs at 100 r.p.m., and compresses air to 1000 lb. It is supplied with automatic regulators governing the stages, the first compression being to 40 lb., the second to 125 lb., the third to 300 lb., and the fourth to 1000 lb.

A Good Crane Is Provided

This completes the equipment of the power units upon the main floor of the building. A Case Manufacturing Co. 20-ton hand-operated traveling crane spans the width of the building, and traverses its complete length. A tram track leads into the building a sufficient distance so that any material may be run in upon a car and picked up by this crane.

The main bearings of all machines are lubricated by a gravity oiling system, while the cylinders are supplied by forced-feed oil pumps. All main steam piping is carried beneath the floor, with suitable goosenecks connecting to the various machines.

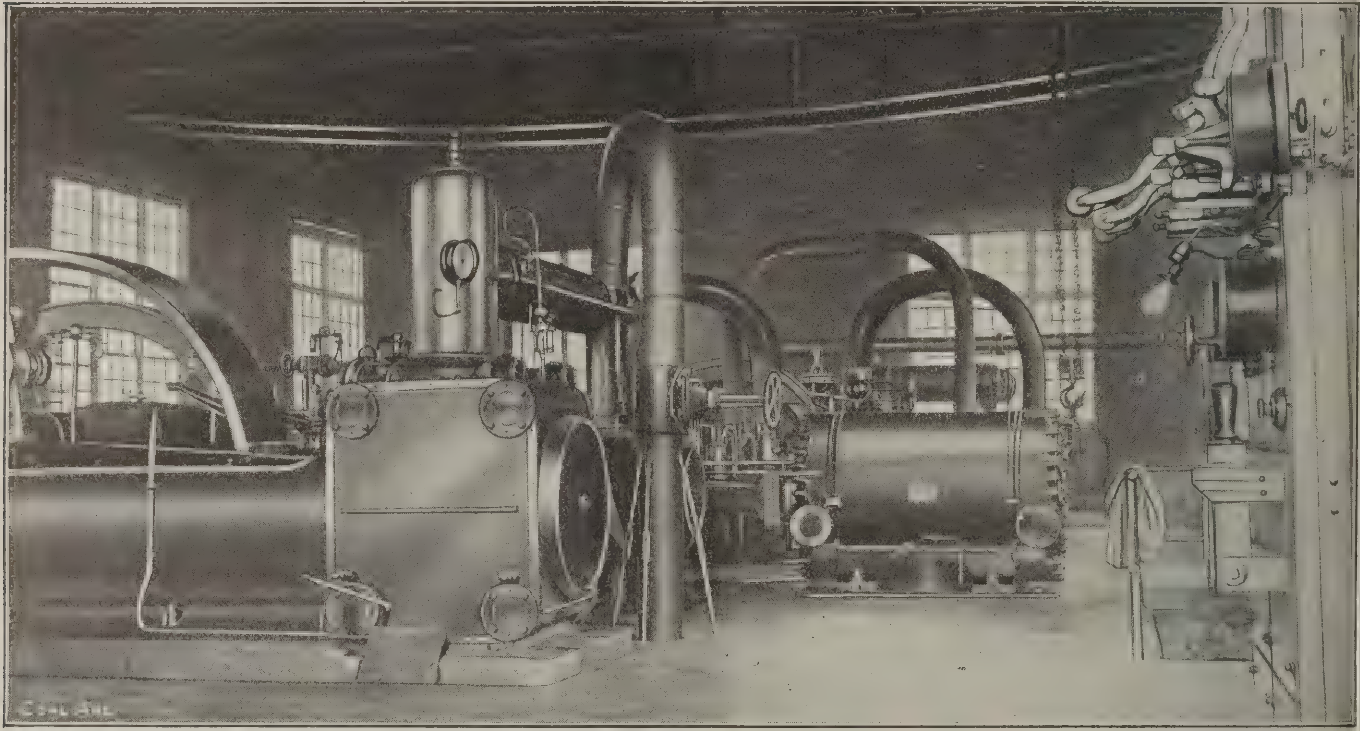
The low-pressure air, or that at 100 lb. pressure, is employed to operate all coal-cutting machines and punchers, as well as all pumps underground. The high-pressure air, or that at 1000 lb. pressure, is employed in the underground haulage locomotives, of which there are 23 in use.

Not the least noticeable features of the plant are the polished brass pipe railings, placed wherever necessary, and the tidy and handy wrench boards. A telephone booth is also conveniently located in the engine room.

The neat, clean, ship-shape appearance of this plant speaks vastly more for the efficiency and morale of the working force than could any number of power-house reports.

In the basement of the building is located a Russel tandem-compound engine direct-connected to a Westinghouse 100-kw., 300-volt, 400-amp. generator. The high- and low-pressure cylinders of this machine are 14 in. and 20 in. in diameter, respectively. The stroke is 20 in. and the speed is 275 r.p.m.

In the boiler house there are installed seven 500-hp. Stirling boilers, four of which are equipped for utilizing waste heat from the coke ovens. Three of these latter have Green chain-grate stokers, and the fourth is furnished with a B. & W. chain grate. The other three boilers are fired by Jones underfeed stokers, with three retorts to each boiler. Coal for all boilers is supplied from an overhead steel bin, each boiler having its own compartment therein.



Interior of Power Plant, Showing Air Compressors, Switchboard and Traveling Crane

The boilers are fed by four 10x6x12-in. Epping-Carpenter duplex feed pumps. A 15x9x18-in. Yough pump forces all the water which has passed from the jackets and intercoolers of the compressors to a hotwell outside the building, back to the supply tanks above the power house, from which all water for the plant is taken. This pump may also be turned onto the boiler-feed line if necessary, and the boiler-feed pumps put on the hotwell.

Forced draft for the Jones stokers is furnished by a 9x3-ft. fan, direct-connected to Troy 8x8-in. vertical engines, operating at 300 r.p.m. These engines are in duplicate, placed upon either side of the fan and connected thereto by a flange coupling. The air supply is automatic, so that when the steam goes down the fan speeds up.

Steam is ordinarily carried at about 150 lb., the pop valves being set for 152 lb.

The firing alley in front of the boilers is unusually wide, being about 16 ft. across; 7 ft. is also allowed between boilers, all units being set singly. Two separate boiler-feed lines are installed, automatic feed-water regulators being supplied, together with high- and low-water alarms. The feed pumps are also equipped with pressure regulators.

How Coal and Ashes Are Handled

Coal is dumped into a bin outside the building, from which it is conveyed to the boiler house by a 20-in., 4-ply rubber-belt conveyor, driven by a 30-hp. motor. It is distributed to the boilers by a movable tripper. The ashes from the furnaces are wheeled and dumped into a car in a pit beneath the boiler-room floor. The car is run upon a track to a point outside the building, where it is elevated in a self-dumping cage and emptied into a concrete bin with a capacity of about 20 cars. From this bin the ashes are drawn into an electric larry, which conveys them to the ash pile.

All engines and compressors except the Mesta high-pressure compressor exhaust through two Lowell Manufacturing Co. open feed-water heaters of about 500 hp. each. The compressor above mentioned exhausts direct to the atmosphere.

In addition to supplying steam for the power house, the boilers also supply steam to hoisting engines of large size and capacity handling the cages in the mine shafts. The house supply and other pumps are also operated from them.

The Pittsburgh-Buffalo Co. justly prides itself upon the mine and the neat, clean, sanitary town of Marianna. There is perhaps no mining community in western Pennsylvania that is more often spoken of as model of excellence. The power plant above described is, however, in thorough keeping with its surroundings. It, too, should be the source of no little self-elation and satisfaction to the management.

EDITORIALS

Asepsis in the Mine

Some time ago we called attention editorially to the freedom from tetanus enjoyed by those who are injured in the mines. Today we desire to refer to the comparative immunity of such wounds from pus formation. We are aware that it will be said that care should always be taken to guard against infection, and in no other way can absolute safety be assured. This is indeed true, but the study of first aid is so large that it is important that stress be laid on the principal elements and not on those which are less important. Nevertheless aseptic treatment must be especially emphasized in cases when men are injured on the surface or in deep mines.

The "bacteria" which are parasites of men and other warm-blooded animals, are in their nature best adapted to blood temperatures. They do not thrive in the mine unless they remain with their host, for their microscopic bodies are not piped with heating systems like the bodies of vertebrate animals. Consequently their living conditions are not favorable where temperatures of 55 to 60 deg. are encountered, as in mines.

The pus-formers (*"pyogenes"*) are usually infinitesimal seed-like bodies, which are known as *"micrococci."* That germ most numerously found in pus is a coccus which occurs in bunches like grapes, earning it the name of *"staphylococcus,"* and these bunches are yellow, hence the expression *"aureus,"* golden. The action of heat on that germ will be seen in the table, as also the effect on the *"streptococcus pyogenes,"* which gains the initial part of its first name from its tendency to colonize in chains. There are other germs beside those which are given in the table, but they are of less importance; some are seed-like *"micrococci"* and some rod-like bacilli. It must be said that Sternberg's figures for the point at which rapid multiplication of micrococci occurs appear somewhat high, for Kruse and Pansini state of the *pneumococcus* and allied *streptococci* that: "Although, as a rule, no development occurs at 68 deg. F., certain varieties were obtained, which after long cultivation in artificial media, showed decided growth at 64 deg. F." All of which makes us wonder if the second column of the table gives sufficiently high figures where the micrococci have been reared in the human body and not in chicken-broth or agar-agar.

Name of germ	Multiplies most freely	Multiplies rapidly
Staphylococcus pyogenes aureus	86° to 99° F.	64° to 68° F.
Streptococcus pyogenes	86° to 99° F.	61° to 68° F
Pneumococcus	95° to 99° F.	61° to 68° F.
Micrococcus pneumoniae crouposae	5° to 99° F.	72° to 75° F.

In all these organisms it is seen that rapid development demands a higher temperature than is usually found n an American mine. On leaving the human body by weat, mucus or the breath, the germs become incapable f multiplication. Moreover, like most "bacteria," they re killed or their vitality is lessened by acids. The second germ in the table is alleged by Von Lingelsheim o be killed within two hours in a 0.4 per cent. solution of sulphuric acid, and the fourth germ, while not destroyed in a saturated solution of ferric sulphate, is restrained from development in a 0.5 per cent. solution of that salt, is killed in a 0.5 per cent. solution of sulphuric acid and fails to develop in a solution one-fourth as strong.

We are prepared to admit that all "bacteria" passing directly from the mouth or carried by sweat to a wound doubtless have nearly the full germinative effect, so that breathing, spitting or placing a tobacco quid on a wound and picking over the exposed face of the injury with the finger nails are nefarious practices.

And we believe that rule 23 of the National Mine Safety Association is right in saying that "If no antiseptic or sterilized dressing is available, no dressing should be applied to the wound." All clothing removed from the body, all handkerchiefs, whether worn around the neck or secreted in the pocket, being warm, doubtless contain not only innumerable germs, but retain them in a condition in which they can immediately infect a wound.

But passing a sweatless hand over a dressing which will ultimately come against an open cut or tear will probably do no harm in the mine. The palm of the hand sweats but little and in the mine is usually dry and acid from contact with sulphates. A little ineptness, therefore, in opening a dressing or placing it, is not a cardinal sin.

In short, as we study the possibilities of infection, we are convinced that there are many gross sins against asepsis, but that only the most venial are committed at a first-aid meet. Will a contestant breathe on a wound? Will he use a tobacco quid? Will he use his handkerchief or his shirt sleeve as a dressing where better material is provided? It is almost unthinkable that he will do any of these things.

In fact, the first-aid meet has this defect, that it is like a drill, all pipeclay and polished shoes, and has as much resemblance to mine service as the parade ground has to the field of battle. What officer would list demerits for looting houses and stealing corn and chickens if he were making a schedule of demerits for a grand parade? Yet faults such as these are far more vital in war than breaking the line or performing any of the tricks of the awkward squad, for which demerits are provided.

As for the air-borne bacteria, Wainwright has shown us how they are removed. We have been shown how they are made listless and enervated by temperature conditions and acid. Do they get back all their vitality on reentering a host? Possibly not, at least not at once. Like a snake when spring comes, they are only slowly revived by the genial heat. Tetanus is most severe in tropical climates where the germ never gets chilled and Malta fever has no terrors when transported to the inhospitable shores of Great Britain. As the virulence of "bacteria" is weakened by excessive heat, and by propagation through resistant hosts and unfavorable media, and as it is said to be reduced by physical violence, perhaps also cold and acids have a similar benumbing effect, leaving the microbes helpless before the bactericidal action of the plasma of the blood.

That there is in this belief some degree of truth may be deduced from the fact that miners' wounds heal without difficulty while Fourth of July and summer injuries frequently have fatal results. Dr. F. L. McKee at the first, and so far the only, meeting of the American Mine Safety Association, declared that whenever miners had their wounds dressed at the hospital the failure to sterilize the wound in the mine had no evil results, a striking testimony to mining conditions which many another doctor could doubtless confirm. Dr. W. S. Roundtree declared that he "had seen only a few infections in two or three years in cases where the first-aid men got hold of the injured soon after the injury was received."

With this statement Dr. G. H. Halberstadt could not agree, saying that "in the anthracite region, the contrary is the case." It must be remembered that Dr. Halberstadt's experience is gained at some of the deepest mines in the country, where the heat is such that the *micrococci* are not materially numbed and some other inhibiting conditions may not be so marked in anthracite as in bituminous mines. In England, where mines are deep, doctors have testified that septicæmia has been due to injuries received from impact of coal.

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Summer Boiler Complaints

The late summer or early fall is frequently a trying season to many colliery power-house men. This is particularly true if the feed-water supply is drawn from surface streams or stagnant pools. During this time of the year, lakes, creeks and rivers are usually low, and the heat hastens the decomposition of any animal or vegetable matter which the water may contain.

Many boiler-feed waters carry chemicals in solution which are alkaline in their reaction, and these, together with any compounds which may be fed to the boilers to prevent scaling, may, with organic oils from the decomposition above mentioned, form a soap, which is almost certain to cause foaming if it accumulates in sufficient quantities. Sewage also, even though present in but small quantities, may carry sufficient organic matter to cause decided foaming or priming.

On the other hand, decaying vegetable matter in ponds or marshes frequently results in the formation of organic acids, which may cause severe pitting or corrosion of the boiler plates. This, however, will not ordinarily occur if the surfaces are even slightly protected by scale.

Colliery boilers are frequently called upon for sudden and heavy deliveries of steam. This in itself is a difficult condition to meet. No boiler, under good steaming conditions, will deliver a dry product, the steam invariably containing small amounts of water in finely divided particles. Of course, passing the steam through a superheater after it has left the boiler proper, will evaporate this water held in suspension, and deliver a perfectly gaseous product to the steam header. Superheaters are, however, not often employed in mining power plants.

The amount of water carried over from the ordinary saturated steam boiler is seldom large enough to cause damage. It is only when water leaves the boiler in masses commonly called "slugs," which are too large for eliminators or steam traps to handle, that there is danger of blowing an engine cylinder head out, which accident is always accompanied with more or less peril to the attendants.

The danger of priming through rapid ebullition, caused by a sudden demand upon the boiler, may be overcome by the installation of an auxiliary steam receiver, or dome, while that arising from organic oils in the feed water may be eliminated or at least materially lessened by installing an efficient coke or charcoal oil filter.

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First-Aid Demerits

We publish today the rules governing the first-aid contest at Knoxville, Tenn. They confirm our idea that the American Mine Safety Association is a live and worthy institution, for, if indications point truly, it has cleaned off the old slate, and a new list of penalties is put in place of the old. No longer does failure to be aseptic appear as the worst sin in the first-aid calendar.

Ineffective artificial respiration and improper treatment each score an equal number of demerits, and only lack of neatness is considered so venial as to deserve the light fine of two discounts. Formerly you could let a man die from inefficient resuscitation methods and yet score 98 per cent. The criminal code of the association was certainly a fearful and wonderful thing.

We have added up the original schedule and the present, and find that there were 50 discounts in the old list whereas there are 95 in the new. It is easy to see how failure to be aseptic, which still counts for 10 demerits has been made a less important offense by the new rulings.

We do not know that Coal Age effected this reformation. Those two dozen physicians doubtless did no need the prodding of that mysterious physician who wrote the "First Aid Muddle," nor were the sequen editorial remarks necessary to awaken their sense of fitness. The surgeons on the committee on first-aid contests, we assume, made the changes as a result of their own careful deliberations, and we expect that they wil make others before long, as indications point the need Only narrow men refuse to rectify errors, and the Mine Safety Association appears to have shown that it is sufficiently broad-gaged to review its own acts.

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Building Activity in Coal Fields

For more than a year anthracite and bituminous coa companies have been actively engaged in rebuilding old plants and developing new ones. The coal business has been rather an exception to the quiet conditions prevailing in American industrial circles. Coal prices were higher last year than in any normal year of the trade' history. The increase in value of the total output, a the mines, was nearly seventy million dollars. The pas twelve months was the first time in years that many companies were able to earn interest on their bonds, and i is to the credit of the industry that those operators now able to see daylight are giving first thought to the betterment of their plants as regards safety and efficiency rather than to the payment of long-awaited dividends.

LEGAL DEPARTMENT

Validity of Coal Trade-Names

By A. L. H. Street*

SYNOPSIS—A name which describes the character of coal or the district in which it is produced, cannot be regarded as a private designation applicable only to the coal produced by the firm using that name. But if a coal is not mined in the district after which it is named, and if its quality is clearly inferior to that of the coal produced in that district, it is likely that the courts will decide that it is not entitled to that name, for a decision indicating this view of the courts has been rendered in a flour suit.

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Several important court decisions show that the limits set by the law on the right to the exclusive use of a trade-name in the selling of coal are often not clearly understood. Below I give the general rules of law on this subject, with brief reference to decisions announced by appellate courts in cases which arose in the coal trade under those principles.

Generic Names Cannot Be Exclusively Appropriated

Newly coined words or words which have had no previous significance in the trade may be monopolized as trade-names by the first person, firm or company that adopts them, but any name which is merely descriptive of the nature or quality of the commodity to which it is applied cannot be exclusively appropriated. Thus, the Kansas City Court of Appeals held in the case of McGrew Coal Company vs. Menefee, 144 Southwestern Reporter, 869, that since the word "Electric," as applied to bituminous coal, has a well understood meaning as signifying production by the use of electric-mining machinery, plaintiff did not acquire the right to monopolize the words "Electric Lump Coal" as a trade-name.

The court said: "The words do not denote the origin or ownership of the commodity to which they refer, but are merely descriptive of the quality of a commodity of general consumption." In other words, the law insists that a valid trade-name be limited to the purpose of designating a particular person, firm or company as the producer of the commodity to which it is applied, without giving the exclusive right to monopolize a generic name, to the use of which all producers of the same class of commodity are fairly entiled.

Geographical Names Cannot Become Personal Property

As to geographical names, the United States Supreme Court has ruled: "The same reasons which forbid the exclusive appropriation of generic names, or of those merely descriptive of the article manufactured, and which can be employed with truth by other manufacturers, apply with equal force to the appropriation of geographical names, designating districts of country. Their nature is such that they cannot point to the origin (personal origin) or ownership of the articles of trade to which they may be applied. They point only at the place of production, not to the producer; and could they be appropriated exclusively, the appropriation would result in mischievous monopolies." Accordingly the court held that the right to use the name "Lackawanna" (a word which is said in Hollister's History of the Lackawanna Valley to be a corruption of the Indian words "Lahawhanna, signifying the meeting of two streams) was not subject to monopoly, though the coal of a particular producer had become well known by that name. (United States Supreme Court, Delaware & Hudson Canal Company vs. Clark, 13 Wall, 311.)

In a later case, Castner vs. Coffman, 20 Supreme Court Reporter, 842, the same court held that the name "Pocahontas Coal" was not subject to exclusive appropriation by selling agents for coal produced at or near a town named Pocahontas, especially as against the mine-owners for whom the agents had acted, even though the agents had enhanced the reputation of that field by careful inspection and grading of coal produced there. Following these decisions, the Supreme Court of Montana has held that the words "Owl Creek Coal" could not be monopolized to designate coal produced in a district known as the Owl Creek coal field, in which there was competitive mining. (Esselslyn vs. Holmes, 114 Pacific Reporter, 118.)

But a jobber who established an extensive trade in Nebraska for coal mined at Big Four, Colorado, where it was known as "Carbon Canon Coal," the jobber selling it under the name "Cristo Canon Coal" was held to be entitled to enjoin a former manager, who established a rival business, from using "Cristo Canon" as a trade name for the same class of fuel. (Nebraska Supreme Court, Consolidated Fuel Company vs. Brooks, 136 Northwestern Reporter, 60.)

Each District Is Probably Entitled to the Use of Its Own Name

But although a geographical name is not subject to monopoly as a trade name, it is probably certain that the courts would grant the producers in any field, especially if it should happen to be celebrated, an injunction against the sale by competitors of coal produced in another field under a name implying that it was produced in the first mentioned field. This is particularly true if the coal of that field should be of a higher quality than the other. As authority for this statement, the writer refers to a decision of the United States Circuit Court of Appeals for the Seventh Circuit, in the case of Pillsbury-Washburn Flour Mills Company vs. Eagle, 86 Federal Reporter, 608, wherein it was decided that the Minneapolis flour millers were entitled to enjoin sale of flour produced elsewhere under brands which implied that it was manufactured in Minneapolis.

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*Attorney and counselor at law, St. Paul, Minn.

SOCIOLOGICAL DEPARTMENT

Lehigh and Wilkes-Barre First-Aid Meet

Thirty-three first-aid teams from 14 collieries of the Lehigh & Wilkes-Barre Coal Co., by splendid demonstrations of first-aid work, made the fourth annual field day a big success. The contests were held at Sans Souci Park, near Wilkes-Barre, and several thousand people attended.

The outside team of the Nottingham colliery, Plymouth, carried off the big event, which was the last of the day. The teams which won in the other events were pitted against each other in the final contest, two problems being submitted to them for solution. The teams entered in the final contest were all well matched and capable and the judges found it somewhat difficult to select a winner. After careful consideration of the work of each team, the honors were finally awarded the Nottingham corps and each member of that team was presented with a bronze medal. Their names follow: William James, captain, John Pritchard, James Colbert, William Berkheiser, Michael Rubic, Anthony Adzoski.

All the problems were such as any team in the anthracite field is apt to encounter frequently in actual practice. No effort was made to puzzle the first-aid men, but the problems caused them to think rapidly, as they would if facing real conditions. Dr. E. C. Wagner and Dr. J. W. Giest, both of Wilkes-Barre, were the judges. After each event they announced only the points scored by the winning team.

INSIDE TEAM OF LANCE OR NO. 11 COLLIERY OF LEHIGH AND WILKES-BARRE COAL CO., NEAR PLYMOUTH, PENN.
(Left to right, Ray Lewis, captain, William Kirschner, Hugh O. Kane, Thomas Lewis and John Cummings with John Edwards as patient.)

One feature of the contest was the first-aid work of the boys' team from the Wanamie colliery. Six little fellows, none of whom are 16 years of age, make up this team and they gave a demonstration, which won much praise. They have been drilled for several months by William H. Craig, and the corps is as proficient in first-aid work as many of the older teams.

Following the contest, a banquet was served to the company officials and the first-aid teams. More than 600 men and boys gathered about the festive board. General Manager Charles F. Huber was toastmaster, and he thanked the men for their interest in first-aid work and then called upon John H. Bigelow, district attorney of Luzerne County, to present pennants to the teams winning the first seven events and bronze medals to the Nottingham outside team for carrying off the chief event. Following the banquet, the men spent the rest of the day in pleasure at the park.

The events and winners follow:

Event No. 1—All corps of outside men compete on the following problem: Treat a compound fracture of the lower third of the left thigh, bleeding in spurts; also a laceration of the left ear and an injury to the right eye (Shock). Use roller bandage for dressing eye and ear. Event won by outside team of Buttonwood colliery. Score 100.

Event No. 2—All teams of inside men Wilkes-Barre and Ashley districts, compete on the following, problem: Treat a compound fracture of both bones of right leg, bleeding severely; also gas burns of both hands, right arm and shoulder and right side of face and ear (Shock). Use roller bandage for head dressing. Event won by inside team of Empire colliery. Score 100.

Event No. 3—All inside teams, Plymouth district and Honey Brook division, compete on the following problem.

reat a compound fracture of the middle of the right thigh, evere bleeding; also severe burns of face, neck, right hand nd forearm, complicated with a fracture of burned forearm Shock.) Use roller bandages for dressing the burn and fracured forearm. Event won by inside team Parrish Colliery. core 100.

Event No. 4—All outside and inside teams, Wilkes-Barre istrict, compete on the following problem. Dress a puncure wound of right side of abdomen (Shock); also a laceraion over left knee, using triangular bandage for knee and bout four turns 4-in. roller bandage for abdomen. Event von by outside team Stanton colliery. Score 100.

Event No. 5—All outside and inside teams, Ashley district, ompete on the following: Dress a puncture wound of right hest between the fifth and sixth ribs (Shock); also a ractured left knee cap using triangular bandage for knee nd about four turns 4-in. roller bandage for chest. Event von by inside team Sugar Notch colliery. Score 100.

Event No. 6—All outside and inside teams, Honey Brook ivision, compete on this problem: Treat a fracture of the eft collar bone and a laceration of the top of the right foot, using a triangular bandage for the collar bone and a spica or the foot. Event won by outside team Audenreid coliery. Score 100.

Event No. 7—All outside and inside teams, Plymouth disrict, compete on this problem: Treat a compound fracture f both bones of the left forearm, bleeding in spurts; also acerations of palm of right hand and fingers (Shock) using 2-in. roller bandage for dressing the forearm and the palm f the hand, and making gauntlet bandage for fingers. Event von by outside team of Nottingham Colliery. Score 100.

Boys' Team, Wanamie Colliery, a Mine of the Lehigh and Wilkes-Barre Coal Co., near Nanticoke, Penn.

(Left to right, back row, John Craig, captain, Frank Stoj, homas Crouse; front row, Stanley Shershing, Walter Shershng and Forrest Rineheimer.)

(Left to right, back row, John Craig, captain, Stanley Shershing, William H. Craig, instructor, Frank Stoi, Thomas Crouse; front row, Forrest Rineheimer and Walter Shershing.)

Event No. 8—The Boys team of the Wanamie colliery gave n exhibition, no points being scored.

Event No. 9—Winners of events from Numbers 1 to 7 nclusive compete on two problems. Problem No. 1—Treat a acerated scalp wound on top of head, and a wound of the ight groin using 2-in. recurrent bandage for the head and an scending 3-in. spica for groin. Problem No. 2—Treat a racture of spine or broken back. Event won by outside eam of Nottingham colliery. Score 100.

The following teams participated, their membership eing as follows:

Hollenback Colliery—Outside team—Arthur Hughes, capain, Andrew Letzko, Frank Hunsinger, Thomas Meighan, Iichael A. Flaherty, Anthony Kennedy.

Inside team—William H. Evans, captain, David T. Davis, Edward Evans, Joseph Moyles, John Murray, John Hughes.

Empire Colliery—Inside team—Joseph Stevens, captain, Valter Powell, John Flanagan, Roy Lowe, John Moran, aniel Ward.

South Wilkes-Barre Colliery—Outside team—M. J. Connolly, captain, Andrew Kratz, Harry Pollard, George Gould, arry Reedy, William Austin.

No. 3 shaft—Ernest Seymour, captain, Watkin Williams, arry Thompson, Hayden Evans, Evan Cann, David Villiams.

No. 5 shaft—Richard Morgans, captain, James Evans, ames P. Evans, Evan Phillips, James Morris, Daniel Rees.

Stanton Colliery—Outside team—W. H. Hetherby, captain, William Rainow, Thomas Harten, Anthony Monahan, John Minnick, John Flaherty.

No. 7 shaft—Edward Griffith, captain, George Irving, John L. Williams, Emmanuel Bennett, Fred Horlacher, Joseph Griswold.

No. 4 slope—Theophilus Richards, captain, Samuel Thomas, John X. Thomas, James Davis, Evan Morgan, Paul Butcher.

Sugar Notch Colliery—Outside team—Manus Kane, captain, Bert Shoemaker, Arthur Lewis, Alfred Williams, Anthony Swartz, William Carr.

Inside team—Thomas Roach, captain, Harry McDermott, Edward Roach, Benjamin Comstedt, Anthony Morris.

Lance colliery—Outside team—Roy Stark, captain, David Cummings, Charles Meyers, Charles Atwell, Walter Kostruza, Emlyn Williams.

Inside team—Ray Lewis, captain, John Cummings, Hugh Kane, James J. Lewis, Thomas Lewis, John D. Edwards.

Nottingham Colliery—Outside team—William James, captain, John Pritchard, James Colbert, William Berkeiser, Michael Rubic, Anthony Adozski.

Inside team—George Griffith, captain, John Matthews, Thomas Ashton, Isaac Thomas, William H. Jones, Martin Cusma.

Reynolds Colliery—Inside team—John Edwards, captain. H. James Edwards, Harry Miller, Patrick Driscoll, Ignatius Hosey, Stanley Socka.

Wanamie Colliery—Outside team—Irve Vandermark, captain, Charles Womelsdorf, A. L. Engler, Oscar Spaide, Theodore Womelsdorf, John E. Burke.

No. 2 slope—William Craig, captain; James Phillips, Frank Gizinski, Evan Edwards, William Hibbard, John O. Evans.

No. 3 slope—John Murphy, captain; E. C. Barrett, William Briggs, Thomas Murphy, William E. Roberts, William Marshall.

Maxwell Colliery—Outside team—Brian McGuire, captain, Westy Bierly, David Morgan, Nathan Kelly, Edmund Krogulski, Stanley Brown.

Baltimore shaft—Albert Stead, captain, Michael Gorham, John Lavin, Michael Cuff, Richard McElligott, Edward Cuff.

Red Ash shaft—Michael Cavanaugh, captain, Griff Hughes, Thomas Grady, Henry Williams, John R. Roberts, Benjamin Llewellyn.

Buttonwood Colliery—Outside team—David J. Williams, captain, Walter Griffith, Gottleib Schwall, John Emmanuel, Harry Bryany, Edward Jacobs.

Inside team—John A. Thomas, captain, William W. Thomas, William J. Thomas, Howard Thomas, Rube Gliddon, David M. Jenkins.

Parrish Colliery—Harry Trebilcox, captain, John Ayres, Ernest Curnow, Benjamin Snyder, David Anthony, Hayden Jones.

Inside team—William J. Jones, captain, Alfred Reed, William Morris, Wade Maxwell, Edward Laughlin, David Jones.

Audenreid Colliery—Outside team—T. O. Mader, captain, Arthur Young, James Dougherty, James Roberts, Philip Lewis, Charles Gildea.

Inside team—John Hackett, captain, Thomas Jones, James McFadden, John Schwartz, Michael Billick, George Slodigo.

Honey Brook Colliery—Outside team—T. D. Muirhead, captain, William McCann, John Donlin, Neal Close, James Cull, George Mazurick.

No. 15 slope—John Liptock, captain, Emro Olyer, Barney Fogerty, William McFadden, John Upshaw, Edward Mears.

No. 20 slope—James McFadden captain, John Fogerty, William John Billick, Michael Pucher, Michael Servibeski.

Green Mount slope—Edward Fritz, captain, Steve Furish, William Kleckner, John Maticko, Hubbard Doud, Steve Lukus.

Wanamie Boys Corps—John Craig, captain, Thomas Stoker, Thomas Crouse, Frank Stoj, Walter Shershing, Forrest Rineheimer.

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Revised First-Aid Contest Rules

The committee on rules, discounts and events of the Knoxville meet has prepared the following rules to govern the contest. These rules will doubtless be generally copied. They show evidences of careful formulation. As the regulations differ considerably from those of the American Mine Safety Association they are worthy of most careful consideration. It has not been announced whether they are rules formulated by the first-aid contest committee of that Association but it is reasonable to assume that they emanated from that body.

RULES GOVERNING FIRST AID CONTEST

1. A team is composed of five men and a captain. Any one in the employ of a coal or metal company may be a member of a contesting team, providing he is not a physician or a trained nurse.
2. The captain will select the patient and designate the member or members of the team to perform the event.
3. The captain will control his team in their field work by giving audible commands.
4. The captain may select himself as one of the members who will perform the event.
5. The captain or other members will not prompt the person performing the event unless he is one of the performers. This will not apply to full team events.
6. At the conclusion of any event, the captain will raise his right hand and announce his team number. The team will remain at its post until relieved by the judges.
7. The teams will bring their own first-aid material, including bandages, splints, blankets, stretchers, etc., and will not be allowed to leave the patient to secure material.
8. The triangular bandage will be regarded as standard in the contest, but roller bandages may be used and those teams which use the latter will be given credits equal to those received by teams which use the triangle if the roller bandage is properly manipulated.
9. All splints must be prepared on the field for each event requiring their use. Specially designed splints may be used, but they must be assembled during the progress of the event in which they are to be used.
10. No practicing will be allowed on the field before the beginning of the contest.
11. The teams will be numbered consecutively, beginning at No. 1 and they will occupy their consecutive position on the field.
12. The judges will perform their work progressively, judging such number of teams in each event as the judges may determine and announce before the beginning of the contest.
13. In events involving resuscitation, the rescue of the patient and stretcher drill, the judges may require the teams to perform separately.
14. Each judge will mark the team number, event, and discount for each team judged, sign his name and deliver his record to the recorder.
15. The recorder will foot up the discounts and mark points made by each team in each event. The total points will be divided by the number of the events and the quotient will be the average for each team for the whole contest.
16. Time will not be an element unless the team or men performing run over the allotted time or fail to give treatment properly. All events shall commence and be finished at the sounding of a gong.
17. All exceptions to these rules must be made to the committee on rules, not later than ten (10) days prior to the day of the contest. The decision of the committee will be final.
18. The prizes will be listed by the committee of awards.

DISCOUNTS FOR FIRST-AID CONTEST

1.	For not doing the most important thing first.	5
2.	For captain's failure to command properly.	2
3.	For slowness in work and lack of attention.	4
4.	For failure to cover the wound entirely, or being unable to give location of injury.	4
5.	For ineffective artificial respiration.	10
6.	For splint improperly padded or applied.	2
7.	For tight, loose, or improperly applied bandage.	6
8.	For insecure or granny knot.	5
9.	For unclean first-aid material.	5
10.	For failure to have on hand sufficient and proper material to complete a dressing	5
11.	For lack of neatness.	2
12.	For awkward handling of patient.	5
13.	For assistance lent by patient.	5
14.	For tourniquet improperly applied.	5
15.	For failure to stop bleeding.	5
16.	For not treating shock.	5
17.	For failure to be aseptic.	10
18.	For improper treatment.	10

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Playground at Mining Town

The Jamison Coal & Coke Company has three mines in the Pittsburgh bed near Farmington, Marion County, W. Va., along a branch of the Baltimore & Ohio R.R. between Fairmount, W. Va., and Moundsville, Ohio. At Jamison No. 9 of this company, is probably the first playground in the Fairmont region to be equipped with amusement appliances. The equipment has been supplied by the mining company.

The Playground of the School at Jamison No. 9, Equipped by the Jamison Coal & Coke Co.

To the extreme left will be seen a see-saw. Behind is an iron framework of three parts, one supporting a swing, and another, gymnasium rings on which in the picture a boy is standing and swinging. A third part of the framework serves as a horizontal bar. Near the school house is a roly-poly on which in the picture, a girl is balancing. In the front of the school is a giant's stride and a merry-go-round.

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Auto-Truck for Rescue Work

The Bureau of Mines has added an automobile truck to its Pittsburgh, Penn., equipment. This will carry a small complement of men, oxygen helmets and rescue apparatus, and can be used within a radius of 100 miles from Pittsburgh. It will be able to reach points not easily accessible by railroad.

The Marvel News

The *Marvel News* is a four-page newspaper issued by he Roden Coal Co. every two weeks. It measures 5¼x22 in. and is distributed free to the employees. The rst issue was dated Apr. 26, 1913.

It is not, of course, as pretentious a publication as the *mployees' Magazine* of the Lehigh Valley Coal Co., ut it is interesting to learn that its first issue predates hat publication. About two columns are devoted to ocals and personals. B. F. Roden, the president of the ompany utilizes another column to warn his employees gainst unprofitable and dangerous speculations. A rominent notice reads:

MINERS' EARNINGS FOR MAY

3 miners earned over $150, average....................	$181
3 miners earned between $100 and $150, average......	114
4 miners earned between $75 and $100, average........	85
4 miners earned between $50 and $75, average.........	63
verage earnings of 174 miners........................	88

We are proud of this record and only wish all could be in he $150 class. Which class are you in? Can't you get in a igher class for June?

These earnings are after deducting all labor and explo-ives. Can your friends at other mines make as good a howing?

The Fourth of July program follows with an account f the athletic exercises which were open to all who were r had been residents of Marvel. The Women's Depart-nent is written by E. B. Roden. The Church News ccupies another column. Several cooking receipts are iven by residents. The store advertises a two-days' in-entory sale at cut prices with millinery at cost. The eart of the paper is filled with most interesting "boiler late," with a story on the rear page. A few local firms dvertise lumber, livery and insurance. A newspaper is welcome innovation in a town as small as Marvel and he venture reflects much credit on the Roden Coal Co.

It may be said that the wages stated are what remains fter all assistance, which some of the miners employ and ll charges for powder are deducted. The average earn-ngs are those of miners only and company men who are aid by the day were not included in the estimate. About 0 per cent. of the men are white and 40 per cent. col-red. Comparatively few are foreigners.

The 74 men described as earning an average of $63 orked less than 15 days in the month. The *daily* earn-ngs of all the men are surprisingly close. The monthly ifference is due to the fewer days some of the men orked. The average number of days worked by all the iners was only 17 days and as Mr. Roden declares, few rofessional men could make a living, working only 17 ays per month.

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Mining Accidents Studied in Public Schools

An effort is being made by J. H. Dague, educational ecretary of the Y. M. C. A., and Sam Phillips, who ormerly held the same position, but is now a state-ining inspector, to have the illustrated textbook "Mine ccidents and Their Prevention," which was published a ear or two ago by the Delaware, Lackawanna & West-rn Railroad Co. Coal Department, slightly modified in xt and adopted as a reader in the Scranton public hools. They are making the effort through the super-ntendent of schools, George W. Howell.

State Help for Mine Schools

The appropriation, this month, of $140,000 by the State of Pennsylvania for vocational training puts the rapidly growing mine schools in the anthracite region on a firmer basis than they have ever been before. Under an act passed May 1, 1913, this appropriation can be used to reimburse all vocational schools for two-thirds of their expenses of the previous year, up to a maximum of $5000, provided that the State Board of Education has approved of their organization, control, location, equipment, courses of study, the qualifications of their teachers, the methods of instruction, the conditions of admission, the employment of pupils and the expenditures of money.

The schools at Nanticoke, where the Susquehanna Coal Co., the Delaware, Lackawanna & Western Railroad Co., and the Lehigh & Wilkes-Barre Coal Co., have operations, and at Shamokin, where the Lehigh Valley Coal Co., the Mineral Railroad & Mining Co., and the Philadelphia & Reading Coal & Iron Co. are operating, have been growing by leaps and bounds. The number of classes has more than quadrupled.

The third annual report of the Nanticoke district institute and classes shows a membership of 679 for the former and eight meetings with an average attendance of 199. The classes had only two dozen students in 1910, but increased to 657 in 1912. At the examination for mine foremen's and assistant mine foremen's certificates, held in Nanticoke last March, four members of this school passed the state examinations for the former, and 24 members passed the state examinations for the latter.

The third annual report of the Shamokin-Mt. Carmel district institute and classes shows a membership of 571 for the former and seven meetings, with an average attendance of 127. There were 450 men at the first banquet, at which Morris Williams, president of the Susquehanna Coal Co., presided and spoke. The classes had 25 students in 1910, 56 in 1911, and increased to 763 last year. At the examinations for mine foremen's and assistant mine foremen's certificates, held at Pottsville last March, members of this school secured two of the former and six of the latter.

The classes at both Nanticoke and Shamokin are held in the local school houses in the evenings from October to March each year. It is aimed to locate them as centrally as possible and to hold them three nights a week so that as great a percentage as possible of those enrolled can attend regularly. No trouble is anticipated in conforming to the state requirements, especially as it will lend its supervision next year, and it was the school boards in these districts who conducted these schools last year and fostered and gave the whole movement its present impetus.

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Perseverance in Resuscitation

Joseph Mango, of St. Clair, was overcome with gas at Wadesville colliery, Aug. 27, and had been given up as dead, but members of the first-aid corps, after working for an hour, revived him. Mango was removed to his home very ill, but he will recover.

Although his body was cold and stiff, and his pulse had apparently ceased, the rescuers, George Phulright, Joseph Cook and William Webb, wrapped him in a blanket and forced oxygen into his lungs with a pulmotor.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 14—An opinion prevails, to a certain extent among miners and some mine officials, that the exclusive use of the safety lamp in a mine means that the ventilation can be neglected and gas allowed to accumulate and that miners can safely work in it with these lamps, which are supposed to insure safety and protection to the miner, in a gassy mine, under almost any condition. The safety lamp, when used with precaution and care, in a mine generating gas, is a means of safety many times to the miner; but if not so used, it is unwise and unsafe to work in gas, even with the safety lamp.

When it becomes necessary to put a mine on the exclusive use of safety lamps, that does not signify that the ventilation of that mine is to be neglected in the least. A mine worked altogether with safety lamps should be ventilated as efficiently as the one with open lights. A mine operated wholly with safety lamps should be ventilated to a degree that, after an inspection has been made, an open light could be taken to any portion of the working face with safety.

In my opinion, a dry and dusty mine, in which the formation of the seam changes frequently and the mine generates more or less gas, at times, and sudden outbursts of gas are known to occur, should be operated with safety lamps only. But a damp mine, generating gas in some sections only and free from any sudden outbursts, can be worked safely with mixed lights.

Suppose, for example, a certain mine gives off little gas in general, but a certain entry going sharply to the rise is generating gas, to some extent. Suppose this heading is advanced far enough from the last breakthrough for another connection and the air current is not ample to keep the face clear of gas at this distance. By means of a temporary brattice extended from the last breakthrough up the entry to a point near the face, the current is made to sweep the face and keep it free from gas so that open lights can be used. But if the brattice work is torn down by an overcharged shot, and, during the night, a considerable amount of gas has gathered in this heading, it would be advisable and safer to use safety lamps to replace the brattice, than to use open lights for that purpose, although open lights are being used in all other parts of the mine. Under conditions of the kind I have named, I deem it safe and advisable to use mixed lights in mining.

John Rose,
District Mine Inspector.

Dayton, Tenn.

Letter No. 15—After reading the different opinions of so many practical men, in relation to the use of mixed lights in coal mines, I cannot understand why any mining company or mine superintendent should attempt to use open lights in one section of a mine and closed lights in another section, whether the mine be rated as a gaseous or a nongaseous mine.

If, at any time, a mine becomes in such a condition that it requires the introduction of safety lamps in a particular section while the use of open lights is allowed elsewhere in the mine there will always be the fear of some careless or reckless person, with an open light on his head, setting off some gas and causing a violent explosion; whereas, if safety lamps were used exclusively, this could not occur.

In my opinion, greater safety is assured by the use of safety lamps, in any coal mine whether generating gas or not; because there is always greater risk where open lights are in use. There have been numerous accidents caused by sparks falling from an open light into a can of powder and burning miners almost beyond recognition. Mines have also been set afire by sparks from lamps falling among oily waste.

Therefore, in my opinion, the company that uses mixed lights in coal mines, is employing a penny-wise and pound-foolish policy.

John A. McDonald, Mgr.,
Dominion No. 8.

Bridgeport, N. S., Canada.

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Unsuspected Causes of Mine Explosions

During the past year, I have received several letters asking for my opinion as to the origin and cause of dust explosions. Having noticed the interest manifested in your columns, in reference to the investigation of what may be termed unsuspected causes of mine explosions, I decided that there was no better method of complying with the request of correspondents than by discussing the question of these possible causes in Coal Age. Your editorial, Aug. 23, p. 273, commenting on the Brookside explosion of Aug. 2, draws attention again to the possible effect on the mine air, produced by the heat of compression due to numerous causes.

Some years ago, I made a microscopic examination of coal dust taken from the McAlester mines, in Indian Territory, now Oklahoma. This examination revealed many millions of molecular particles of a rhomboidal form, resembling minute balloons, each incased with a filmy substance that appeared like bitumen and which a chemical analysis proved to be a composition of bitumen and carbon. When this dust was placed in a beaker and treated with a 0.1 per cent. solution of sulphuric acid, a gas was given off, in copious quantity, that was hydrogeniferous. This gas, in combination with about seven parts of oxygen, formed a very explosive compound and burned in a Bunsen jet like an oxyhydrogen flame.

Further investigation led me to the conclusion that these fine particles of dust left undisturbed would, in time, decompose and become harmless, the escaping gas being diluted by the air sufficiently to render it nonexplosive. When disturbed, however, these molecular balloons were seemingly fractured, and the quantity of gas then given off rendered the air explosive. This would occur in mine workings as the result of a sudden concus-

on, such as might be produced by a "windy shot" or
eavy roof fall. The ignition of such an atmosphere
ould surely cause a terrific mine explosion.

To illustrate this condition in mining practice, let us
ippose that a shotfirer has 14 shots to fire. Each suc-
essive shot disturbs more dust and fractures a certain
ercentage of the so called molecular balloons, until suffi-
ient gas has been generated to cause an explosion when
gnited by a following shot or by the shotfirer's open
ght. A careful analysis of the dust from the Cokedale
iine, after the explosion, Feb. 9, 1911, compared with
ie results of the analysis of the dust taken from the
IcAlester mine, convinced me that there was every rea-
on to believe that the hydrogeniferous gas produced
om the coal dust, in both these mines, was the primary
iuse of explosion in each case.

If we accept this theory as a possible cause of mine
xplosions, the question arises what remedy can we sug-
est to prevent the same. In answer to this important
uestion, I would state that: 1. A longer interval of
me should be allowed between the firing of successive
iots, to give the air current an opportunity to remove
ie gases generated by the last shot. This is especially
nportant where dust is present. 2. Provide an ample
ell-split ventilating current and carefully watch its hu-
iidity. 3. Provide an efficient sprinkling or spraying
stem. In this connection, I would urge the use of a solution of the following formula: One part sodium chloride in 100 parts of water, or a 1 per cent. solution of sodium chloride.

My reason for recommending this salt solution is that a long series of experiments have proved its efficiency. The affinity of the salt for water renders it capable of retaining moisture for a long period of time, under conditions that would otherwise produce the rapid evaporation of the water. It is well known that some salts are "hygroscopic," meaning that they absorb moisture from the air and from other substances. Other salts completely dissolve in the water they absorb, and these are termed "deliquescent." The use of these salts in sprinkling keeps the mine in a semimoist condition. Also, the chlorine of the sodium chloride has a tendency to attack the film of the molecular balloons and liberate the gas gradually, which is thus diluted and rendered harmless by the air. The use of this solution is equal, in effect, to 20 applications of water, which greatly reduces the number of sprinklings required. I, therefore, recommend it as being safer and more economical. I shall be glad to correspond further and answer any questions in the same connection, having devoted much time and study to the analysis of mine dust.

THOMAS H. EDWARDS,
Mining Engineer.

Golden, Colo.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

DIVISION

The operation of division is the reverse of that of multipli-
ition. By this process, a number is divided into two or more
iual parts; or it is found how many times one number called
ie "divisor" is contained in another number called the "divi-
nd." The resultant number is called the "quotient."

The sign of division (÷) written between two numbers
gnifies that the first is to be divided by the second. The
eration is simply expressed by the formula

$$\textit{Dividend} \div \textit{divisor} = \textit{quotient}$$

r, by example, $8 \div 2 = 4$

hich is read: eight divided by two equals four.

The operation of division is often expressed by writing the
vidend above the divisor, with a line between them, which
pression is called a "fraction": thus,

$$\frac{\textit{Dividend}}{\textit{Divisor}} = \textit{quotient} \qquad \text{Or,} \quad \frac{8}{2} = 4$$

The operation is also frequently expressed by writing a
agonal line between the two numbers; thus $8/2 = 4$.

Proof by Multiplication—To prove that the work is cor-
ct, the operation is reversed and the divisor multiplied by
e quotient. If the work is correct, the product will be equal
the dividend; thus

$$\textit{Divisor} \times \textit{quotient} = \textit{dividend}$$

r, by example, $2 \times 4 = 8$

Division of Larger Numbers—When the dividend contains
veral figures and the divisor is a single figure only, the
ocess known as "Short division" is employed. But if the
visor, also, contains several figures, a different process,
iown as "Long division," must be used.

Short Division—The process is best explained by an ex-
nple. Let it be required to divide 7,814,508 by 2 and 3, re-
ectively. Write the divisor on the left of the dividend and
oceed to divide the figures of the dividend, separately, by
e divisor, and write the quotient figure, each time, under-
ath the corresponding figure of the dividend. If, in any
se, the division is not even, there being a remainder, this
ust be carried and prefixed as a tens figure to the next fig-
e of the dividend, as illustrated in the following example,
here the remainder to be carried is indicated by the small
ures written above the figures of the dividend.

$$\begin{array}{r} 2\,)\,\overset{1}{7},814,508 \\ \hline 3,907,254 \end{array} \qquad \begin{array}{r} 3\,)\,\overset{1}{7},8\overset{1}{1}\overset{2}{4},\overset{1}{5}\overset{1}{0}8 \\ \hline 2,604,836 \end{array}$$

The several steps in these two examples are as follows:

(1) $7 \div 2 = 3$, remainder 1;
$18 \div 2 = 9$;
$1 \div 2 = 0$, remainder 1;
$14 \div 2 = 7$;
$5 \div 2 = 2$, remainder 1;
$10 \div 2 = 5$;
$8 \div 2 = 4$.

(2) $7 \div 3 = 2$, remainder 1;
$18 \div 3 = 6$;
$1 \div 3 = 0$, remainder 1;
$14 \div 3 = 4$, remainder 2;
$25 \div 3 = 8$, remainder 1;
$10 \div 3 = 3$, remainder 1;
$18 \div 3 = 6$.

The Coal Age Pocket Book

Long Division—The process here is similar to that of short division, except that there being two or more figures in the divisor, it is necessary to set down each several product, in turn, and subtract it from its corresponding period of the dividend to obtain the remainder which is prefixed to the next figure of the dividend, as shown below.

```
   Divisor  Dividend   Quotient
        346 ) 156747480 ( 453027
 1st prod.     1384            346 × 4 = 1384

  1st rem.      1834          1567 — 1384 = 183       Proof
   2d prod.     1730           346 × 5 = 1730        453027  Quotient
                                                        346  Divisor
    2d rem.      1047         1834 — 1730 = 104      -------
     3d prod.    1038          346 × 3 = 1038        2718162
                                                    1812108
      3d rem.      948         1047 — 1038 = 9      1359081
       4th prod.   692          346 × 2 = 692            138  Remainder
                                                    ---------
        4th rem.   2560         948 — 692 = 256     156747480  Dividend
         5th prod. 2422         346 × 7 = 2422

 Final remainder,  138        2560 — 2422 = 138
```

In the above long division, the several products and remainders and each separate operation are indicated in small type. It is important to notice that the remainder before bringing down the next figure of the dividend is always smaller than the divisor; if not, increase that figure of the quotient and repeat the multiplication till a remainder is found that is less than the divisor.

If, after bringing down the next figure of the dividend, the number so increased is still less than the divisor, as in the case of the third remainder above, no division is possible; a cipher must be placed in the quotient and a second figure brought down and a third, if necessary, till the remainder so increased is greater than the divisor. For each figure of the dividend brought down a figure must be written in the quotient—a cipher whenever the increased remainder is too small for division. The number of figures in the quotient when the division is complete is always one greater than the number of figures brought down from the dividend.

Incomplete Division—It generally happens, as in the above example, after all the figures of the dividend have been brought down there is yet a remainder, which shows that the division is not a complete division. In other words, the divisor is not contained an exact number of times in the dividend; but there is a remainder too small for complete division.

This is best illustrated as follows: When 8 apples are divided among 4 boys each boy has 2 apples; thus $8 \div 4 = 2$. But if there were 9 apples and 4 boys, each boy would have 2 apples and there would be 1 apple left, which if divided equally would give each boy one-fourth; because there is 1 apple and 4 boys—only enough to give each boy a fraction, which is written ¼; and this makes each boy's share 2¼ apples.

Therefore, when the division is not complete write the last remainder over the divisor and annex to the quotient; thus, $9 \div 4 = 2\frac{1}{4}$.

INQUIRIES OF GENERAL INTEREST

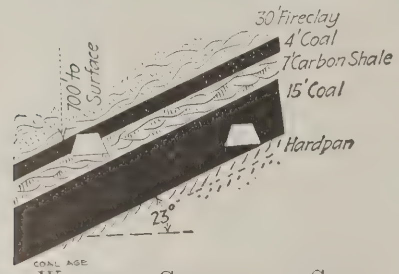
Working Inclined Contiguous Seams

Kindly describe and illustrate the working of a section of two seams of coal at an average depth of 700 ft., vertical measurement, from the surface to the pavement of the lower seam. The strata are inclined at an angle of 23 deg. from the horizontal. The upper seam is 4 ft. thick, overlaid with a bed of fireclay 30 ft. in thickness. A carboniferous shale 7 ft. thick separates the two seams. The lower seam of coal is 15 ft. thick, with a moderately hard pavement or floor.

Mine Foreman.

Johnstown, Penn.

The relation of these seams and their associated strata is shown in the accompanying figure. Assuming that the surface conditions, with respect to the location of the property and facilities for transportation are favorable, if the coal outcrops on the property at a suitable point for the installation of the surface equipment and the shipment of coal, the mine should be opened by a slope driven on the double- or triple-entry system, according to the conditions to be encountered. These main-slope openings should be driven on the floor of the lower seam and the dimensions should be such as to provide amply for the expected tonnage and the proper ventilation of the mine workings in both seams.



Working Contiguous Seams by Cross-Tunnel

If the seams do not outcrop on the company's property, a shaft should be sunk at a suitable point for the location of the surface equipment and affording suitable shipping facilities. This shaft should be located as far as practicable to the dip of the seam; but the location, in this respect, must be determined by giving due consideration to both the underground conditions of haulage and drainage, and the surface conditions previously mentioned.

From the foot of the shaft, the main-slope haulage roads and airways are driven to the rise, on the floor of the lower seam. If the coal is to be worked to the dip, this section should be developed in advance of the rise workings. Levels or gangways should be driven to the right and left of the main slope and airways. These levels should be driven on the double-entry system, approximately as shown in the figure. Chambers or chutes should be driven to the rise of these gangways, in each seam. The chambers in the thin overlying seam should be driven in advance, so that the pillars can be drawn back before the corresponding chambers in the lower seam are worked.

The chambers in the lower seam are driven up in the lower bench of coal, unless it is found advantageous to work the entire thickness of the seam at once. It will generally prove more practicable to extract the upper bench of coal in the thick seam when drawing back the pillars. The lower levels should be worked out in advance of those above.

⁂

Mining under a Soft Roof

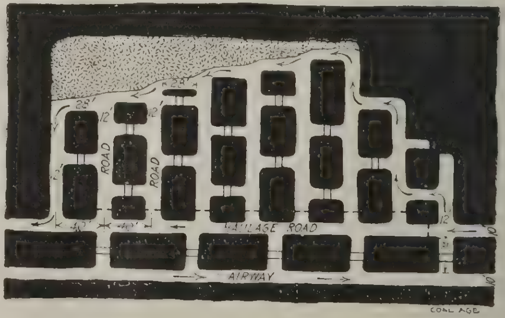
In the mine where I am employed, we are working a bituminous seam of coal 8 ft. thick and overlaid with a very soft top that gives much trouble; the bottom being also soft. It is necessary to take down 8 ft. of the top overlying the coal and haul it away, which makes the mining expensive. The coal lies 300 ft. below the surface. The rooms are driven on 55-ft. centers, with a slight pitch, about 2 per cent. Thus far we have been unable to devise any means of holding up the slate while taking out the coal. There is little water, the mine being well drained. I would be glad to receive any suggestions that would enable us to hold the roof so that the coal can be mined with safety.

Joseph Hahula.

Southwest, Penn.

The difficulty in holding a weak top, especially when working a thick seam of soft coal, is due largely to driving too wide an opening. We would suggest that the rooms, in this case, should be driven up narrow, say not to exceed 12 ft. in width; and under this frail top, the rooms should not be driven further than, say from 40 to 50 yd., which practically determines the distance between the cross-entries. The width of the room pillars, for this depth and thickness of seam, should not be less than 21 ft., which will make the room centers 33 ft.

An even better plan than this would be to drive double rooms, as shown in the accompanying figure, making the openings or stalls 12 ft. wide and 40 ft. center to center.



Plan of Driving Double Stalls

This would leave 28-ft. pillars between the respective stalls and give each miner 14 ft. of pillar to draw back, two miners working on each road except the first. When the rooms have reached their limit, say 40 or 50 yd., the work of drawing back the pillars should be commenced, and care should be taken to keep the pillar work in line. All standing timber should be drawn as the work proceeds so as to allow the roof to fall and relieve the load on the pillars.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—In post timbering in mines, what should be the ratio of the diameter to the length of the post, in order that it shall present an equal resistance to crushing and bending?

Ans.—For practically all kinds of mine timber in use, the ratio of the diameter to the length of the post, in order to fulfill these conditions, is 1:12, both dimensions being expressed in inches. This gives the simple rule: The diameter of the post in inches, measured at the small end, should not be less than the length of the post in feet.

Ques.—What are the advantages and disadvantages of drawing pillars uphill, on a pitch, say from 5 to 15 deg. or less? State fully.

Ans.—Assuming that the rooms have been driven to the dip and that the pillars are to be drawn back in a direction up the pitch, as the work progresses the weight of the roof rests more and more on the lower loose end of the pillar. While this has the advantage of assisting to break the coal from the pillar more easily, it has the disadvantage of crushing the pillar to a great extent, and the coal mined falls back into the waste where its recovery is dangerous and much of the coal is lost. The miner is also in greater danger from a sudden fall of roof or coal than when drawing pillars downhill. When drawing back pillars downhill the pillar gives greater support to the broken roof than when drawing uphill; although, in the former case, the miner must protect himself more carefully by setting timbers below the falls. Again, when drawing pillars uphill the water drains from the face of the pillar, but may accumulate in sufficient quantity as to require pumping, while the coal must be hauled up the pitch instead of sliding down a chute, as when drawing downhill.

This question may refer, however, to drawing a number of pillars starting from the basin and progressing uphill. In this case, the rooms are evidently driven on the strike of the seam, and there is a distinct advantage in drawing the lower pillars first, since the roof weight is better supported and the coal less crushed than when the work advances toward the basin. When drawing uphill, in this way, no pumping will be required; while, if the work progressed downhill, the accumulation of water at the dip would greatly impede the work on the pillars, at that point and require to be pumped.

Ques.—What kind and size of hoisting engine would you install to hoist 1200 tons of coal from a shaft 400 ft. deep, in eight hours, with a steam pressure of 70 lb. gage? The weight of coal in each car is 3000 lb. Allow 20 per cent. for resistance of engine, ropes and pulleys; also make allowance for the time lost in caging.

Ans.—The number of hoists per hour is

$$\frac{1200 \times 2000}{8 \times 3000} = 100 \textit{ hoists}$$

In hoisting-engine practice, it is customary to allow a certain time for unavoidable delays, say five minutes per hour. The time per hoist is then

$$\frac{55 \times 60}{100} = 33 \textit{ sec.}$$

Now, allowing, say 13 seconds as the time lost in starting and stopping each trip, and caging the coal, the actual net time of hoisting at a maximum speed, is 33 — 13 = 20 sec. per hoist; and the maximum speed of hoisting is then

$$\frac{400}{20} = 20 \textit{ ft. per sec.}$$

Before the load on the engine can be determined, it is necessary to calculate the size of rope required to hoist the following load: Coal, 3000 lb.; and, say car, 1600 lb. and cage, 2400 lb.; total, 7000 lb.; and adding 10 per cent., for friction, gives for the total load on the rope, 7700 lb. The diameter of the rope to support this load, using a factor of safety $f = 8$, is then

$$d = \sqrt{\frac{fL}{34}} = \sqrt{\frac{8 \times 7700}{34 \times 2000}} = 0.94, \textit{ say } 1 \textit{ in.}$$

The weight of a 1-in. rope is 1.58 lb. per running foot; and the total weight of the rope hanging in the shaft is then 400 × 1.58 = say 640 lb.

The unbalanced load hanging in the shaft is, now, as follows: Coal, 3000 lb.; rope, 640 lb.; total, 3640 lb.; and, allowing 20 per cent. for resistance of engines, rope and pulleys, as stated, the effective load or load hoisted, including frictional resistance, is 3640 ÷ 0.80 = 4550, which is the load on the engine.

The required horsepower of the engine is then

$$H = \frac{4550 \times 20 \times 60}{33{,}000} = 165+ \textit{ hp.}$$

The engine to be used for this hoist should be a duplex, direct-connected engine, having a piston speed of 600 ft. per min., and an efficiency of, say 85 per cent. Assuming a slide-valve engine, cutting off at two-thirds stroke, the mean effective pressure (M.e.p.), in the cylinder, for a pressure of 70 lb. gage at the throttle, is

$$M.e.p. = 0.9\ [0.917\ (70 + 14.7) - 17] = 54.6 \textit{ lb. per sq.in.}$$

Then, for an efficiency of $f = 85$ per cent. and a mean effective pressure of $p = 54.6$ lb. per sq.in., the diameter of the steam cylinder is

$$d = 205 \sqrt{\frac{H}{fpS}} = 205 \sqrt{\frac{165}{0.85 \times 54.6 \times 600}} = \textit{say } 16 \textit{ in.}$$

And, assuming a stroke of 18 in., the engine will make

$$(600 \times 12) \div (2 \times 18) = 200 \textit{ r.p.m.}$$

The size of duplex, direct-connected engine required in this case, assuming a double-compartment hoist, is, therefore, 16x18 in., running at a speed of 200 r.p.m. and developing 165 horsepower.

COAL AND COKE NEWS

Washington, D. C.

James E. Callbreath, secretary of the American Mining Congress, has issued the usual call and program for the forthcoming session of the congress to meet at Philadelphia Oct. 20 to 24. In the general description and discussion of the ground to be covered, Mr. Callbreath says that particular attention will be given to the question of coal mining and development and conservation of coal resources in general. He first points out some of the popular interpretations of the convervation idea as applied to coal mining and indicates the points at which these ideas are considered defective, by the public. Then he speaks of the proper interpretation of the consergation idea and says:

> The best conservation of coal resources, i.e., the highest use and the least possible economic waste, is a matter of vital public concern, but of particular interest to every industrial center depending upon coal for power. This rests not alone upon the importance of the coal-mining business, but upon the magnitude of the industries to which coal is an absolute necessity.
>
> Any increase in average production cost made necessary to conserve the more expensively mined coal reserves which is less than the transportation cost for a more distant supply, will find economic justification.
>
> Every theory of coal conservation must consider the right of the coal operator to a fair profit, the miner to fair wages and the public to have its fuel at the lowest price consistent with good mining methods.
>
> As a whole the coal-mining business is the most indispensable, the most unprofitable, the most maligned and misunderstood of all the mediums through which the welfare of the people is secured. It is the most important and the most helpless, having in it the power to command and yet being a non-resistant mass, accepting with only feeble protest the criticisms of a misinformed public. The public looks to a cheapening of this essential product by destroying the productive machinery which now furnishes it the cheapest fuel in the world.
>
> The consumer must understand that in the end he must pay the value of the coal in the ground, the wages of the miner, the expense of special safety appliances, and any additional cost of production occasioned by the public demand for conservation, which means the saving of more expensively mined coals, in addition to the regular costs of production and a reasonable profit to the operator.
>
> The coal operators cannot ignore the question of profit if they would. The wiping out of present profits must result in the destruction of the productive machinery so engaged, which would entail an enormous increase of future costs.
>
> These questions concern the laborer, the manufacturer, the investor, the mine operator and the general public, which depends upon local industrial activity. Leaders of thought representing the various phases involved, will discuss this subject.

Special study will also be given to the question of an interstate trade commission to be intrusted with the duty of making special studies of the coal-mining industry as well as other problems that have figured largely in mining discussion during the past year or so.

A Revised Resolution Is Introduced

Representative Murray, of Massachusetts, has prepared and introduced a revised form of his resolution relating to coal in which he calls upon the several executive departments for all data in their posession bearing on:

> First. Capitalization, ownership and control of the Pennsylvania anthracite mines.
>
> Second. Intercorporate relationship of the coal-mining, coal-handling and coal-selling companies and the companies transporting coal by water or rail, or both.
>
> Third. Comparative freight rates on anthracite coal and on articles of similar bulk from the principal anthracite-shipping points to the principal seaports and interior cities.
>
> Fourth. Comparative rates on bituminous coal for shipments under essentially the same conditions and for equal distances as in the third paragraph.
>
> Fifth. Cost of mining, transporting, and selling anthracite coal; the information to be in such detail as to show the relative costs of the different companies.
>
> Sixth. The total revenues, expenses and profits of the anthracite-mining companies since the year nineteen hundred.
>
> Seventh. The total revenues, expenses, and profits of the anthracite-carrying railroads since the year nineteen hundred.
>
> Eighth. Wholesale prices of anthracite coal at the mines and at the principal distributing points, and retail prices of coal in the principal cities since the year nineteen hundred.

HARRISBURG, PENN.

The appropriation of $140,000 by the State of Pennsylvania for vocational schools, which give definite preparation for a definite occupation, puts the rapidly growing mining schools conducted under the auspices of the various coal companies throughout Pennsylvania, on a firmer basis than they have ever been before.

Under Act. No. 92, approved May 1, 1913, this appropriation can be used to reimburse vocational schools, and reads as follows:

> This Commonwealth, in order to aid in the maintenance of approved local and joint industrial . . . . schools or departments, shall as provided in this act, pay annually from the treasury to school districts and unions of school districts, maintaining such schools or departments, an amount equal to two-thirds of the sum which has been expended during the previous school year by such a school district . . . . for instruction in practical subjects and in such related technical and academic subjects as may be necessary to complete well-rounded courses of training: Provided, No one school district shall receive more than five thousand dollars in any one school year.

These schools will be under the supervision of the state Superintendent of Public Instruction, as to organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission, expenditures of money, etc.

The mining schools have been growing by leaps and bounds and the number of classes has more than quadrupled in the last year. In placing new schools it is aimed to locate them centrally and hold them three nights a week so that as great a percentage as possible of those enrolled can attend regularly. No trouble is anticipated in conforming to the state's requirements, especially as it will lend its aid and supervision next year. It was the school boards of these mining districts who conducted these schools last year and fostered and gave the present impetus to the whole movement.

The good accomplished by the mining institutes and schools, together with the splendid efforts of the Y. M. C. A., the International School of Correspondence, the University of Pittsburgh, and several of the coal companies is shown by the number of pupils which are among those receiving state certificates for mine foreman, assistant mine foreman, fire boss, etc., which are now ready for distribution by the Department of Mines.

This appropriation is something new and is largely experimental. If there is an increase in vocational schools, the Legislature will doubtlessly be induced to increase the grant at its next session. It is a small beginning at meeting the modern demand for something more practical in the school system. The progress of the schools will be watched with much interest.

A Thorough Inspection Is Ordered

The Chief of the Department of Mines Hon. James E. Roderick, has ordered an investigation of all electrical equipment in the anthracite region and the Randolph Means Co., consulting engineers of Pittsburgh, has been designated by Mr. Roderick to make the inspections. This company has been doing similar work in the bituminous region of the state.

At present the work will be confined to inspection of equipment in the mines throughout the Lackawanna region, and will be extended as soon as possible until the whole anthracite field is thoroughly inspected.

It is the intention of the Department of Mines to institute a thorough examination and wherever the installations are not in keeping with the standard methods, recommendations will be made that will reduce the hazards from electricity to a small percentage. Electricity in the anthracite region is rapidly gaining in favor as a transmitting medium to the different mechanical operations around the collieries.

PENNSYLVANIA

Anthracite

Scranton—Five properties at Park St. and Capouse Ave. were damaged by a mine cave recently, the fissures that wrecked the buildings extending to the middle of the thoroughfare.

Wilkes-Barre—The Delaware and Hudson Co. has made an offer to the Sacred Heart Church for a settlement on a basis of $600 for damage done to the cemetry owned by the congregation, by mining operation of the company's Pine Ridge Colliery. Members of the congregation will probably insist on the damaged burying plot being repaired or in having the bodies re-interred from the worst affected graves.

Hazleton—Over 700 foremen and clerks of the Lehigh Valley Coal Co. from points between Pittston and Shamokin, on Saturday Aug. 23, held their annual outing at Hazle Park. The collieries of the company were closed to permit the men to attend the picnic.

Bituminous

Sykesville—The 200 men who went on strike at the mines of the Cascade Coal Co. about three weeks ago, returned to work Aug. 27. The strike was occasioned as a protest against poor working conditions, and the agreement effected was in the men's favor.

DuBois—C. P. Munch, who formerly leased the mines at Caylor, Armstrong County, then owned by the Great Lakes Coal Co., has been charged by the Union with having embezzled money which was deducted by him from the miner's pay on behalf of the United Mine Workers of America. He has entered bail before the Justice of the Peace for $500. An endeavor is also being made by several miners to collect from him by civil action wages which are said to be still due them for labor performed.

Bakerton—Two new mines are soon to be opened in the northern end of Cambria County. The first opening will be on the White farm and some 3000 acres will be operated. New houses are to be erected by the Barnes-Tucker interests, which are the operators of the new mines, and in a short time a large mining town will rise near the operations. Electric haulage and other modern devices are to be installed, and the workings will be run on a thoroughly uptodate plan. The Pennsylvania R.R. has a line near the field and will handle the output.

Charleroi—The first coal was run recently at the new plant of the Carnegie Coal Co. at this place. Two hundred men are now employed and it is expected that in a short time, this will be increased to 800. This is the first time the mine has been in operation for three years. The new operation contains about 1200 acres of coal, which was purchased for approximately $1,500,000.

WEST VIRGINIA

Charleston—Since his return to Charleston from a short trip West, President Thomas Cairns, of District No. 17, United Mine Workers of America, has received many urgent letters requesting him to send organizers into the Fairmont and Norfolk & Western coalfields. This matter must, however, be taken up with the higher officers of the United Mine Workers before organizers can be sent.

Work on the opening of a new mine by the Virginia Coal Co. on the Coal Fork of Campbell's Creek, is progressing rapidly, and it is expected that coal will be taken from this mine within a few days.

Williamson—By decree of the Mingo Circuit Court and the Common Pleas Court of Hamilton County, Ohio, the receivers have been directed to sell at public outcry the assets of the James R. Shanklin Coal Co., whose principal office is in Cincinnati. The sale will be made at the company's works at Blocton.

ALABAMA

Jasper—C. B. Stalnaker and associates, of Jasper, Alabama, have acquired a tract of coal land on the Northern Alabama Ry., near Jasper, containing a 9-ft. bed of Big Seam coal, and are making arrangements to operate same at an early date.

KENTUCKY

De Koven—Fire caused by lightning recently destroyed the general company store of the Ohio Valley Mining Co., at De Koven, Ky., causing a loss of about $20,000. The postoffice was located in the building, and was also burned.

Lexington—Twenty-one mine foremen's certificates were recently granted by the Kentucky Mining Department, at Lexington, after the completion of the examinations held the last week in August, to ascertain the qualiificaitionis of the applicants. Of the certificates granted, six were first-class and the remainder second-class.

Corbin—A disiastrous fire, at Corbin, located at the junction of the main line of the Louisville & Nashville with its Mididlesboro branch, and about 100 miles north of Knoxville, Tenn., caused damage estimated at a quarter of a million dollars, destroying eight stores, two hotels and a dwelling. The town is one of the most active in the southeastern Kentucky coal fields, being the seat of many operating companies, as well as an important railroad point.

OHIO

Columbus—The commission appointed by Governor Cox to investigate the conditions surrounding the payment for coal mined in Ohio, has examined a number of mining districts of the state. Among the counties visited were: Jackson, Coshocton, Stark, Columbiana, Tuscarawas, Guernsey, Belmont, Jefferson, Muskingum and Perry.

The commission left Sept. 2 for a trip in the coal fields of Illinois, where it will collect information of use in this work. It has been decided not to investigate conditions in the mines of the Pomeroy Bend district, because of the fact that they are so similar to those prevailing in eastern Ohio.

John C. Davies, state mine inspector and a member of the commission, says it will probably be Dec. 1 before a final report is ready and it will require hard work to get it completed by that time. The report will be submitted to a special session of the Ohio General Assembly, to be called the coming winter.

Maynard—A fall of stone at the Purseglove mine, near Maynard, caused it to be closed for several hours, Aug. 27. The fall occurred in an old entry and blocked the main road, over which the haulage motors operate. No one was near the place when the fall occurred, and no one was injured.

INDIANA

Francisco—While a deep water well was being driven on Judge O. M. Welborn's farm, two miles west of here, the drill, at a depth of 200 ft., passed through a 6½-ft. vein of excellent coal, indicating that the Francisco field is at least two miles wide.

Petersburg—The Vandalia Coal Co., of Indianapolis, now has options on 5000 acres of the best coal land in Pike County, the options covering a territory of seven square miles. In some places two or three veins exist, ranging from four to seven feet thick.

By hard work, 250 miners who were in the Littles mine, near Petersburg, Ind., were taken out when fire broke out at the mine recently. The fire started in the fan house, and was confined there by the efforts of 200 men while the miners in the workings were being removed. The united efforts of the miners and others subdued the blaze after a time, and the damage was repaired in three or four days after the fire.

Washington—Samuel Elswick has opened a new coal mine south of this city and is taking out coal of good quality. He has a vein 4½ ft. thick, and though employing only a small force of miners at the present time, he expects to have room for many more during the winter months.

ILLINOIS

Ladd—The mine of the Illinois Third Vein Coal Co., which has been closed down for about six weeks, undergoing some needed repairs, has recently resumed operations.

Seatonville—The No. 4 mine of the Spring Valley Coal Co., located at Seatonville, has suspended operations for a period of perhaps six weeks, for repairs preparatory to a good run during the fall and winter months.

Springfield—Mine A of the Citizens' Coal Co. will resume operations soon, as will also the mines of the Central Co-operative Coal Co., which have been closed down for the summer months. There seems to be a shortage of men in some parts of the state, but the mines generally are working a little better than formerly.

Belleville—The Boyd Coal & Coke Co., has applied to the Circuit court for an injunction to restrain the officers of the United Mine Workers from "aiding and abetting" a strike by paying benefits to striking miners. The company claims that by paying strike benefits the union officials are preventing the operation of the mine.

Du Quoin—The strike at the Majestic and Queen mines came to a climax recently, when Superintendent A. C. Eaton, of the mining company, shot and killed William Sisney, a member of the pit committee at the Majestic mine. It is understood that the men met and got into a controversy over the differences of the oposing factions. Following the shooting, both parties got together and the trouble has been settled.

De Soto—The mine of the Kuckemeier Coal Co. will likely resume operations in the course of the next month, after the re-lining of the main shaft. A boulder moving in quicksand, and weighing seven tons, caused the shaft to cave in and this had to be blasted out.

ARKANSAS

Fort Smith—The controversy over the water situation at the Western Coal & Mining Co. property at Jenny Lind which has called forth much criticism is now at an end. The operators are repairing their wells and seeking a new water supply, and according to Judge Hester an amicable settlement has been reached satisfactory to all concerned.

COLORADO

Colorado Springs—The organization work which is being carried out all over Colorado by the United Mine Workers of America has been extended to the coal mines in El Paso County. The miners here number only about 350 or 400 men, but about 100 have joined the local union.

Denver—Officials of the United Mine Workers of America on Aug. 25 issued a signed statement denying that the open shop would be considered as a basis of negotiation with the operating companies. This statement also affirms, however, the intention of the union officials to exhaust all honorable means to bring about a settlement before a strike order is issued.

FOREIGN NEWS

Vancouver, B. C.—Public indignation over the forced importation of Japanese coal, as a result of the refusal of the operators to arbitrate the strikes in mines near here, is liable to effect, it is said, the opening of government mines in Alaska. The mine operators declare that they will import Japanese coal until the strikers return to work and the owners are being bitterly denounced as responsible for this situation.

PERSONALS

J. F. A. Williams, of New Orleans, has been appointed sales manager of the West Kentucky Coal Co. with headquarters at Paducah succeeding W. E. Gage, who resigned several weeks ago.

Earl A. Henry, inspector of the 5th West Virginia mining district, has been appointed chief inspector of the state department of mines succeeding John Laing, resigned, effective Sept. 1. Mr. Henry has been a district inspector for 14 years.

Carrol A. Garner, who, for a number of years, was employed as an instructor in the mining department of the Pennsylvania State College, has resigned, and accepted a position with the Lehigh Valley Coal Co., as a mining engineer, in the Hazelton Division.

CONSTRUCTION NEWS

Pottsville, Penn.—The Maderia Hill Coal Co., of Pottsville, expects to build a 3000-ton capacity breaker in the near future.

St. David, Ill.—The contractors who will do the construction work on the head frame of the No. 2 mine of the Big Creek Coal Co., which was destroyed by fire about three weeks ago are on the job and will begin work soon. It is estimated that 60 days will be required to place the mine in condition for operation.

Kenova, W. Va.—In order to connect up its proposed Beaver Creek branch line with its main line, whose nearest point is Kenova, W. Va., 100 miles distant, the Baltimore & Ohio R.R. is said to be planning a line from Kenova up the Big Sandy Rivier, which will give an outlet to the various large operations along Beaver Creek, as well as on the newly completed line at the mouth of Shelby Creek, 20 miles east of the Beaver Creek line.

Pittsburgh, Penn.—The purchase of the Belmont Central R.R. built a number of years ago to tap the Belmont County, Ohio, coalfields has revived talk of the construction of a connecting line between the Newark and Cleveland divisions of the Baltimore & Ohio. It was the latter line which recently purchased the Belmont Central. The road extends from Lafferty, Ohio, toward Morristown and if the connecting link is constructed will pass through the latter place connecting with the Newark division at Belmont.

Morgantown, W. Va.—The Polard Coke Co., which owns 1100 acres of coal along Dunkard Creek in Greene County, Penn., expects to begin work about Oct. 1, on 220 new ovens of the Mitchell type. Some ovens are at present in operation, and the entire plant of 250 ovens is to be in blast by July 1, 1914. A contract has also been awarded to the A. K. Jenkins Lumber Co., of Point Marion, for 30 new houses. This company is the first to begin actual operation in the Greene County field made available to the coke and coal market by the extension of the Monongahela Railroad to the state line, where it connects with the Buckhannon & Northern Ry.

Whitesburg, Ky.—It is reported that the Lexington & Eastern will soon begin the construction of a branch line three miles in length up Potter's Fork, in order to reach the holdings of the Mineral Fuel Co. It is expected that the Mineral Fuel Co. will build a town at the end of this branch plans having been prepared providing for the building o over a thousand houses, including dwellings, hotels, boarding houses, stores, churches and schools. The work of ballasting the entire upper end of the Lexington & Eastern is nearing completion, making the line a first-class one i every respect as far as Whitesburg.

San Francisco, Calif.—Capitalists on the Pacific coast ar figuring on establishing a by-product coke plant at San Francisco, expecting to receive coal for this plant from the Atlantic sea board, the coal to be transported through the Panama Canal when same is opened to navigation. At present a great deal of coke is used on the Pacific coast, being received from Australia. A by-product coke plant at San Francisco would have a good market for all the by-product so that there would be no loss from any source. It is believed by many that such a plant receiving coal from Pennsylvania, West Virginia or Virginia would be a decidedly paying proposition.

Johnstown, Penn.—What is declared to be the final survey preparatory to the beginning of actual construction i now being made by a large corps of surveyors working i Somerset County under the direction of the Western Maryland R.R. The proposed road will leave the main line nea Rockwood and go north through the Husband field to Jenners, tapping some of the richest coal land in Somerse County. The New York Central is gradually extending it coal branches down through Cambria and Indiana Counties directly toward the northward extension of the Wester Maryland. It is predicted that these two lines will mee in Johnstown, and will have no diifficulty in making connections, thus tapping another heavy freight district. line through here would give the New York Central anothe route into the rich West Virginia coal fields, which hav been extensively investigated by the Vanderbilt interests o late.

NEW INCORPORATIONS

Memphis, Tenn.—The Mercer Coal Co., of Mercer, Tenn has been incorporated with a capital stock of $50,000 t develop coal mines.

St. Louis, Mo.—The Briquette Coal Manufacturing Co., o St. Louis, has been authorized to sell its stock and engage i business. This concern is capitalized at $160,000.

Philadelphia, Penn.—The Eastern Pennsylvania Coal C of Philadelphia, has filed notice with the Secretary of Stat of increase of stock from $200,000 to $7,500,000.

New York, N. Y.—The Alexander Coal & Coke Corporation has been incorporated with a capital stock of $100,0 by W. H. Alexander, D. M. Stokes and A. Van Fosson.

Pittsburgh, Penn.—The Appalachian Coal & Timber C has been incorporated with a capital stock of $50,000 by T. Manning, P. H. Reniers, M. J. Sebolt, all of Pittsburgh.

Somerset, Penn.—Application will be made Sept. 22 b Harry J. Filer, Frank P. Filer and Enoch W. Filer for th charter of an intended corporation to be called the Lak Trade Coal Mining Co.

Pineville, Ky.—The Looney Creek Coal Co. has filed articles of incorporation at Frankfort. The company will operate in Harlan County above Poor Fork, close to the workings of the Wisconsin Steel Co.

Knoxville, Tenn.—The Golden Ash Coal Co. has been incorporated in Knox County with a capital stock of $40,00 The Southern Mining Co. has also been incorporated i Knox County with a capital stock of $30,000.

New York, N. Y.—Rubel, Nager & Rubel have been incorporated in Brooklyn to deal in coal, coke, etc. The capita stock is $100,000 and the incorporators are S. Nager, J Rockville Center, S. A. Telsey and S. Rubel, of Brooklyn.

St. Louis, Mo.—The East Kentucky Coal & Coke Co. hav filed articles of incorporation in St. Louis. The incorporato are S. R. Johnson, H. T. Ochterbeck, W. D. Condie and W. Spinney. The object of the firm is to buy, sell and mi al, coke, iron and other mineral products and the capi- stock which is wholly paid is $2000.

Connellsville, Penn.—The Pittsburgh Steam Coal Co. and e Stoner Coal Co. have consolidated under the name of the nnellsville Coal & Coke Co. The Pittsburgh Steam Coal operated plants at Montana and Opekiska, W. Va., while e Stoner Co. had plants at Alverton in Westmoreland unty, Penn.

Charleston, W. Va.—The Barton Coal Mining Co. has been corporated at Philadelphia to mine, manufacture and deal coal, coke, lumber and other commodities and products. ie authorized capital is $25,000 and the incorporators are alter S. Simms, of Philadelphia, W. F. Jacoby, Morristown, nn., J. Leon De Hart, of Philadelphia, and others.

Toledo, Ohio—The S. C. Schenck Co. has been organized Toledo with Dan Schenck, well known in coal circles, the head of the new concern. The new company was corporated under the laws of Ohio with a capital stock of 00,000, and will take over the business formerly conducted S. C. Schenck, deceased, and will retain its former head- arters on Superior St. The Chicago office will also be aintained. The officers are: President, D. D. Schenck; ce-president, H. E. Schenck; secretary and treasurer, L. R. henck. C. L. Dering has been appointed manager of the icago branch.

INDUSTRIAL NEWS

San Francisco, Calif.—The Goldschmidt Thermit Co. has oved its office from 432-436 Folsom St., to 329-333 Folsom ., San Francisco.

Pottsville, Penn.—The Wolf Creek Coal Co., of Hazleton considering shipping all of its product to the colliery at w Boston, and its preparation for market at that place.

Gebo, Wyo.—The Owl Creek Coal Co. has recently pur- ased from the Kerr Turbine Co., Wellsville, N. Y., a 200- v. direct-current Economy turbo-generator for installation Gebo.

Manila, P. I.—The Norwegian steamer "Titania" has en taken under time charter for a period of four years, d is to ply between Japanese ports and the Philippines th coal.

Sebree, Ky.—It is reported that a syndicate has acquired al rights in the western end of Webster County, cover- g about 40,000 acres, at prices averaging approximately 0 an acre.

Portland, Ore.—On completing her forthcoming voyage China from Portland, with a lumber cargo, the Norwegian amp "Thor," Captain Kroger, will load back for the Coast d then go into the coal trade between British Columbia, n Francisco and Portland.

Moundsville, W. Va.—The Ben Franklin Coal Co., of West rginia, is installing a Christie box car loader at its Panama ne. The siding tracks are also being raised about 8 ft. ese improvements are being made because of an increase the number of orders.

Portland, Ore.—The British steamer "Harlow" is now in rtland Harbor to load. She brought over from Rotter- m to San Francisco the largest coal cargo on record on e Pacific Coast. The cargo was 9554 tons, and was for n Francisco coal dealers.

Provo, Utah—The Spring Cañon Coal Co. will place in op- ation in its mines at Helper, Utah, 6-ton and 15-ton, 40-in. ge electric mining locomotives, and will install in its power ant a switchboard, all the apparatus having been ordered om the General Electric Co.

Pottsville, Penn.—The prolonged drouth in this region has used the collieries and washeries to run short of water, d many mines must soon close unless heavy rains come. me collieries are using the strong sulphur water from the nes for steam purposes, although it is extremely injurious the boilers.

Parsons, Kan.—A fire which started in 31,000 tons of coal red in the yards of the Missouri, Kansas & Texas Rail- y Co. six weeks ago is still burning. It is estimated that e company has lost 6000 tons of coal since the fire started. e gas and fumes from the burning coal makes it almost possible for a person to live in that part of town.

Whitesburg, Ky.—It is reported that John Litts and asso- tes, of Wise County, Va., are closing deals on a boundary between 15,000 and 18,000 acres of rich coal and timber d lying along Rockhouse Creek and Carr's Fork, west of hitesburg, along the borders of Letcher and Knott Coun- s.

Birmingham, Ala.—The American Concentrator Co., of Joplin, Mo., have effected an arrangement with the Roberts & Schaefer Co., whereby the latter company is to design and build the new coal-washing plant for the Tennessee Coal, Iron & R.R. Co., at Birmingham, Ala., for which the American Concentrator Co. recently contracted, and in which plant their "Elmore" coal jigs will be used.

Somerset, Penn.—A deal involving the transfer of 215 acres of the surface and mineral rights of the Geo. B. Mangus farm near the new mining town of Cairnbrook was closed Aug. 26 by M. L. Reiman, of Johnstown who held an option on the property, making the transfer to John Lochrie, of Windber for a consideration, that was in the neighborhood of $30,000. It is the intention of Mr. Lochrie to develop the mineral.

Connellsville, Penn.—The probability that the constitutionality of the recent act placing a tax of 2½ per cent. on the value of anthracite coal at the mines will be tested is indicated by the action of some of the companies in segregating this tax and keeping a complete record of the persons from whom it is received, so that should the act be declared unconstitutional there will be little trouble in making the proper refund.

Philadelphia, Penn.—The Pennsylvania R.R. is soon to install a wireless telephone system on the trains of that road for the use of the engineers and conductors. It is said that this new scheme will do much toward the prevention of accidents. Preliminary tests have already been completed over the Huntington and Broad Top line and the freight and coal trains of the road are now being equipped with the new wireless system.

Canonsburg, Penn.—The Joseph Cowden heirs have sold their farm of 240 acres near Bishop in Cecil township to people representing the Montour Railroad Co. for $250 an acre. The tract of land contains 240 acres, so that the total sum involved in the deal was $60,000. As the farm was badly cut up by the new railroad, the owners refused to consider the amount offered by the company for right of way and insisted on selling outright.

Pittsburgh, Penn.—The freight traffic on the New York Central lines through northern Cambria and Clearfield counties is increasing rapidly, and some big improvements are being contemplated by officials of the road. The coal companies operating along the Cairnbrook-Windber branch are storing train loads of coal to be shipped as soon as the branch is in operation, and it is feared that there will be a freight rush when this line is finished.

Harrisburg, Penn.—The United Mine Workers are determined to force the question of eliminating electric motors from anthracite mines, which are considered dangerous by reason of the presence of gas. Several accidents happening recently have brought attention to the fact that a spark from a motor has set off the gas. Acting upon instruction from the subdisitrict convention, held by the union recently, the officials have presented the facts to the Department of Mines and will insist that the danger be eliminated.

Duluth, Minn.—Hard coal shipments from the head of the lake for the month of August will not equal the coal tonnage of August a year ago by approximately 20 per cent. There appears to be no dimunition in the demand for coal, but at the present time there is no certain shortage, and hence no apparent hurry for customers to order their coal. Coal is moving from the dock slowly, and this fact has determined the amount that is coming up the lakes. Railroad men do not anticipate a heavy movement from the docks until later in the Fall.

Waynesburg, Penn.—One of the largest deals in coal acreage in Greene County has been practically closed between J. V. Thompson of Uniontown, and the Youngstown Sheet & Tube Co. Over 5000 acres of the finest coking coal lands situated in Cumberland and Monongahela township are involved in this deal, and the consideration named is nearly $5,000,000, or an average of about $1000 an acre. In addition to the coal rights the surface land is included, and it is expected that mining and coking operations are to be opened on a large scale shortly. Several hundred ovens will be erected and several shafts sunk.

Philadelphia, Penn.—Another attempt to smash the anthracite coal trust was begun Sept. 2, when the Government filed a civil suit under the Sherman law. The Reading system, the railroad, coal producing and subsidiary rail and coal corporations was attacked.

That the system owns 75 per cent. and transports 50 per cent. of all the anthracite coal in Pennsylvania was alleged by the Government. The bill declares unless the present combination is smashed the Reading will in time "control every ton of commercially valuable anthracite known to exisit."

COAL TRADE REVIEWS

GENERAL REVIEW

Full winter circular on hard coal now in effect and business temporarily restricted. High prices on bituminous diverting some demand to the anthracite steam grades. Seasonal business in soft coal far ahead of any previous record. Demand continues as strong and insistent as ever.

With the full winter circular on hard coal now in effect there has naturally been a temporary curtailment in business. However, anthracite occupies a strong position. An unusually large volume of orders has been carried over from the summer still unfilled; the retail trade is already beginning to tune up and the current month will see considerable activity. The high prices prevailing on bituminous is diverting some business to the smaller grades of hard coal.

Although there is a feeling in the bituminous trade that buyers have accumulated large advance stocks, it is probable now that the production about balances the demand and the realization of any one of the several impending favorable conditions, will precipitate a sharp advance. There is no question but what the seasonal average business on soft coal has been greatly exceeded, and if the market can be held steady over the next few weeks the colder weather will bring a natural support that will carry it through the balance of the season. However, the West Virginia grades are firmer in spite of excellent loading dispatch at the terminals, and it hardly seems possible that there can be any easing off in the buying power. The better grades generally are well filled up, and with the scarcity of labor and cars the market should have no difficulty in maintaining its position.

The demand for prompt coal from the Pittsburgh district in the Lake trade is good with moderate premiums being obtained. Some uncertainity is expressed over the future, but the present situation could not be improved upon, although it is probable that there is considerable buying in anticipation of the biennial wage agreement Apr. 1 next. The production is up to the full rated capacity, and the car supply fair. Rumors are current of a congestion at the head of the lakes, which may eventually divert considerable of the Pittsburgh district coal into other markets. As yet there is no apparent increase in the supply, however, and everyone continues to be short of coal.

The car shortage has become quite acute in Ohio and promises to interfere with the Lake shipping unless relief is obtained shortly. However, both steam and domestic grades are strong and a large tonnage is moving into the Northwest. A new advanced circular was put into effect Sept. 1. The dumpings at Hampton Roads were heavy during the week, principally in the New England trade, foreign shipments being relatively light. Vessels have been loaded promptly, although some agencies have been compelled to go into the spot market for tonnage to fill out their requirements; the car supply is much improved in this section. The demand in the Southern market is strong, with prices at a slightly higher level; the car shortage is causing some operators to fall behind on their contracts, and this is the worst feature in the local situation.

There is considerable pressure on the screenings market in the Middle West, but otherwise the trade is strong and indications are good for an excellent business this month. Producers generally have long-term contracts at satisfactory figures and are taking an optimistic view of the situation. Some trouble is being experienced in obtaining the desired kind of railroad equipment, and the possibility of labor trouble in certain districts is also adding an element of uncertainty to the situation. The mines in the Rocky Mountain regions are beginning to tune up to full capacity on improved conditions in the market; indications of a coming car shortage are noted by the scarcity of box cars.

BOSTON, MASS.

Pocahontas and New River slightly firmer, with ample business for the present. Georges Creek less plentiful. The better Pennsylvania grades practically unchanged. Anthracite unusually active for the season.

Bituminous—The market on Pocahontas and New River this week is a shade firmer. Sales have been made rather freely at $2.90 f.o.b. for coal to be taken in the next 30 days and this in spite of large receipts and excellent loading dispatch at all the terminals. Several of the agencies were
pecting to be actively in pursuit of new business by this ti
but orders still keep ahead of the output. At New Engla
distributing points the supply about balances the dema
The outlook, therefore, is hopeful and any one of a numl
of things that might happen would be enough to send pri
higher. It is generally felt, however, that buyers have
been laying in heavy advance stocks and that when their
quirements in that direction are fully satisfied much of
buying power will be withdrawn. There is also a tender
to buy farther into the next contract year than has ordinar
been the case.

Arrivals here have been heavy the past week, 60,000 t
having been entered at the B. & M. wharf alone, this bei
about twice the normal figure. There has probably not b
a time in recent years when mills and other corporatic
were so intent on accumulating coal. In Georges Creek th
has been another spurt, so that supplies are less plenti
than a week ago. The demand from the line and offsh
trade has been exceptional and for the present shipments
tide will be somewhat curtailed.

Pennsylvania coals are less heard from just now, but t
price remains practically unchanged. Most of the operat
have sufficient contract business in hand so they are
worrying much over spot coal. The quality grades are w
sold up for the present, the output being still less than n
mal. There is much interest in the outlook this fall
Pennsylvania bituminous, but it is early to make predictio
It is rumored the all-rail sales have not been as heavy
proportion as those at tide-water and therefore that the w
ter months may show a mild flurry on rail coals when t
tide-water trade is running along smoothly.

Anthracite—September opens with an unusually large v
ume of orders still unshipped and there is no doubt now th
the hard-coal market will maintain its strong positi
throughout the season. Most dealers as well as such co
sumers as the large gas companies are running along
hand-to-mouth shipments of broken, and stocks of stove a
not any too large. The retail trade is beginning to come
strong, and September is likely to be a heavy month for lo
deliveries.

Wholesale quotations on bituminous are about as follov

	Clearfields	Cambrias Somersets	Georges Creek	Pocah New Ri
Mines*	$1.10@1.50	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.35@2.75	2.60@2.90	2.92@3.02	
New York*	2.70@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2
Boston†				3.83@3
Providence†				3.90@4

*F.o.b. †On cars.

NEW YORK

**Anthracite companies carrying small stocks of prepar
sizes over. Stove and broken in short supply and pea b
coming tighter. Soft coal shows a further stiffening due
car shortage and the holiday cessation of work.**

Anthracite—There seems to be little or no change in t
anthracite situation at this time. Broken coal continu
scarce; egg is a little easy, stove also scarce and chestn
plentiful. The demand for pea is getting strong on the li
trade. Buckwheat is very plentiful, rice is becoming a dr
and No. 3 Buckwheat while plentiful is improving. The co
panies are carrying little or no prepared coal in stock ou
side of chestnut and have but a moderate amount of sma
sizes in storage.

The hard-coal market is quoted on about the followi
basis.

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individu
Broken	$5.00		$4.95	
Egg	5.25	$5.15@5.25	5.20	$5.10@5
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.25@5.50	5.45@5.15	5.25@5
Pea	3.50	3.35@3.50	3.45	3.30@3
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.30@2
Rice	2.25	2.25	1.95@2.20	1.70@2
Barley	1.75	1.60@1.75	1.70	1.30@1

The Bituminous market seems to have strengthened som
what over its condition of last week due no doubt to t

shortage of cars on the Pennsylvania Railroad Thursday and Saturday of last week and the holidays this week. Any weakness that appears in the market seems to be on coal standing at the piers unsold. All of the operating companies have plenty of orders at the mines and most of those producing higher grades of coal are unable to promise shipment for the next week or two. The demand is not strong. The New England market while steady is receiving a heavy tonnage and contracts are getting good attention. Lake shipments are continueing on a large basis but there is a feeling that the docks at the head of the lakes are getting filled up and shippers are under the impression that they may find it necessary to sell some coal in the Eastern market in the near future.

Gas coal is strong and firm as yet with slack scarcer than it has been and up about ten cents in price. The market is quotable on the following basis:

West Virginia steam, \$2.60@2.65, fair grades of Pennsylvania, \$2.70@2.75; good grades of Pennsylvania, \$2.80@2.85; best Miller Pennsylvania, \$3.10@3.20; George's Creek, \$3.15@3.25.

PHILADELPHIA, PENN.

Anthracite market shows little or no improvement. Broken coal still a feature, with the demand good and supply deficient. The middle of September indicated as a possible turning point. Bituminous market a trifle easier; prices well maintained, but deliveries better.

The first week in September, which is the initial month of the full circular prices, has not opened up in a particularly auspicious manner. Curtailed operations at the mines still continue effective, and except for the demand for broken and stove coal, there is practically no market. The high prices for bituminous has had the effect of creating a slightly better call for the steam sizes, but on the whole, there is no very marked improvement. Until the middle of September there is not likely to be any change for the better, this period generally being considered the ending of the summer dullness, and the beginning of fall activity.

The retail market still reports conditions to be anything but good. Odd lots here and there mark the return of the householders who have been absent during the heated term, and when the cool evenings make themselves manifest, business should pick up. The celebration of Old Home week at Mahanoy City has further curtailed the output of coal inasmuch as many of the collieries in the vicinity of that town suspended work in order to take part in the festivities.

The bituminous situation showed a tendency to ease off during the last week. Not that prices have in any way sagged, but there appeared to be a little more coal offering, and slightly better inducements offered in the way of prompt deliveries. Prices still range around \$1.15 to \$1.20 for almost any kind of coal, although there are reports of slack being sold at less than \$1.

ATS

PITTSBURGH, PENN.

Coal production at full capacity. Prompt supply insufficient. Additional sales for the lake trade. Connellsville coke price maintained despite bear efforts. Hostetter Connellsville output in the market.

Bituminous—Mines continue to operate at substantially full capacity, except for occasional stoppages like that of last Saturday, when the annual picnic of the miners of the Monongahela valley occurred and Labor Day this week. Car supply has been fairly good only, but is expected to be improved somewhat by the breathing spell given the railroads through these interruptions to mining. Demand for odd lots of coal continues fairly good, with offerings light. There has been a considerable demand for additional coal for lake shipment and \$1.35 has been readily obtained on such lots as could be spared.

On the whole the coal situation could hardly be better, though satisfaction over the heavy movement is tempered somewhat by reflection that a part of it is probably due to anticipation of an unusually severe contest over the biennial scale, which comes up for readjustment against the close of the present scale period, Mar. 31 next. We continue to quote regular prices, subject to premiums frequently for prompt coal: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in. steam, \$1.50; 1¼-in. domestic, \$1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—Recent rumors of irregularities in furnace coke prices when traced to their source seem to hinge partly upon the offering of coke under standard at slight cuts from the regular figure of \$2.50, and to the desire of a merchant house, so it is alleged, to break the market. The test of actual buying has brought out actual contracts for September at the full price of \$2.50, for standard grade coke, and a fair volume of prompt business has also been done at this figure. Negotiations have been on the past few days which when concluded will probably cover all the furnace coke needed for September in addition to regular contracts, and at full prices for standard grade. The output of furnace coke, some 25,000 to 30,000 tons monthly, of the Hostetter-Connellsville Coke Co. controlled by the United States Steel Corporation, is temporarily on the market. The August tonnage was quietly disposed of at the full price, and a large part of the September output has already been closed, with negotiations on for the balance, all at the full figure. There are prospects that the coke will not be offered for October, being required by the steel corporation, and the absorption of this extra tonnage for August and September is taken as a clear indication of the strength of the market. We continue to quote: Prompt furnace, \$2.50; contract furnace, \$2.50; prompt foundry, \$3; contract foundry, \$3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 23 at 369,476 tons, a decrease of 27,141 tons, and shipments at 269,323 tons, a decrease of 28,954 tons. The weekly average of production and shipments during the first half of the year was 410,000 tons, the average in July having been about 378,000 tons and thus far in August about 387,000 tons.

BALTIMORE, MD.

Bituminous market remains excellent, the demand being far above the seasonal average. Anthracite business increasing, especially for assorted sizes.

The soft-coal market remains exceptionally good for this time of the year. Not only is the seasonal average being surpassed, but instead of a cessation the demand seems to be on the increase. Most coal men are rather at a loss to explain the present state of business, but all agree that affairs are good just now. Prices remain firm, quotations generally being about on a par with those of the past week. Complaint is being made of a shortage of slack and still higher figures for that grade seem in store. As a matter of fact, if the market can be held steady for a few weeks longer the winter demand will open up.

There is only one discordant note to the present situation from a strictly local viewpoint, and that is that while loadings were fairly heavy at the piers the past week, a smaller number of charters than usual was announced. This slow down was in regard to coastwise and foreign business alike. Scarcity of miners is cutting a considerable figure at present, and this, with a renewal of the car scarcity, is preventing the tonnage movement from being quite as large as the present call for coal would seem to warrant.

Anthracite conditions are highly satisfactory. Quite a number of consumers who want assorted sizes are now urging prompt delivery. While all kinds of hard coal is to be had just now without especial difficulty, the experience of past years has taught many consumers that this may not be the case a month or so from now.

BUFFALO, N. Y.

Some difference of opinion as to the outlook. Certain dealers are afraid the lake trade is running down. Local demand as heavy as ever. Coke weak.

Bituminous—There is some difference of opinion as to the future of the bituminous trade,though none as to the continued strength of it here at present. A few dealers hear reports of a congestion on the upper-lake docks and say that much of the coal intended for that market will be diverted this way before long if the upper lakes are really getting in their full season's supply; but that is merely an inference as yet.

On the other hand it is stated that a certain large manufacturing concern has just asked for a supply of slack from now to April at \$1.25 f.o.b., without obtaining an offer. All that can be said of the actual situation here is that there is no weakening of prices and no increase in the supply. Practically everyone is short and there is no consignment coal on track anywhere within reach of this market. Operators can see nothing in the reported weakness. There is very little contracting. The consumers are offering what would look like good prices at almost any other time, but sellers are cautious; they do not know what to ask and besides they are afraid they would be unable to get the coal unless they control the mine. Even when they have mines behind them they have often contracted so much that they are obliged to go into the open market and buy at whatever is asked.

Still the shipper who predicts a \$2 price for slack before long is looked on as visionary; slack is much scarcer than it was awhile ago, but it would take a decided panic for it to make any such advance. Still it is difficult to say what will take place when the lakes close three months hence. Often there is a short flurry and the former prices are resumed.

Bituminous quotations will therefore have to be placed at former figures, $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack, with Allegheny Valley 15 to 20c. lower.

Coke—The coke trade is not strong, some jobbers reporting offers from the ovens at some reduction from former prices. It seems to be the idea, though, that prices are at the bottom, from the fact that there is still little stock coke offered. With best Connellsville foundry selling at $4.65, f.o.b. Buffalo, stock prices are $4.25, with off-grade 48-hr. furnace at about the stock price.

Anthracite—There is a slight stir in the local retail demand for anthracite and some of the rail lines are increasing their orders, but the business is not what the shippers expected. They say that it is bound to come all at once in a month or so, just as it has always done. Shippers of independent anthracite are selling a moderate amount of the smaller sizes at circular prices, but are not able to do anything with egg yet. Lake shipments of anthracite were 145,000 tons for the week, which is somewhat less than the summer average, on account of the scarcity of coal.

TOLEDO, OHIO

Fears that a car shortage may interfere with the Lake movement. Railroads still feeling the effects of the spring floods. Prices firm and the demand strong.

Toledo dealers are busy filling orders and watching their cars. There seems to be something of a shortage of cars at the mines, which has not as yet affected the lake business, but which shippers greatly fear will cut down the movement if it grows any worse. For some time past murmurs of a slight congestion has been coming in from the northern lines, but the first effects to be really felt here came during the past week.

Considerable fear is expressed at many points at the inability of the railroads to cope with the situation as fully as could be desired this season owing to the fact that they were badly crippled by the washouts occasioned by the March floods. There is a firm demand for steam coal and the domestic situation is favorable. Concerns are now busy filling contracts, including school and municipal contracts. Quite a number of large vessels cleared from the local docks during the past week and there are a few now awaiting accommodation.

Prices as quoted here follow:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.70	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.50	1.35	2.50	1.50	2.50	....	....
Nut	2.00	1.20	2.25	1.50	2.50	....	....
⅞ lump	....	1.60	....	....	....	1.25	1.25
Mine-run	1.60	1.35	....	....	....	1.15	1.15
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Activity still characterizes the Ohio trade. The demand for domestic and steam grades is good and the tonnage moving to the Northwest large. An advance in prices was announced effective Sept. 1. Car shortage is increasing.

The coal trade here during the past week has been active in every way. The new circular became effective Sept. 1, which boosts prices to a higher level and the demand for all grades is active. The tone of the market is satisfactory in every respect and operators, shippers and dealers look forward to a good trade for the remainder of the year.

About the only disturbing factor is the growing car shortage which is curtailing production in certain districts. In eastern Ohio the shortage is probably the worse and as a result the output during the week has been about 55 per cent. normal. There is also a lack of cars in the Pomeroy Bend district and the production there is estimated at 65 per cent. In the Hocking Valley and domestic producing fields the car supply has been better and a larger tonnage was produced.

The domestic trade is probably the strogest point in the market at this time. Dealers are gradually laying in stocks for the rush which is expected soon. There is a good demand for the splints and rescreened varieties. Large householders have placed their orders and deliveries are being made. One of the features of the domestic trade is the fact that winter fuel supplies are being laid in earlier than usual.

Steam business is also strong as manufacturing generally is in good condition; iron and steel plants are good purchasers of fuel and railroads are also buying a considerable tonnage. Very few steam contracts are expiring at this time and much of the tonnage is being purchased on the open market. The demand for the small sizes is strong and an advance has been made in the past week.

The lake trade is also active and will continue so right up to the close of navigation. The docks at the upper lake ports are fairly free as the interior movement is good. Chartering of bottoms is being carried on actually and the tonnage shipped from Ohio ports during the past week shows a large increase over the previous week. The retail trade is good and dealers are busy taking care of small orders. Retail prices are higher in accordance with the advanced circular.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump	$1.75 @ 1.70	....	$1.85 @ 1.75	$1.70 @ 1.65
3-4 inch	1.60 @ 1.55	$1.30 @ 1.25	1.55 @ 1.60	1.55 @ 1.50
Nut	1.30 @ 1.20	....	1.35 @ 1.30	....
Mine-run	1.35 @ 1.25	1.20 @ 1.15	1.30 @ 1.25	1.25 @ 1.20
Nut, pea and slack	0.80 @ 0.75	....	0.70 @ 0.65	0.75 @ 0.70
Coarse slack	0.70 @ 0.65	0.75 @ 0.70	0.60 @ 0.55	0.65 @ 0.60

HAMPTON ROADS, VA.

Heavy dumping particularly at Sewalls Point. Vessels being loaded promptly. Foreign shipments lighter, but coastwise heavier. Stronger demand inland.

Dumpings over the tidewater piers for the week have been good. This is especially true as regards the movement from Sewalls Point, the loading at that pier being extra heavy and it is believed that a new record will be established this month. While the foreign movement has not been very satisfactory there have been some large shipments to the New England market. Practically all vessel tonnage arriving at Hampton Roads has been taken care of promptly although some of the suppliers have been compelled to go into the open market and purchase coal to apply on contract business.

Prices quoted for spot coal have been from $2.80 to $3, but it is impossible to ascertain whether any sales have been made at the latter figure. The demand inland has been fair, but only for New River and Pocahontas, and while there have been some sales of Kanawha and other high volatile coals, prices have not been very satisfactory.

Foreign shipments during the week have been to Para, Manos, St. Lucia, Cuban ports and Vera Cruz. The Atlantic fleet has been in the Roads some days taking in stores and a supply of bunker coal.

LOUISVILLE, KY.

Demand continues strong. Car supply better and may effect an easier situation shortly. Still a heavy movement into the Northwest. New rumors of an impending strike.

The demand for all grades of coal continues strong, as might be expected with the approach of the Fall season. The shortage of cars, however, which threatened to further aggravate the situation, is showing every indication of improvement, and now seems to be indefinitely postponed. Mines in all parts of the state have been getting all the equipment they required, but whether this will continue, particularly with the heavy movement from eastern Kentucky into the Northwest, remains to be seen.

The movement into the Northwest, as noted, continues as heavy as before, and as this is almost entirely on contract, the indications are that it will continue steady throughout the season. There is also a good volume of domestic trade; dealers were rather conservative about putting in supplies during the summer, and with a fair demand now coming in from their customers their storage supplies are being rapidly cleaned up. In event of the anticipated shortage developing into a reality, many dealers will find they are unable to supply their customers.

The possibility of a strike is the most serious factor in the market at the present time. It is stated on reliable authority that a determined effort will be made to organize the miners in the eastern Kentucky field, and that recognition of the union will be enforced. Reports are to the effcect that the move will be initiated on Oct. 1, and there have already been some preliminary skirmishes which have resulted favorably to the operators. There is no controversy in the matter of wages, the trouble hinging entirely on recognition of the union and the consequent closed shop.

Prices are now on the September basis, the better grades of block selling at $2 to $2.25, with block and lump at $1.90 to $2.15, round $1.40 to $1.50 and nut and slack at 70 to 85c. The second grades are quoted at from 10 to 25c. less and the demand is strong in all departments.

BIRMINGHAM, ALA.

Demand strong and prices good, showing a slight advance. Car shortage causing some shippers to fall behind on contracts. Coke quiet but fairly steady.

The coal and coke market here shows little change over last week; the demand is strong and prices good, with a slight advance. The car situation is still annoying the operators, as all mines are running on short time for lack of equipment, and contract shipments are slightly behind on this account. The Southern Railway has just closed a contract with a Northern car works for 1720 fifty-ton all-steel cars, and 15 large freight locomotives, to be delivered as fast as possible; while this will not help the present situation, it will give this district additional equipment this winter, when it is most needed.

The coke market is quiet, especially on the foundry coke, and no improvement is looked for in this line until the pig-iron market picks up and furnaces now out of blast put back; this does not seem probable at a near date because of the low price of iron. The iron market is holding up well, sales being smaller than last week, but at better prices, which is a good indication that the market is steady.

NEW ORLEANS

Dealers prepare for fall rush. Opening of cotton season causes gins to lay in fuel supplies. Exports to Latin American ports.

Local dealers are getting their equipment in shape for the rush of fall business. Owing to the limited amount of fuel required for heating purposes in New Mexico, orders for domestic supplies do not begin until the middle of September. With the first cold snap, however, orders come in great volume.

Dealers in Alabama coal report the first pinches of actual car shortage. That this condition will grow steadily worse is practically certain. Operation of cotton gins throughout the state now is becoming general. Owing to the high prices of fuel oil many of the gins have returned to the use of coal.

Exports of coal during the week were to Frontera, Mex.; Ceiba, Honduras; Cape Gracias and Bluefields, Nicaragua; Puerto Barrios, Guatemala; Belize and Stann Creek, British Honduras. All exports were in less than cargo shipments.

DETROIT, MICH.

Market stronger than at any time during the summer. Stiffening particularly noticeable on the smaller sizes. West Virginia grades in heavy demand.

Bituminous—Soft coal is still continuing to show a steady improvement and is much stronger right now than it has been at any time during the summer. The better grades are about the same as last week, but the smaller sizes have shown a tendency to stiffen still further with indications for a steady improvement, from now on; the demand for these sizes is in excess of the supply, and some large consumers who have crushers are being forced to make their own slack from the larger coal.

Both the West Virginia grades and three-fourths lump are also in excellent demand. The latter is being held rather closely at $1.05 minimum, with mine-run the same and slack being quoted at 95c. to $1; indications point to an advance to about $1.10 on this last, before the middle of the current month. Prices on the domestic grades are steady with a hardening tendency, due to the heavy demand. Pocahontas is becoming quite scarce with the demand far in excess of the supply, so far as the local market is concerned.

The market is quotable on about the following basis, prices generally firm:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.65	....	$1.75	....	....	$2.75	$2.50
Egg	1.65	....	1.75	....	....	2.75	2.50
Steam lump	1.50	....	....	....	....	....	....
¾-in. lump	1.25	$1.25	1.25	$1.25	$1.25	....	....
Mine-run	1.15	1.15	1.15	1.15	1.15	1.50	....
Slack	0.90	0.90	0.65	0.70	0.70	....	....

Anthracite—The anthracite market is beginning to show indications of some activity and this business from now on will depend entirely on weather conditions. A premium of 25c. is being asked in occasional instances on stove and egg.

Coke—Coke producers are holding firm at $3, sales involving several thousand tons, having been concluded on this basis during the past two weeks. Semet Solvay is now quoted at $3, Connellsville $3 and gas house $2.75.

INDIANAPOLIS, IND.

August showed considerable improvement over July. Screenings weak but the outlook on the whole is excellent. Summer buying heavier than usual.

August has shown considerable improvement over July in the volume of business in the coal fields of Indiana, mines having come much nearer a full running schedule. There is car trouble at many operations, which are long on hoppers and short on gondolas, but the railroads say they can do better now on gondolas.

The industrial situation is mixed but on the whole satisfactory. August is a vacation month, a time for inventories and for overhauling in many manufacturing establishments. It has also been an exceedingly hot month in Indiana and this factor alone has something to do with a falling off in the demand for screenings, which grade is now pressing for sale. The coal men have made large contracts and they speak optimistically of the outlook. The retail business continues good. Apparently there has been more than the usual summer buying. Retailers have bought better than their customers, at that, and are long on Eastern coals, particularly Pocahontas.

Mine quotations are around the following figures:

No. 4 screenings	$0.60	Egg	$1.50
Nos. 5 and 6 screenings	0.50	4-in. domestic	1.60
No. 4 mine-run	1.15	Brazil block	2.20
Nos. 5 and 6 mine-run	1.10	Washed coal	1.75 @ 2.25
1½-in. steam lump and nut	1.30		

CHICAGO

Large buyers, keeping out of the market, have forced screenings down to 45c. Franklin County operators have advanced prices and report satisfactory sales. Prices for smokeless coals are strong. A slight weakness in the domestic coke trade is noted.

A marked drop in the volume of business in the steam coal market in Chicago has been noted within the past week. As a result of action taken by a number of the large buyers in keeping their orders off the market, screenings were reduced, on the average, to 45c. a ton.

Despite the action of the Franklin County operators in advancing prices for lump, egg and nut coal to $1.75 a ton, the mines, sales of that fuel generally have been satisfactory. In the Carterville district, the operators are divided into two groups. The majority of the standard mines in that field are charging $1.50 a ton, but there are a few which are obtaining $1.60. There has been a slight softening in the market so far as the domestic coke trade is concerned. As a rule, prices for gas-house coke are easy.

Prices for smokeless coal continue strong, mine-run selling at $1.50 to $1.65. The circular price on lump and egg coal is $2.25 with sellers of free tonnage obtaining $2.50. A price of $1.60 a ton is being asked for inferior grades of 1¼-in. Hocking lump, the standard producers, however, obtaining $1.70.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07@2.32	$2.55@2.80	$2.27	
Steam lump	1.92		2.07	
Egg		2.55@2.80		$4.30@4.55
Mine-run	1.82	2.30	1.87	3.55@3.65
Screenings	1.22@1.32	1.60@1.75	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

ST. LOUIS, MO.

Indications splendid for a good September business. Prices advancing on all except Standard. Car shortage still prevailing. Anthracite weak, with smokeless and coke normal.

Prospects were never brighter for a good month in the coal trade than they are at this time. There is some uncertainty, however, as to just how much coal will be offered. The first few days of the month practically none was produced in southern Illinois, on account of the holidays; also, several mines were tied up by petty grievances on the part of the miners, and there has been an extraordinarily large advance sale of screened sizes, so that up to Sept. 10 or 15 there will be practically no coal to offer, and the car shortage will be severe enough by that time to steady up the market.

Coal in the Standard field is still being sold at about cost. Screenings are down to 30c. and mine-run has been offered the past week for 75c. There is no hope for any money in this field until the car shortage curtails work to about two days per week and there is an extraordinary good demand.

Anthracite is still moving in at from 25 to 30c. under the circular. There has been a fairly good demand for smokeless the past week, and coke is moving a little more freely than it has for a month. There is absolutely no washed coal market here at the present time.

The circular prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.00@1.10
3-in. lump	....	....	$1.30	....
6-in. lump	$1.70 @ 1.85	....	1.50	1.25@1.35
Lump and egg	1.50 @ 1.60	$2.15	1.60	....
No. 1 nut	1.30 @ 1.40	....	1.05	0.87½
Screenings	0.55	....	0.40	0.85
Mine-run	1.50	....	....	0.75
No. 1 washed nut	1.60	....	1.60	....
No. 2 washed nut	1.35	....	1.50	....
No. 3 washed nut	1.20	....	....	....
No. 4 washed nut	1.00	....	....	....
No. 5 washed nut	0.60	....	....	....

OGDEN, UTAH

Market conditions improving slowly, with mines gradually reaching capacity. First indications of a car shortage appear, with a scarcity of box cars. Mine price advanced Sept. 1.

August has gone down on record as a month presenting new and peculiar conditions in the coal market. The usual storage period ended on Aug. 1, with little coal in stock, although the operators expected August to be a very busy month. Anticipating this the mine price was increased 25c. by some producers, and 50c. by others, although the latter was shortly reduced to the 25c. advance. Those operators who advanced to 50c. expected the dealer and consumer to buy heavily during August, but in the early part of the month it became apparent that the market was still in a sluggish condition and buyers not ready to place orders. The territory has been worked and reworked by all the salesmen, with only moderate results. No large orders are being placed and most of the coal bought is for immediate use.

Most of the mines were able to run at a little better than half time during the last week in August, showing some encouragement. Owing to a better demand for lump, some operations are getting a little long on nut, and indications are that there will be a surplus of this grade during September.

All the sugar factories have completed shipments on their storage orders for slack and very little coal will be consigned to them during the first half of September, which will no doubt cause a surplus of this grade. The first indications of a shortage of coal equipment occurred Aug. 29, when the mines were compelled to load commercial coal in open cars, the railroads being short of box cars. The intermountain territory has a large crop this year, and most of the closed cars will be used in handling the crop.

The new circular went in effect Sept. 1, the market now being quotable on the following basis: Lump, \$2.75; egg, \$2.50; nut, \$2.25; mine-run, \$1.85; slack, \$1.

PORTLAND, ORE.

No material change in coal situation here the past week. Indications favor fair volume of business in the fall.

There has been practically no change in the coal situation here the past week. The volume of business is light, as is to be expected, at this time, but dealers look for an improvement in the movement in the near future with preparations for the winter season. Prices remain unchanged for the present with no indication of any occurring until winter quotations go into effect, which will mean \$1 additional per ton, as compared with the summer rates. There is no indication of importations of Australian coal this fall.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for July and the first seven months of this year and last year:

	July		Seven Months	
	1913	1912	1913	1912
Coal	2,938,723	2,519,881	19,604,691	17,668,329
Coke	391,485	368,720	2,839,373	2,653,612
Total	3,330,208	2,888,601	22,444,064	20,321,941

FOREIGN MARKETS

GREAT BRITAIN

Aug. 20—For early loading admiralty coals are almost unobtainable. Enquiries for forward loading are more numerous and firm prices are quoted. Quotations are approximately as follows:

Best Welsh steam	\$4.98@5.04	Best Monmouthshires	\$4.20@4.26
Best seconds	4.74@4.86	Seconds	4.02@4.08
Seconds	4.62@4.74	Best Cardiff smalls	2.76@2.88
Best dry coals	4.32@4.56	Seconds	2.46@2.58

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while these for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

British Exports—The following is a comparative statement of British exports for July and the first seven months of the last three years, in long tons:

	July		7 Months		
	1912	1913	1911	1912	1913
Anthracite	304,022	295,993	1,366,747	1,278,215	1,703,090
Steam	4,961,888	5,056,308	26,427,909	23,682,045	31,090,553
Gas	1,260,008	1,114,572	5,958,632	5,747,845	6,624,980
Household	161,813	168,061	829,466	802,268	1,023,436
Other sorts	354,135	340,277	1,790,763	1,704,806	2,059,387
Total	7,041,866	6,975,211	36,373,517	33,215,189	42,501,446
Coke	85,978	99,605	545,210	474,086	599,275
Manufactured fuel	191,945	200,814	981,094	327,228	1,223,046
Grand total	7,319,789	7,275,630	37,899,821	34,516,503	44,323,767
Bunker coal	1,632,501	1,883,676	....	9,758,398	11,970,713

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 29:

Stocks	Week's Range High	Low	Last	Year's Range High	Low
American Coal Products	83	83	83	87	80
American Coal Products Pref	....	....	105	109¼	105
Colorado Fuel & Iron	33	31½	32⅞	41½	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	210	195	200	....	....
Island Creek Coal Com	53½	52	53½	53½	47¼
Island Creek Coal Pref	85	84¼	85	85	80
Pittsburgh Coal	20⅜	19⅞	20⅜	24⅜	14½
Pittsburgh Coal Pref	85¾	84¾	85⅜	95	73
Pond Creek	20⅞	20	20⅞	23¾	16½
Reading	163¾	160⅜	162¾	168⅞	151⅜
Reading 1st Pref	84	84	84	92½	84
Reading 2nd Pref	....	....	88¼	95	84
Virginia Iron, Coal & Coke	39½	39½	39½	54	37¼

Bonds	Closing Bid	Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	Sale	93½	93½	93½	99⅛
Colo. F. & I. gen. 6s	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83	Sale	83	83½	77½	85
Cons. Ind. Coal Me. 1st 5s	76	78	76	26	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	85⅞	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77½	80	78½	78½	73	80½
Tenn. Coal gen. 5s	..	99¼	98½	Aug. '13	98½	103
Birm. Div. 1st consol. 6s	100⅝	102	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..		..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	93	92	Aug. '13	92	98

No Important Dividends were announced during the week.

⁂

American Coal Products Co.—The common stock of this concern amounts to \$50,000,000 of which \$10,539,300 are outstanding; the authorized preferred is \$5,000,000, 7% cumulative of which \$2,500,000 are outstanding and are redeemable after three years at 120. It is provided that the full paid common stock must always be not less than twice the preferred stock and that no additional mortgage or bonded debt can be placed against the property or its subsidiaries without the consent of two-thirds of the stockholders. The company paid regular dividends of 5½% from the time of its organization up to Oct., 1909; in 1910 it paid 6%; 6½% in 1911, and 7% in 1912.

Colorado Fuel & Iron Co.—The disastrous result of the strike, which this company went through in 1903, caused the report for the year ended June 30, 1904, to show the lowest earnings in the history of the company. Last year the company did nearly three times as much business as in 1904; during this latter year the company earned sufficient to pay off the \$1,500,000 accrued dividends and leave a balance of approximately \$300,000.

COAL FREIGHT DECISIONS

Fourth Section Applications Nos. 774 and 5301.—In the matter of coal rates from the anthracite fields to points on the New Haven R.R.

Respondent allowed to make a less charge than is made to intermediate points on prepared sizes of anthracite coal, all-rail, from mines in the anthracite region to Boston, Needham, Needham Heights, and Newton Upper Falls, Mass. **Opinion No. 2419.**

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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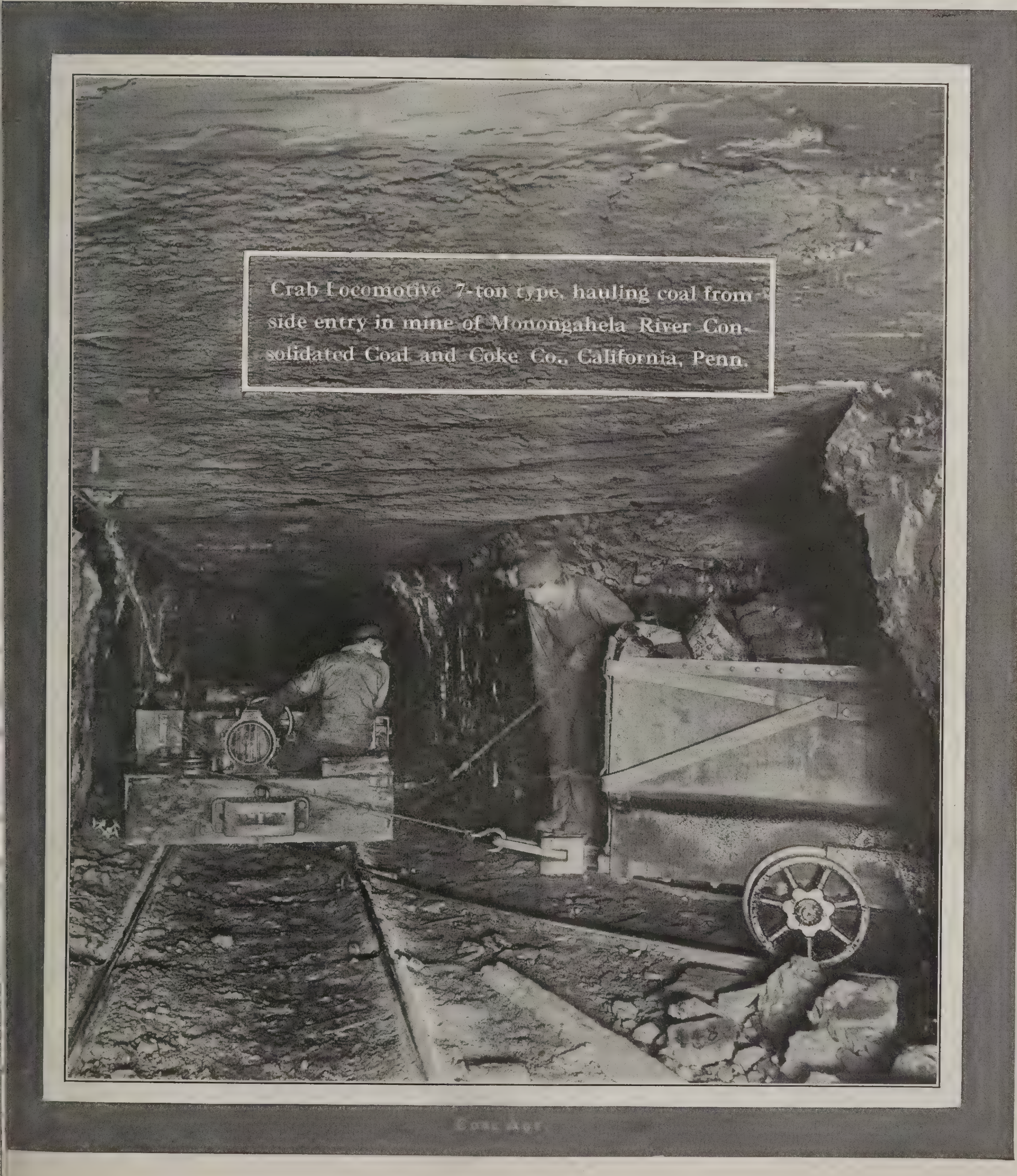
Advertising Index, Last Page



Crab Locomotive 7-ton type, hauling coal from side entry in mine of Monongahela River Consolidated Coal and Coke Co., California, Penn.

An Actual Record
of the service rendered by
Baldwin-Westinghouse
Electric Mine Locomotives

Standard Westinghouse bronze armature bearing with oil and waste lubrication as supplied on these locomotives.

At the mines of the Ray Consolidated Copper Company, Ray, Arizona, there are eleven ten-ton Baldwin-Westinghouse Electric Mine Locomotives in operation. The following information is proof of the phenomenal record of **low repair and maintenance** cost made by these locomotives:

Brushes and Commutators

The first shipment of locomotives was put into operation May, 1911, and additions have been made from time to time until now a total of 11 locomotives are in use. In this time not a single brush has been changed, nor a single commutator turned down.

Bearings

In the spring of the present year, one of the motors was removed from the first locomotive installed to ascertain the general condition and amount of wear in the bearings. General condition of the motor was A-1. The armature, commutator and brushes were in perfect shape. A careful test of the armature bearings showed that in practically two years of operation the wear was only .003.

Controllers and Resistors

A careful system of inspection is carried out at Ray, and when it is found that contact fingers become badly worn or burred, they are either smoothed up or replaced. Up to date not a single segment has been replaced on any of the controllers.

No trouble has been experienced with the grid resistors; only three grids having been replaced in three years time, and this was due solely to a collision, in which the grid was damaged.

Mechanical Parts

The foregoing does not cover repairs to wearing parts, such as brake shoes, trolley poles, etc., which of necessity must be replaced from time to time. With regard to wheels, however, only one pair of wheels has been changed in two years.

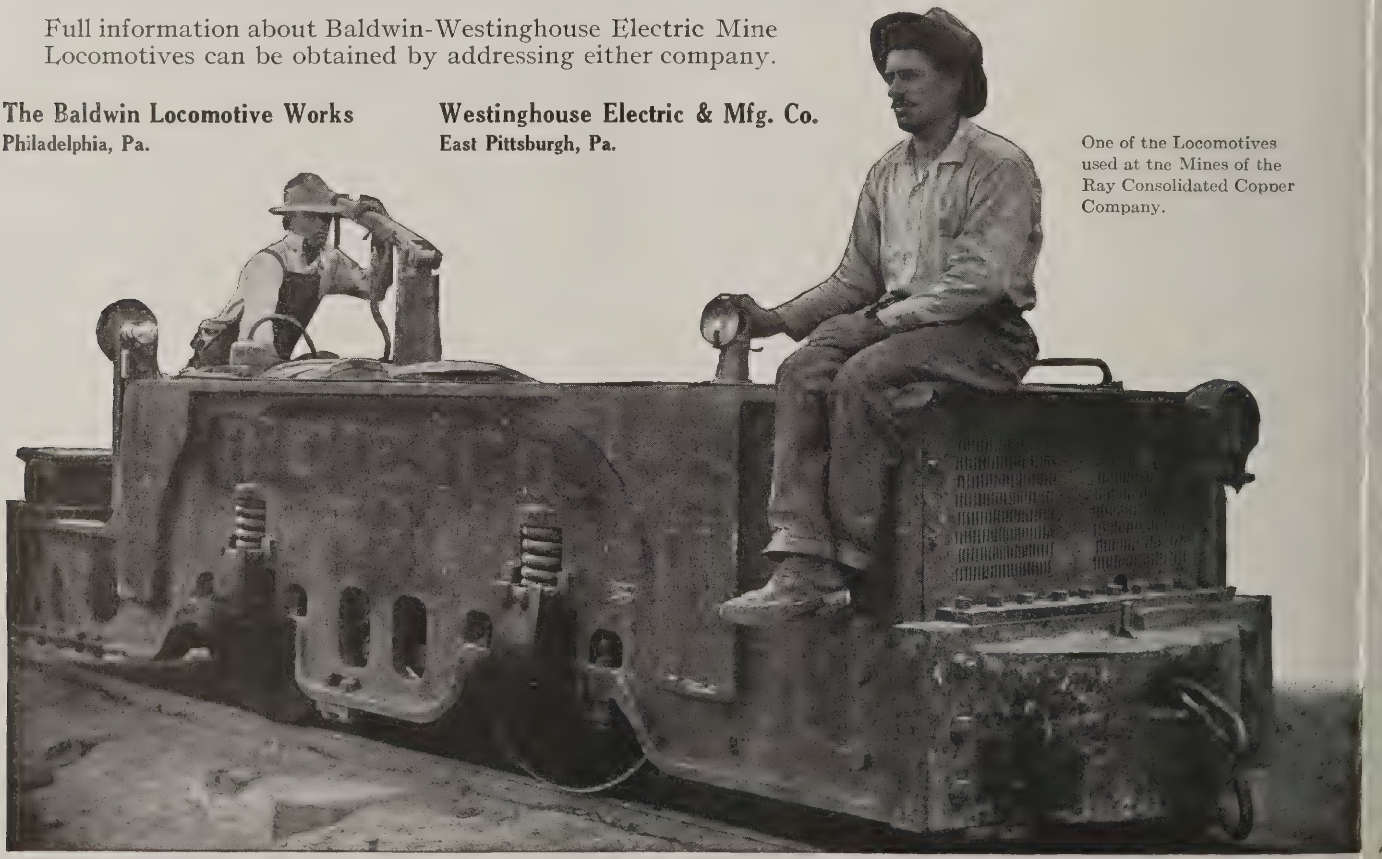
Two of these locomotives are used for general purposes, such as hauling mine timbers, etc. The remainder are used for hauling ore. The output of the mine is 6000 tons in 16 hours, at the present time. The average train consists of 20 to 25 cars holding 5 tons of ore each, and weighing approximately 2 tons each.

The above statement emphasizes the reliability of Baldwin-Westinghouse Mine Locomotives. The newer cast steel bar frame design has many features that are far superior to the earlier types, used by the Ray Company.

Full information about Baldwin-Westinghouse Electric Mine Locomotives can be obtained by addressing either company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



One of the Locomotives used at the Mines of the Ray Consolidated Copper Company.

COAL AGE

FLOYD W. PARSONS, *Editor.*

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VOLUME 4 SEPTEMBER 13, 1913 NUMBER 11

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None sent free regularly, no returns from news companies, no back numbers

The Advertising of Today

The Weekly Ad-Talk Page

The day of the solid-gold watch given with every bottle of Dr. Killum's cure-all is over. The voice of the advertising faker is heard no more in the land. The bunks and the piffles that gave Advertising a parti-colored eye have been locked in the outhouse, and a *clean, truthful* Advertising has taken its place in the fore rank with other forms of legitimate salesmanship.

The State of Minnesota has recently passed an act making it a misdemeanor for any newspaper or any firm to print or cause to be printed any misstatement whatsoever of any goods or articles within the limits of the State.

The significance of this act is far reaching. It means that the State Government has recognized the correctness of the step long ago taken by the better grade of publications; i.e., the safeguarding of the public from unscrupulous advertisers.

All over the United States, committees have been working for the last two or three years in an endeavor to get rid of all chance or faking advertising. The work of these vigilance committees has shown excellent results. The "fire sales" have almost disappeared from our midst, and advertising has been given added impetus toward its ultimate goal—the entire and unquestioning confidence of every reader. Many a time your wife has tried a new brand of canned goods, or you yourself have switched from your previous favorite tobacco to a new kind, simply on a friend's recommendation. You depend on your friend's integrity and try the new article. Your friend, on the contrary, is not apt to misinform you, because he knows that if his information proves untrue that you will lose a certain amount of confidence in him; therefore he tells you only the truth.

This is exactly the case with every truly modern advertisement. By "modern" we mean the kind that recognizes only truth as a vehicle of expression. Dealers all over the country have come to learn that while you may be misled once into buying an inferior article through an advertisement, in the end the results will be all against the dishonest advertiser, because you will never reorder, and, further, you will never recommend his article to a friend. It is this recommendation of yours that the advertiser is after. A personal advertisement is better than any other form.

And it's because it pays advertisers to be truthful that it pays you to read their ads and buy their goods.

COAL AGE

Vol. 4 NEW YORK, SEPTEMBER 13, 1913 No. 11

Recently one of our boyhood friends was sentenced to prison for theft. Some days later another friend of our youth was elected president of a great industrial concern. Both had an equal start.

Thus the paths diverge as the years pass. The average man must row hard to even stand still—so strong is the current in life's stream. Any old scow can drift with the tide, and no skill or effort is required to go over the falls which are always nearby.

But when we row hard and straight, still making but little progress, it is naturally disconcerting to hear our friends tell tales of easy trips to some port of success. We say, "How do they do it?" and award ourselves booby prize for being chief of the grand tribe of mortal incompetents.

However, rest easy—smother your envy; the same fellows will be telling like tales next year. You'll find they seldom get into the harbor and never tie up at the dock. Something always slips just as they're going to land. Some day, gentle, forgiving folk will whisper "dreamers," while those less diplomatic will say "liars."

The longer we live, the more we are forced to realize that "getting on" in the world is a full-size man's job Investigators claim that but one man in twenty is even a moderate success in a material way. One per cent. of the population of this country owns nearly fifty per cent. of the nation's Wealth.

Therefore, if a fellow is doing a little better than breaking even, he is of the chosen few. There isn't any real difference between the man who lacks ability to earn more than a living wage, and the fellow who does earn more but saves nothing Both finish at the same tape. The water that has passed is of no further use to the miller. The only market to recognize money already spent is the "land of regrets."

No one has a right to be entirely satisfied. Self-content generally means stagnation. But it's not wise to get wrinkles worrying about the other fellow's success. The chances are, if we could read the secret history of his life, we would find in it enough sorrow and suffering to disarm all our envy. Besides, failure often wears a fur coat, false whiskers and rides in an automobile.

If Bill, or Tom, or John, who used to go to school with you has "got on in the world," don't tell all your neighbors how stupid he was as a boy, and how in the old days you could mine more coal in an hour than he could in a shift, or how you could make twice as many set-ups with your transit.

It's just possible his success is due more to his personality, coupled with a policy of attending strictly to his own business, than to any display of genius. Some men spend so much time minimizing the virtues and ability of others that but little is left to add worthwhile credits to their own record of personal effort.

We may as well seek the end of the rainbow for its bag of gold as expect to add one iota to our personal success by the practice of envy. This passion is only an awkward homage inferiority pays to merit; it corrupts a man's soul as rust corrodes iron. Why send back our mutton and go hungry just because the other fellow is eating venison? Be a booster.

The Atlas Co.'s Plant at Burgettstown, Penn.

By Lee Llewellyn*

SYNOPSIS—This is the second and concluding installment on this plant. The screening and other arrangements for treating and cleaning the coal are described. Particular attention is devoted to the mechanical details and the steel tipple construction is also discussed.

⁂

There are two gravity-screen rigs at this plant, each equipped with 3-ton weigh baskets. The rigs are duplicates, except that in one the nut, or nut and slack mixed, passes from the nut-screen chute direct by a spiral chute to one picking table, while in the other the material passes from the nut-screen chute to a shaking pan, which delivers it to the other picking table.

The lump-screen chute is 6 ft. wide by 19 ft. long and provided with 12 ft. of standard bar screen with $1\frac{1}{4}$-in. spaces for bypassing the screenings around the baskets. Chutes are equipped with extra-heavy fly gates for passing room cleanings to the cross bone-conveyor chute or rock to the rock bin. The screen bars are $2\text{x}\frac{5}{8}\text{x}\frac{3}{16}$-in. standard "Akron" bars, supported by $4\text{x}\frac{3}{4}$-in. bearing bars spaced on 24-in. centers. The upper dead plate has a 2-in. buckle at the center of its lower end to assist in distributing the coal evenly to the screen bars. The lower dead plate extends 12 in. beyond the lower end of the screen bars and is notched at upper end and bent down between the bars to raise any lumps that may ride between screen bars. This construction also prevents lumps, riding in this manner, from chipping on the sharp edge of the dead plates, as is the case in ordinary construction. These notches extend far enough beyond screen bars to catch any dust that may ride the bar. The fly gate for bypassing room cleanings and rock is of extra-heavy construction, consisting of two steel plates riveted to a 2-in. square trunnion shaft, which is turned at the ends to accommodate bearing plates attached to screen chute. Gates are counterweighted for easy operation and operated by a lever located near the dump attendant.

View of Tipple, Showing Hoisting-Engine, Power and Boiler Houses with Man Hoist on the Right

The weigh baskets are hung from structural steel weigh frames and arranged with counterweights for returning them to their normal position after dumping. The operation of the baskets is controlled by the weighmaster through a counterweighted brake wheel connected to a rope and lever system leading to the scale house. The weigh frames are suspended from 10-ton standard tipple scales provided with quick-weighing dials.

Each nut-screen chute is 6 ft. wide by 26 ft. long and provided with 16 ft. of screening surface. Screen bars are $1\frac{3}{4}\text{x}\frac{3}{8}\text{x}\frac{3}{16}$-in. "Akron" bars, supported by $4\text{x}\frac{5}{8}$-in. bearing bars, spaced on 24-in. centers. A lower deck is provided for gathering the slack, which is discharged into railroad cars over a chute common to both rigs; this chute is provided with a section of perforated plate, for taking the real fine dust out of the slack coal. The nut coal passes to a hopper, common to both rigs, and is loaded over a spiral end-loading chute, equipped with a hinged section for low cars. Both the nut- and the slack-loading chutes are equipped with gates operated from the car-trimmer's platform, to stop the flow of coal when shifting the railroad car. Screens are hung by adjustable rods, so that the angle may be varied to suit conditions.

A rock bin, common to both rigs, is provided for receiving rock from either dump. It is of heavy-plate construction and equipped with two substantial steel-plate gates for passing the rock to the dump cars.

Feeders and Picking Tables

There are two plate feeders for feeding the $1\frac{1}{4}$-in. lump to picking tables. They are of the reciprocating type and consist of a steel-plate chute section hung by forged-steel hangers underneath structural-steel cageways which receive the coal from the feeder hoppers. The rereciprocating chutes are beveled at such an angle as to insure an even distribution of coal on the tables. The reciprocating motion is imparted to the chutes from the feeder crankshafts through forged-steel connecting-rods and adjustable crankpins. Feeder crankshafts are driven from the picking-table countershaft through one steel thimble roller and one machine-molded bevel-gear transmission. By this arrangement of drives, when a picking table is stopped its feeder will also immediately stop.

---

*Chief engineer, Pittsburgh Coal Washer Co., Pittsburgh, Penn.

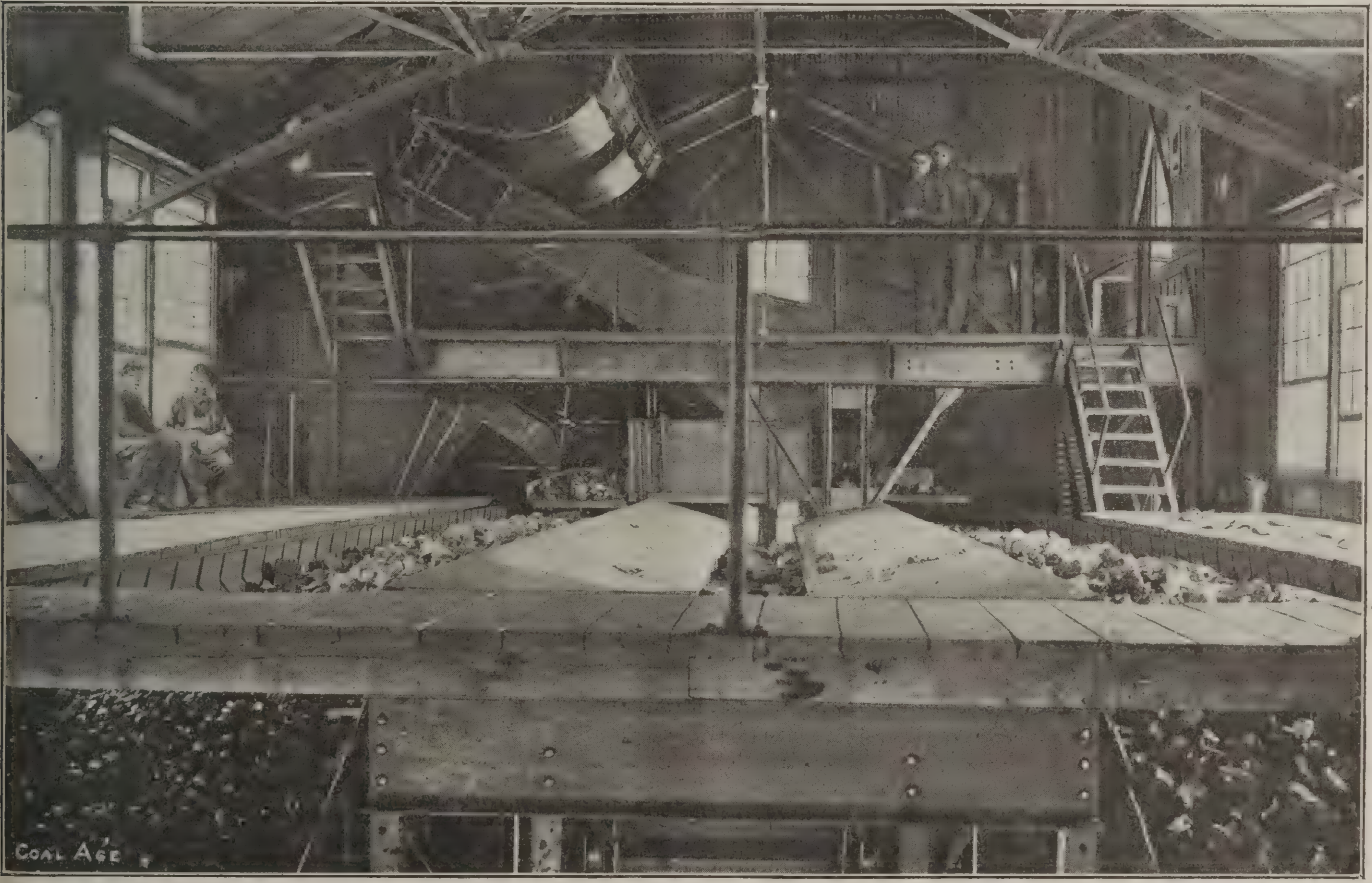
The tables are of duplicate design, and arranged with hinged chute sections for discharging into the cars. They consist of two strands of 12-in. pitch steel thimble-roller chain, to which is attached double-beaded pans 5 ft. long, with moving sides 10 in. high. The tables are arranged for 35 ft. of clear picking space. The speed is 40 ft. per min. and each table is capable of handling 275 tons of run-of-mine per hour, based on the maximum output of 3000 tons per eight-hour day, and assuming 65 per cent. of the output to be ¾-in. lump, the average thickness of lump coal on the tables will be 6 inches.

The drive for the tables is by a 15-hp. motor (which also drives bone conveyor, feeders and shaking pan), through one belt and one cut spur-gear transmission to the line shaft, from which each table is driven by one machine-molded spur gear and one steel thimble roller-drive chain transmission. The driving pinion of each table is fitted with a friction clutch, operated through levers, pipe toggles and bell cranks, from the car-tender's platform.

The tables are mounted on structural-steel frames, supported by the picking-house floor beams, and each is provided with a set of special loading chutes, designed to load and top three different-height cars, viz: 8 ft., 10 ft. and 11 ft. 3 in. high. The first, or stationary chute section, is hung with the discharge point 14 ft. above the top of the rail for topping 11-ft. 3-in. cars. The second and third sections are hinged and hung so the discharge ends will be 10 ft. and 12 ft. high, respectively, above the top of the rail, for topping 8-ft. and 10-ft. cars. Hand winches are used for operating the hinged chutes.

Bone Conveyors, Crushers and Elevator

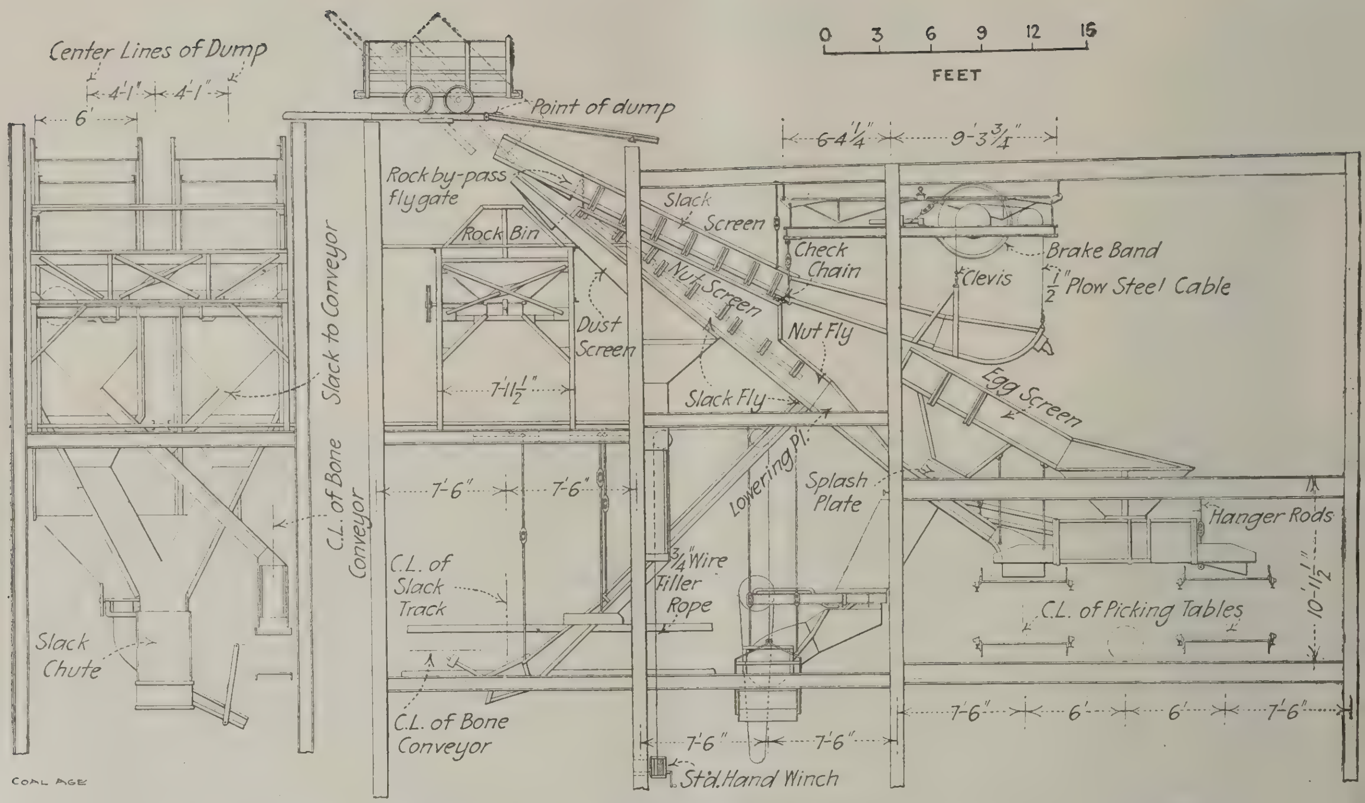
These conveyors are of the apron type and consist of two strands of 9-in. pitch steel thimble-roller chain, to which is attached double-beaded pans 2 ft. long with moving sides 4 in. high. The conveyor between the picking tables is driven from the picking-table countershaft through one steel thimble roller-chain transmission and the other is driven from the crusher countershaft through one belt and one machine-molded spur-gear transmission. The speed is 40 ft. per min. and capacity 35 tons per hour.



Weigh Baskets, Feeder Hopper, Picking Tables and Bone Conveyor. Note the Excellent Light on the Tables

The crusher is of the belted, toothed roll type, of extraheavy design, having rolls 24 in. in diameter by 24 in. long. The rolls are mounted on 3½-in. shafts supported by a cast-iron frame and provided with steel-plate housing. The drive is from a 15-hp. motor by belt to the crusher countershaft, which is mounted on the crusher frame and extended for outboard bearing. One roll is driven from the countershaft by one cut-steel spur-gear transmission and the other by belt transmission, equipped with the counterweighted idler pulley. The belt-driven roll is adjustable and equipped with safety springs to protect the rolls in case injurious foreign material is passed to them.

The elevator is of the perfect discharge type and about 40 ft. center to center of sprockets. It is composed of two strands of 9-in. pitch steel thimble-roller chain, to which are attached 9x12x20-in. buckets every 18-in. cen-



Longitudinal and End Elevation of Tipple with Details of Screens and Chutes

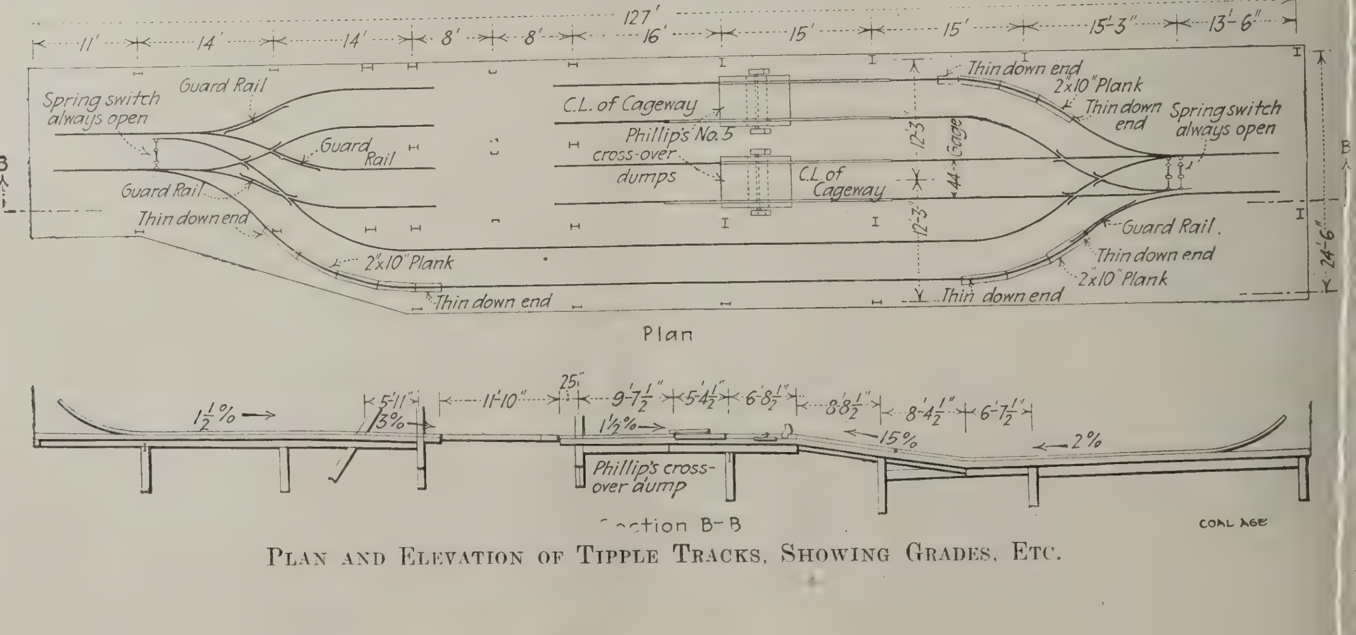
ters. The chain is a duplicate of bone-conveyor chains. The buckets are made of No. 10-gage steel and the digging lips reinforced by $1\frac{1}{2}$x$\frac{3}{8}$-in. wearing bars. The elevator is provided with a steel boot, casing, hood and steel discharge plates to insure perfect discharge. The elevator is driven from the car-haul countershaft through one machine-molded bevel gear, and one steel thimble roller-chain transmission. The speed is 60 ft. per min. and the capacity 40 tons per hour.

The Boiler-House Car has a capacity of 3½ tons of crushed coal. The hopper portion is built of ¼-in. steel plate, thoroughly stiffened and braced, and supported by a rigid channel-iron frame mounted on four 16-in. heavy cast-iron traction wheels, having chilled treads and 3-in. cold-rolled steel axles. The car is traversed by a General Electric mill-type series-wound motor, having a continuous rating of 3½ hp., through two sets of cut spur gears to the front axle of the car. The motor is controlled by an R-53 reversing controller placed in the operator's cab. Car is provided with a gate and structural-steel chute for passing the coal to the stoker hoppers. The chute is arranged so it can be readily drawn back out of the way when the car is traveling between the boiler house and storage bin.

Miscellaneous Details

Chain Drives—All drive chains for this installation are the steel thimble roller, of one size. Each drive chain is equipped with an idler sprocket to keep the loose side of the chain tight. Special care was taken to have as few sizes of sprockets as possible.

Shafts—All shafting is cold-rolled steel supported in



Plan and Elevation of Tipple Tracks, Showing Grades, Etc.

extra-heavy bearings equipped with compression grease cups. No size less than 2½-in. was used, except in gates.

Belts—All drive belts are of the best 5-ply rubber and made continuous for easy running.

Gears are either cut or machine-molded. Gears having a peripheral speed of 200 ft. per min. or over are cut. Pinions having a peripheral speed of 200 ft. or over are forged-steel; all others are cast-steel, machine-molded.

Motors are duplicates, of the General Electric Co. make, type CVC, and wound for 250 volts direct current. The size and units they drive are as follows:

One 15-hp. drives crusher and bone conveyor.
One 15-hp. drives picking-table machinery.
One 15-hp. drives car haul and bone elevator.

The computed horsepower necessary to drive the total equipment is 35.

Steel Work—The columns and batter braces for main headframe and the tipple columns, from foundations to tipple floor, are 10-in. H-sections. The picking-house columns are 10-in. I-beams. The tipple columns above the tipple floor are two 4x3x$\frac{5}{16}$-in. angles placed back to back. The air-hoist columns and batter braces are 8-in. H-sections. The boiler-house car-trestle columns are angle- and plate-supporting I-beam stringers, which themselves support 40-lb. rails for carrying the boiler-house car.

All steel is openhearth, conforming to the Manufacturer's Standard Specifications. All supports and struts are of beam construction. No latticed work was used. The steel framework for the tipple, boiler-house car, trestle and air-hoist headframe was sublet to the Pittsburgh Bridge & Iron Works, of Rochester, Penn., who fabricated and erected same from plans furnished by the Pittsburgh Coal Washer Co.

All roofing and siding is No. 22 corrugated protected asbestos metal. The roofs are laid with 1½ corrugation side lap and 4-in. end lap. Sides have one corrugation side lap and 4-in. end lap. Flashing in No. 24-gage and placed above all windows and doors where they are exposed to the weather.

Stair stringers are built of 8-in. channel irons with angle-iron clips for supporting the treads, which are 2-in. oak planks and bolted to clips on the stringers. All stairways are provided with neat 1¼-in. gas pipe hand rails.

The main tipple floor is 3-in. oak, all other floors, walkways and platforms being 2-in. oak. They are securely spiked to nailing strips bolted to the floor members. All platforms and walkways, where necessary, are protected by a 1¼-in. gas-pipe hand railing.

The main tipple windows are 12 lights, 10x12. The picking-house windows are 24 lights, 10x12. Standard doors are 3x7 ft. Window frames are white-pine mill frames and window sash, white pine. Doors and door frames are of the same material.

⁂

Coal in Turkey

Although Turkey produces about 1,000,000 tons of coal and possesses rare unexploited deposits ranging from lignite to anthracite, it imports annually coal to the amount of some $1,500,000, says the Daily Consular and Trade Reports. Most of this coal comes from Great Britain. Of late, certain railroads in Turkey have adopted liquid fuel. There is, nevertheless, an opening afforded in Turkey for American coal, both soft and hard. Negotiations are now being conducted between New York brokers and large commission houses in Constantinople that appear to promise the early introduction into Turkey of American coal as successfully as into Alexandria, Trieste and Genoa.

⁂

Illinois' Loss from Biennial Shutdowns

The coal miners of Illinois, according to E. W. Parker, of the U. S. Geological Survey, are probably better organized than those of any other bituminous coal-mining state. The result has been the establishment throughout the coal-mining regions of the 8-hr. day, but the habitual bi-yearly shutdown has naturally resulted in long periods of idleness and loss of income, both to operators and employees.

In 1906, practically all the important mines were shut down, and 49,792 men out of a total of 61,988, were idle for an average of 58 days each. This was equivalent to an average of 48 days of idleness for each of the 61,988 employees, or to 25 per cent. of the total time made.

In 1908, the suspension was not so long nor quite as many men affected, 47,456 out of a total of 68,035 being idle for an average of 37 days, equivalent to an idleness of 26 days for each of the 68,035 employees, or 14 per cent. of the total number of days worked by each man during the year.

In 1910, out of a total of 72,645 men, 67,218 were idle for an average of 136 days, and the total time off was equivalent to 9,133,953 working days. The total time made for the 72,645 men was 11,612,966 days, or an average of 160 days each. Thus, the idle time in 1910 was nearly 80 per cent, of the working time made.

The total number of men employed in 1912 was 78,098, who worked an average of 194 days. Idleness due to strikes or dissensions affected a total of 60,505 men, who lost an average of 33 days. The aggregate idle time due to labor troubles was thus 13 per cent. of the total time worked.

⁂

West Virginia Mines Are Flourishing

The last monthly statement of coal shipments over the Norfolk & Western Ry., tells an interesting story concerning the coal mines of West Virginia. For the seven months ending July 31, the total amount of coal and coke shipped was 14,526,695 net tons, as compared with 13,905,052 tons for the corresponding period of last year, or an increase of 4.47 per cent.

The shipments for July aggregated 2,254,601 tons, as compared with 2,096,477 tons for the corresponding month of 1912, which was an increase of 158,124 tons or 7½ per cent. This shows that the increase is growing from month to month. The highest percentage of gain was in coal shipped to Tidewater for export, which increased 33 per cent. in July over the corresponding month of last year, or from 116,339 tons to 155,762 tons.

The coal for export for the first seven months of the year aggregated 1,032,082 tons, an increase of 81,189 tons. Coal shipped to interior points in the seven months increased from 9,994,907 tons in 1912, to 10,318,605 tons in 1913. Representative operators affirm that they could have made a still better showing but for the scarcity of labor.

The Coal Production of Texas

According to the figures of the U. S. Geological Survey the production in coal in Texas in 1912 passed the 2,000,000-ton mark, with a value at the mines of $3,655,744. This is the record production of the state.

The coals of Texas occur in three geological systems, the carboniferous, the cretaceous and the tertiary. The carboniferous coals are bituminous in character, and are found in the north-central part of the state in an area covering approximately 11,000 square miles. The productive portion is confined to the central part of the field. The principal mining operations are in Eastland, Palo Pinto, Erath, Wise and Young Counties.

The cretaceous coals are in the southern part of the state and are mined near Eagle Pass in Maverick County. These are also classed as bituminous coals. Lignite beds of tertiary age extend entirely across the state from the eastern boundary at the Sabine River in a southwesterly direction to the Rio Grande. In the southwestern extremity near Laredo in Webb County the lignite merges into a coal of higher grade, and the production in this region is classed as bituminous.

The development of the lignite resources of Texas began in the last decade of the last century, and the advent of the gas producer in which lignite is found to serve excellently is giving a further impetus to production. The output of this quality of fuel in 1912 reached nearly 1,000,000 tons.

The number of men employed in the coal and lignite mines of Texas in 1912 was 5127, who worked an average of 230 days against 5353 men for an average of 226 days in 1911. The general average production per man was 427 tons for the year and 1.86 tons per day in 1912 against 369 tons and 1.63 tons respectfully in 1911.

There were only two fatal accidents at the coal or lignite mines of Texas last year.

⁂

Coal Production in Kansas

The coal production of Kansas in 1912, according to E. W. Parker of the U. S. Geological Survey, working in coöperation with the Geological Survey of Kansas, increased from 6,178,728 short tons valued at $9,472,572 in 1911, to 6,986,182 tons valued at $11,324,130, the gain amounting to 13 per cent. in quantity and 19½ per cent. in value.

The increased production in Kansas, as in the other southwestern states in 1912, may be attributed to the diminished supply of fuel oil and natural gas from the mid-continent field. These fuels, especially oil, have been virtually removed from the steam trade, and steam users have returned to coal.

In 1912, a total of 11,646 men, who worked an average of 202 days, were employed in the coal mines of Kansas, against 11,357 men for an average of 190 days in 1911.

The fatality record in Kansas exhibits the same improvement in 1912 that was evident in most of the coal-mining fields. The number of fatal accidents decreased from 42 to 28, a diminution of exactly one-third.

The coal-productive area of Kansas lies entirely in the eastern part of the state. The coal measures underlie approximately 20,000 square miles, of which about three-fourths may be considered as probably productive. Over 90 per cent. of the total production of the Kansas mines is derived from Cherokee and Crawford Counties. The principal coal bed in the district, the Cherokee, varies from 3 to 10 ft. in thickness, although the average is only about 3½ ft. The coal is bituminous, of good quality, and roof and floor conditions are excellent.

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The Mine Pump

By Berton Braley

(Written expressly for "Coal Age.")

I chug and chug the whole day through
  As faithful as I "oughter,"
I always have my work to do
  To clear the mine of water.

The mine cars rattle to and fro
  In noisest endeavor,
But mine cars come and mine cars go
  While I go on forever.

By day and night, by night and day
  My valves have throbbed and thudded,
And I must keep right on that way
  Lest all the mine be flooded.

The cage may sometimes quit the job
  And men can use the ladder,
But if for long I ceased to throb
  Few breakdowns could be sadder.

But I am here to stop the flow
  With strength that wearies never,
And while the cages come and go,
  Still I go on forever.

The miners dig the buried coal
  Whatever depth it lurk in,
But I must see the "deep black hole"
  Is dry enough to work in.

For if they had to swim I know
  'Twould bother their endeavor—
So miners come and miners go
  But I go on forever.

I am not "fair to outward view"
  I never was a beauty,
My lines of loveliness are few,
  I'm built for heavy duty.

I know my humble job, and so
  I make my best endeavor,
For men and mules may come and go,
  But I go on forever.

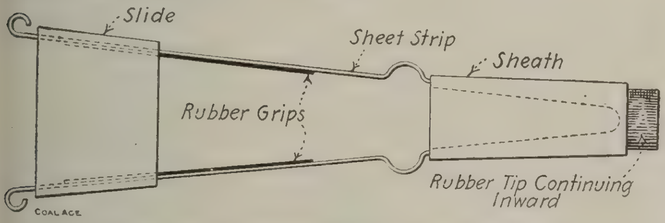
New methods supplement the old,
  New tools and new inventions,
New men the reins of power hold,
  The mine has new dimensions.

I note how wise the bosses grow
  How uptodate and clever,
But men and methods come and go
  While I go on forever.

A Pick-Point Protector

Attention has recently been directed in South Wales to a pick-point protector invented by Samuel Griffiths and Edward Thomas, which, although of very simple construction, should have considerable value in preventing the numerous accidents to life and limb arising from the careless handling, carrying and using of the miner's pick.

The apparatus, as shown in the sketch, is made of sheet tin with a rubber lining on the inside so arranged that the rubber grips the part of the pick adjacent to the point. The sliding sleeve is fitted on the two arms in such a way that when this is pushed toward the pick shank it causes the arms to grip the surface of the pick, holding the protector securely in place. To the arms is fitted a head containing a solid piece of rubber against which the pick point is placed.



How the Protector Is Constructed

In order to adjust the protector to the pick, the slide is drawn back, the pick point placed between the two arms touching or almost touching the head of rubber inside the case. The slide is then pushed up and tightened on the pick. Although this device is simple in adjustment, it is claimed that it will not slip when in use, its tendency being to tighten and not to slip. The protector weighs about one ounce and can easily be carried in the vest pocket.

⁂

Shooting off Solid in Illinois

Of the production of 59,885,226 short tons of coal in Illinois in 1912, 26,878,049 tons, or 44.9 per cent., was mined by machine; 7,675,805 tons, or 12.8 per cent., was pick mined, and 24,136,940 tons, or 40.3 per cent., was shot off the solid, according to E. W. Parker of the U. S. Geological Survey. In 1911, 45.6 per cent. of the total Illinois product was machine mined, and 40.3 per cent. was shot off the solid.

These figures show that a comparatively small proportion of Illinois coal is hand mined, and a relatively large amount is "powder mined." This is discreditable and inexcusable.

In this respect, Illinois stands in unfavorable comparison with West Virginia, where less than 1 per cent. of the production in 1912 was shot off the solid. The larger proportion of machine-mined tonnage in 1912 is gratifying, and bears out a prediction that the Illinois coal operators were determined to reduce as much as possible the pernicious practice of making the powder do the work.

The flat-lying character of the Illinois beds is favorable to machine mining, and there appears to be no good reason for permitting solid shooting to continue. The number of mining machines in use increased from 1402 in 1911 to 1654 in 1912.

New Developments in Anthracite Field

The Delaware & Hudson Co. is spending $300,000 on a new breaker at Archbold, the Susquehanna Coal Co. is sinking a shaft at Lykens, the Delaware, Lackawanna & Western Railroad Co. is expending a large sum on the new Loomis colliery, and the Lehigh Valley Coal Co. has appropriated $200,000 to build a new fireproof steel and concrete breaker at Franklin, abandoning the old breaker located there.

In addition to this the Lehigh Valley Coal Co. is spending approximately $200,000 on the thorough fireproofing of its buildings inside and outside the mines, and the Lehigh & Wilkes-Barre Coal Co. is remodeling the Inman breaker at the Buttonwood colliery of the Parrish Coal Co., taken over last February.

The necessity for all this expensive activity is due to the fact that machinery which met all requirements a few years ago is now out-of-date, and has to be supplanted by machinery which is more intricate and costly. There has been a steady increase for several years in the demand for "prepared" sizes of anthracite, and this tendency has brought about a corresponding increase in the cost of handling the coal.

This, however, is not the only factor which has compelled the dismantling of old breakers. Anthracite mining today is carried on in much poorer veins, and at greater depth, than in days past. The richer veins and those nearer the surface have been rapidly exhausted, and the companies are forced to mine coal which once would have been left untouched.

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The Coals of Washington

The coals of Washington, while limited to a few scattered areas, chiefly along the eastern border of Puget Sound, range from anthracite to lignite in character. Lignites are found in the southwestern part of the state, in Cowlitz and Lewis Counties. In Lewis County, as the measures approach the mountains, the lignites grade upward into sub-bituminous and bituminous coal.

The areas along Puget Sound contain sub-bituminous and bituminous coal, some of the latter possessing fair coking qualities, and in the northwestern part of the state, on the slopes of Mt. Baker in Whatcom County, anthracite has been reported.

The coking coals of Washington are the only ones of that grade on the Pacific Coast. They are found in the Wilkeson-Carbonado district in Pierce County; in the North Puget Sound field in Skagit and Whatcom Counties, and in the northern part of the Roslyn field in Kittitas County, but at present coke is made only from the Wilkeson-Carbonado coal.

The production of coal in Washington reached its maximum in 1910, when according to the figures of E. W. Parker, of the U. S. Geological Survey, compiled in coöperation with the Washington State Geological Survey, the output amounted to 3,911,899 short tons. In 1912, the output was 3,360,932 tons. The value fell off from $8,174,170 to $8,042,871.

Reports to the United States Bureau of Mines show that the fatalities in the coal mines of Washington in 1912 were fewer by one-half than in 1911, the total number of men killed in 1912 being 14 against 27 the preceding year.

Coal Shipping on the Great Lakes

SPECIAL CORRESPONDENCE

SYNOPSIS—This installment of the Lake article gives an uptodate estimate of the capacity of the coal docks at the Twin Ports. There are also detail descriptions of two of the largest and mose important installations.

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In a recent issue of the *Coal Trade Journal*, we find the following interesting remarks concerning the capacity of the principal dock companies:

THE SUPERIOR-DULUTH DOCKS

According to the latest available figures on dock capacities at the Twin Ports, which are as reasonably accurate as it is possible to make them, the docks at the head of the Lakes, including improvements now under construction, can store ten and a half million tons of bituminous and over a million and a half tons of anthracite, a total of over twelve million tons of fuel. The docks are equipped to handle, on the average, 50 per cent. more than this amount, and with the improved machinery now being installed by several of the more progressive mining companies, it is probable that twenty million tons of coal could be handled each season.

GENERAL VIEW OF THE CLARKSON COAL & DOCK CO.'S UNLOADING TANDEM

During the past year substantial additions to the total storage capacity of the Twin Ports docks have been made by the Berwind Fuel Co., which now is completing a million-ton dock; the North Western Fuel Co., whose dock No. 1 at Superior is being made into a model structure of its kind; the Pittsburgh Coal Co., which is making better and bigger docks of No. 5 at Superior and No. 7 at Duluth; the Carnegie Fuel Co., which has built a mammoth new dock at Duluth; the Island Creek Coal Dock Co., which is building a million-ton dock at Duluth, and several others which have made minor improvements and additions.

According to estimates made by the various dock superintendents, 200,000 tons of coal could be unloaded at Superior and Duluth daily under maximum working conditions and about half that amount could be loaded onto cars and shipped out. Records of this kind are difficult to compile, however.

For several years the storage capacity of the docks at the Twin Ports has increased at the average rate of a million tons per year and the end is not yet in sight. It is probable that next year several of the dock companies here will make improvements to property on which docks are now located and new structures also are rumored to be under consideration. Men high in the trade here look to see, perhaps shortly after the completion of the new steel plant here in 1915, a storage capacity of 20,000,000 tons of coal at the Head of the Lakes.

STORAGE, RECEIVING, SHIPPING

In the tables accompanying this article the Pittsburgh dock No. 7, at Duluth, includes No. 1, and the new dock, recently completed. Pittsburgh dock No. 2 is leased by the Clarkson Co. The Boston Coal Dock & Wharf Co. dock is given under the name of St. Paul & Western, which now operates the dock. At Superior the Reiss Coal Co. has under lease Pittsburgh docks Nos. 3 and 4, and the Island Creek Coal Co. is operating what was known as Dock No. 6. The old P. & R., or Great Northern dock, is at present occupied by the Great Lakes Co.

The capacity figures follow:

Superior

	Storage Capacity		Handling Capacity per day	
	Antnracite	Bituminous	Rec'pts	Shipm'ts
Pittsburgh Coal Co. No. 5	250,000	750,000	15,000	8,000
Berwind Fuel Co., No. 1	......	800,000	10,000	6,000
Carnegie Fuel Co., No. 1	......	750,000	10,000	4,000
North West. Fuel Co. No. 1	300,000	700,000	20,000	14,000
North West. Fuel Co. No. 2	......	550,000	9,000	7,000
North West. Fuel Co. No. 3	44,000	64,000	4,000	3,000
Northern Coal & Dock Co.	75,000	125,000	6,000	5,000
M. A. Hanna Dock Co.	60,000	500,000	6,000	4,500
P. & R. C. & I. Co.	200,000	250,000	10,000	5,000
Lehigh Valley Coal Co.	150,000	......	5,000	2,500
Island Creek Coal Dock Co.	35,000	100,000	3,500	3,000
St. Paul & Western	40,000	200,000	5,000	4,000
Reiss Coal Co. No. 3	30,000	125,000	4,000	3,000
Reiss Coal Co. No. 4	......	150,000	3,600	2,000
Great Lakes Coal Dock Co.	75,000	275,000	5,000	3,000
Total	1,259,000	5,339,000	116,000	94,000

Duluth

	Antnracite	Bituminous	Rec'pts	Shipm'ts
Pittsburgh Coal Co. No. 7	100,000	900,000	15,000	8,000
Berwind (under cons.)	......	900,000	10,000	6,000
St. P. & Western (Boston)	40,000	315,000	4,000	3,000
Is. Cr. No. 1 (under cons.)	......	900,000	10,000	6,000
Carnegie Fuel Co. No. 2	250,000	900,000	10,000	6,000
N. W. Fuel Co.	25,000	35,000	3,500	1,500
Clarkson Coal & Dock Co.	25,000	250,000	5,000	3,000
Zenith Furnace Co.	......	600,000	4,500	3,500
Duluth M. & N. R.R.	......	300,000	4,000	3,000
Cutler & Co.	......	20,000	2,000	1,000
Total	440,000	5,120,000	68,000	41,000

Twin Ports Totals

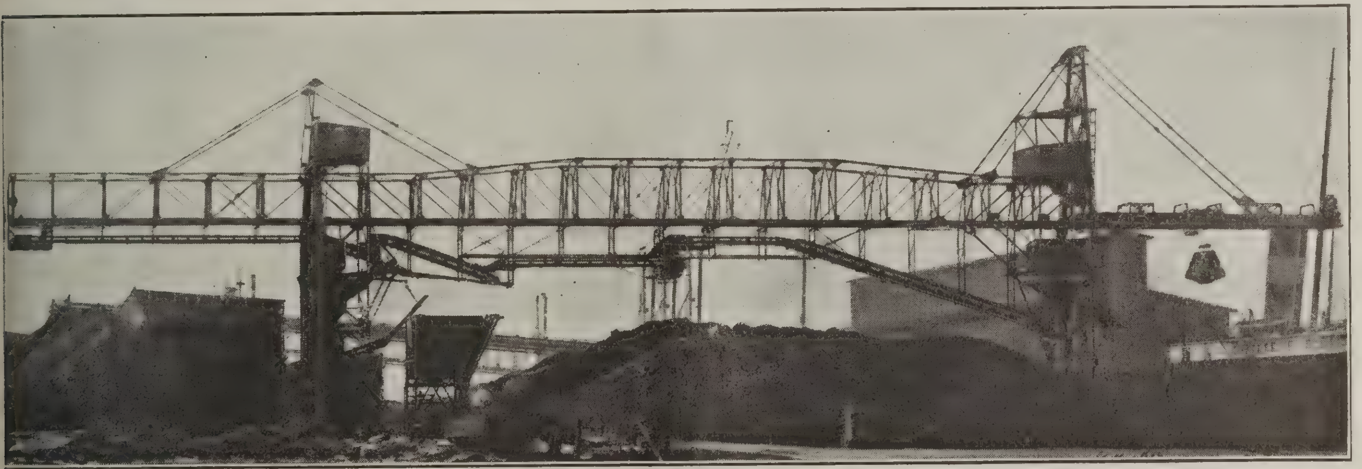
Superior, hard	1,259,000	Superior, soft	5,339,000
Duluth, hard	440,000	Duluth, soft	5,120,000
Total hard	1,699,000	Total soft	10,459,000
Grand total			12,158,000

THE CLARKSON COAL & DOCK CO.'S PLANT*

In the early spring of 1912, the Clarkson Coal & Dock Co., of Duluth, realized the necessity for having a more modern coal-handling equipment on their dock in order to take care of their large increase in business. They, therefore, contracted with the Roberts & Schaefer Co. for two bridges of the Watson patent.

The Clarkson dock is approximately 600 ft. wide and 1000 ft. long. It, therefore, became necessary to work the two bridges tandem in order to cover this space. To unload vessels rapidly while depositing coal on the back part of the dock, it was also deemed advisable to use belt conveyors rather than attempt to run the unloading bucket to the back dock. The two bridges were built with identically the same equipment and with the same span, so that the front dock, if later extended in length, could be equipped with the bridge which is now used on the back dock, by merely swinging the bridge on a curved track around to the front dock; it does this under its own power.

Each bridge is equipped with a four-yard Andresen-Evans bucket, operated by means of two 60-hp. Westinghouse mill-type motors. The motors operating the bucket, instead of being carried on the carriage according to the usual method, are on stationary platforms in the towers of the bridges. These motors are geared direct to large cast-steel drums by means of Falk Herringbone gears, which eliminates the noise that usually accompanies the operation of such a high-speed machine.



BRIDGES, AT DULUTH, MINN., CONSTRUCTED BY THE ROBERTS & SCHAEFER CO.

DRIVING ARRANGEMENT, SCREENING PLANT, ETC.

A single ¾-in. cable leads from the drums to the carriage on the bridge. There are two drums on the carriage, one having two sections and the other three sections. The cable from the hoisting drums is attached to one section of each drum on the carriage, while the bucket having three lines is attached to the other three sections of the drums. The holding-line drum on the carriage is equipped with a magnetic brake, and the closing-line drum with a magnetic clutch. The brake is for the purpose of holding the bucket open while the clutch enables the operator to lower his bucket in the open position, both drums revolving together when the clutch is set.

When the coal is being stored on the dock, the bucket on No. 1, or the front dock bridge, runs only from the hatch in the vessel to a hopper in the front leg of the bridge. The coal is then fed from the hopper to a belt conveyor, which deposits it on either the front or back dock, as desired. This is accomplished by means of several fixed trippers and also by means of two shuttle belts, which operate back and forth underneath the fixed belts.

Each bridge is equipped with a complete screening outfit, and coal may be loaded direct from the vessel through the screening equipment of either bridge into cars, or may be reclaimed from the stock pile and loaded out through the screening plants. Each screening plant delivers coal to two tracks, so that cars may be loaded out on four tracks at the same time.

A portable box-car loader is installed in each bridge. These are pivoted to the bridges and swing parallel to, and within the clearance lines, of the bridges, so that they do not act as an obstruction when the bridges are traveling on the dock.

Each bridge has an unloading and screening capacity of 300 tons of coal per hour. The equipment on the Clarkson dock is considered to be one of the most efficient at the head of the lakes.

THE PITTSBURGH COAL, DOCK & WHARF CO.'S ALLOUEZ NO. 5 DOCK

The Pittsburgh Coal, Dock & Wharf Co. is equipping one-half of its Allouez No. 5 dock, at Superior, Wis., to be one of the largest coal-dock properties in the world, if not the largest. The half of the dock, now being equipped, will have a storage capacity of about 800,000 tons of bituminous coal and 200,000 tons of anthracite. The entire dock, when completed, will have a total capacity of two million tons. The plant is being carefully laid out with railroad tracks and proper machinery so that large shipments can be easily and rapidly made.

The dock is being equipped with two Brownhoist 5½-ton man trolley bridge tramways, which are being manufactured and erected by the Brown Hoisting Machinery Co., of Cleveland, Ohio.

These two bridges will be identical in size and construction, except that one will have a more elaborate screening apparatus than the other. Each bridge will be supported by a shearleg of A-frame construction, at the front or water end, and a pier at the back end. The bridge will have a span of 342 ft. center to center of the

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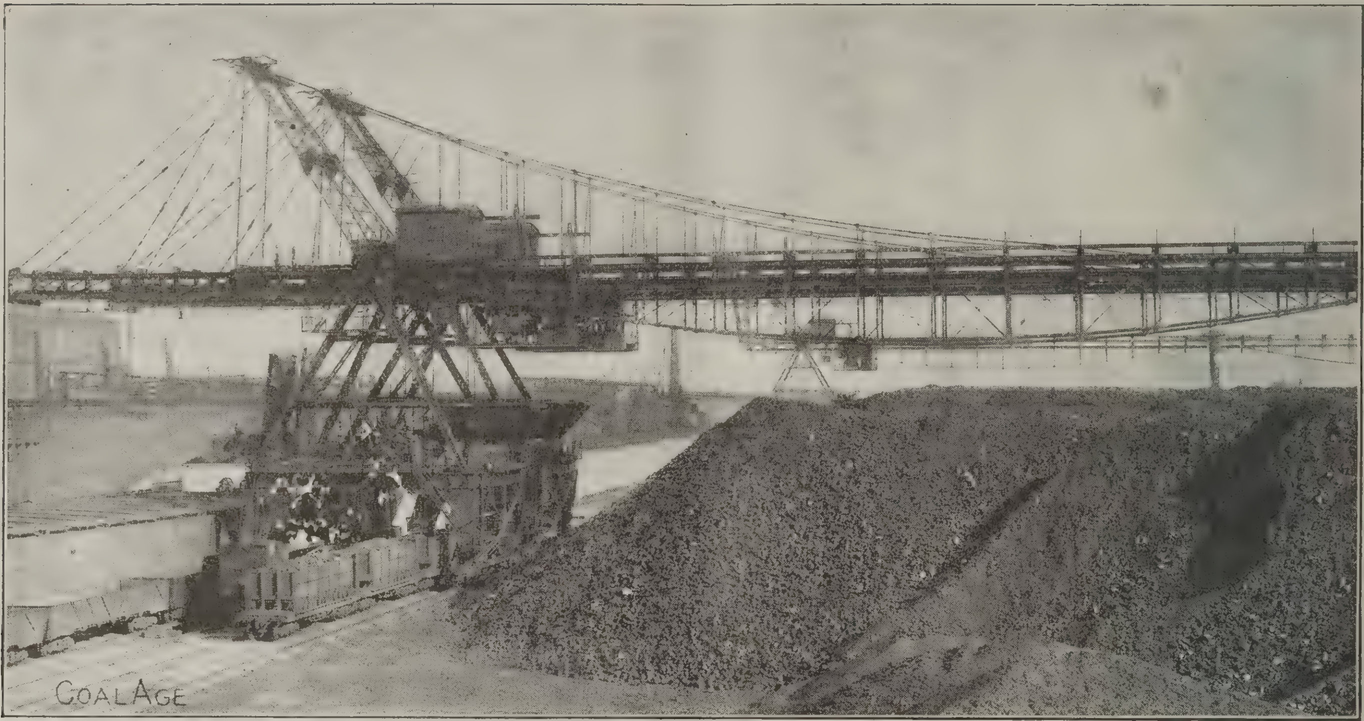
*By E. E. Barrett, chief engineer, Roberts & Schaefer Co., Chicago, Ill.



UNLOADING DIRECT FROM VESSEL TO RAILROAD CARS ON THE PITTSBURGH COAL CO.'S DOCK NO. 7, AT DULUTH

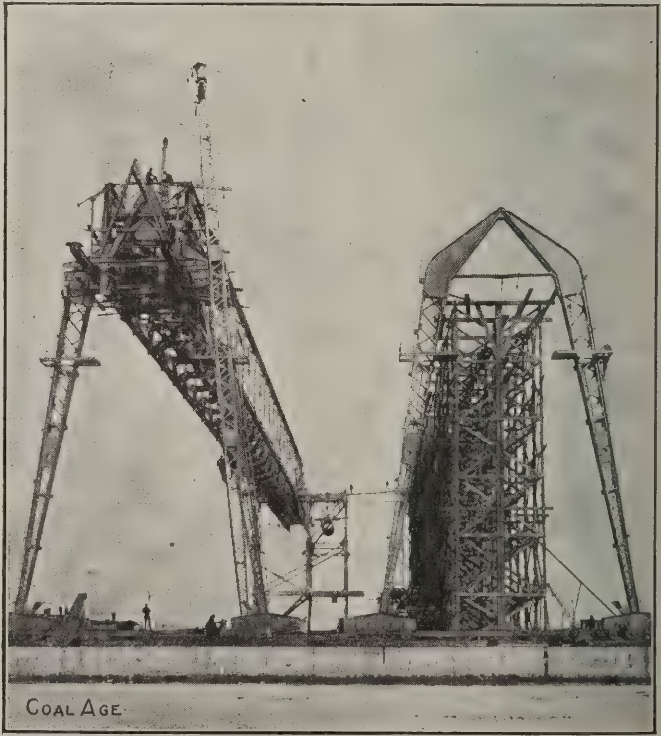
shearleg and the pier. There will be a cantilever at the pier end, 125 ft. 6 in. long, which will span the three railroad tracks and the screening pile. There will also be a cantilever at the water end 117 ft. 9 in. long, which will span three railroad tracks and extend over the water; at the end of this latter will be a hinged apron, which can be raised or lowered to allow the boats to dock. The shearleg and the pier are supported on equalizing trucks with flanged wheels, which travel along the dock on rails. The entire bridge is propelled by a motor, through suitable gearing and shafting.

The bridge, including the cantilevers and the hinged apron, is fitted with tracks on which a man trolley travels back and forth. The trolley is fitted with a cage, in which the operator rides and in which are placed all the switches and controllers for operating the entire bridge. There is suspended from the trolley a Brownhoist coal-grab bucket, of 5½-ton capacity. This bucket has a spread of 17 ft. 8 in., when opened, and is 6½ ft. wide. The bucket is suspended from a turntable on the trolley, thus enabling the operator to turn it through 90 deg., when desired. The operator on the trolley controls the operation of the bucket, the trolley, and also the bridge travel along the dock. The trolley and the bucket are equipped with powerful hand or foot brakes controlled by the operator. The bridge traveling mechanism is supplied with a solenoid brake, which will always be set whenever there is no current passing through the motor.

Each shearleg is equipped with a 50-ton bin, into which the coal is placed by the bucket. Run-of-mine only is loaded into this bin and it is discharged from the bin into a scraper conveyor, which loads it into railroad cars. The shearleg is also fitted with a box-car loader and a car puller.

The pier of Bridge No. 1 is equipped with a 500-ton bin, which receives the coal from the bucket. It is then discharged from the bin onto a shaker screen, located beneath, and passes through a chute onto a pivoted scraper conveyor. This conveyor in turn discharges into the railroad cars. The coal passing through the shaker screen will be discharged into an elevator, which in turn will discharge it onto a belt conveyor, which carries it either to the cars or to the stockpile.

The screening plant located on the pier of Bridge No. 2, is similar to that which is used by the company on their dock No. 7, at Duluth. It consists of a 50-ton receiving bin into which the coal is dumped by the bucket. Below this bin there is a shaker screen, onto which the



TWO NEW BROWNHOIST TRAMWAYS AT THE ALLOUEZ NO. 5 DOCK OF THE P. C. D. & W. CO.

coal is fed from the receiving bin through a power-driven reciprocating gate, which insures a constant discharge.

The coal passing over this screen is discharged into a scraper conveyor, which carries it to the railroad cars; that passing through the shaker screen falls onto an elevator, which carries it up to a rotary screen, where it is sorted into three sizes, stove, nut and screenings. Directly beneath the rotary screen, there is a bin divided into three compartments, one for each grade. Each one of these pockets is provided with a gate, through which the coal flows onto a horizontal belt conveyor, which takes it to the cars or the stockpile. Each compartment is also provided with a second chute for discharging the coal into the small chute at the foot of the shaker screen, to be carried by the scraper conveyor to the cars.

Sometimes the coal is taken from the screening pile and rescreened, being picked up by the bucket and discharged into the receiving bin. This bin is provided with an auxiliary chute, which feeds the screenings into the elevator, where they are discharged into the rotary screen.

The piers on both bridges are also equipped with a boxcar loader and a car puller. The operation of the entire plant is as follows:

The coal is unloaded from the boat by the buckets operating on the bridges. Some is then loaded directly into cars, through the bin on the shearleg. If the coal is for storage, it is placed on the large stockpile to await shipment, and if it is to be screened it is carried to the screening plant and then loaded into cars or is put on the screening stockpile. The bridges will also be used for unloading the anthracite and storing it in the hard-coal storage shed. The two bridges and all screening apparatus are electrically operated.

(To be continued)

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Grecian Coal Importation

Whereas during 1911 the coal imported into Greece amounted to 639,822 tons says the Daily Consular and Trade Reports, only 476,695 tons were imported in 1912, showing a decrease of nearly 25 per cent. The causes of this decrease was the coal strike of the early summer n England, which country supplies the greater part of he coal consumed in Greece and the strike of the coal workers at Piræus, the port of discharge of most English coal. Another factor was the exclusion of Greek teamers from the Black Sea as a result of the Balkan War. The freight rate from Cardiff to Piræus has advanced from $1.52 to $3.16 per ton, which was the record rate during the Transvaal War.

The decrease in the importation of coal was not conned to Greece, but was general throughout the Balkans nd Asiatic Turkey, and is estimated during 1912 as follows: Greece, 163,000 tons; European Turkey, 99,000 ons; Asiatic Turkey, 8000 tons; Roumania, 29,000 tons; ulgaria, 54,000 tons; total, 353,000 tons.

The coal usually imported is Cardiff mixed with Newort for ordinary bunkering purposes with a few shipments of double screened. The coal used by the gas comanies is generally North Country, from Newcastle.

The railway companies imported about 10,000 tons of briquettes from Westphalian coal fields; altogether about 78,000 tons were imported from German coal fields. hese shipments included 8000 tons of coke and about 0,000 tons of anthracite. The general shortage of coal throughout the Levant will necessitate the placing of important orders as soon as peace is concluded, and the requirements of these markets will offer opportunity for American coal shippers.

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Mexican Rebels Dynamite a Million-Dollar Coal Operation

The Roberts & Schaefer Co., of Chicago, Ill., have received the following communication from one of their clients, a high official of a large coal corporation operating in Northern Mexico:

Compania Carbonifera Agujita y Anexas, S. A.
Agujita, Coah., via Sabinas.
Aug. 25, 1913.

Gentlemen:

We beg to advise you that on Aug. 16 our entire plant at Lampacitos was destroyed by the Carranza forces in making their retreat northward from Hermanos, where they were badly defeated by the Federals. The destruction was premeditated, and as soon as word from Hermanos came that the fight there had been lost, it was immediately started.

The Carranza soldiers used dynamite and gasoline, and within two hours they had created a loss of fully one million dollars. The washer was completely destroyed, as was the warehouse with $40,000 worth of supplies. In the power plant the 200-kw., 150-kw., 100-kw. and 30-kw. generating units were first blown to pieces with dynamite, and then the building was burned.

At the mines the tipples were burned, and the fans and fan houses—which were fireproof—were destroyed with dynamite. All of the electric and steam hoists were destroyed with dynamite, and the houses burned. A large number of employees' houses and miners' houses were also burned and the home of the writer was destroyed with all contents.

VIEW OF THE RETORT OVENS AT LAMPACITOS, MEX.

We have been unable to get down there to estimate the total loss, but from the information gained from the last people to leave the place, there seems little hope of finding much left. The mines will soon fill with water, which will also be a greater loss. Our plant at Agujita has been threatened with similar disaster unless we pay $50,000 for "protection." This we cannot do. They have already taken from there all of our supplies, furniture, etc., and we fear that the property may be destroyed at any moment.

We are writing you in full regarding this matter, with a view of requesting that you give the matter some publicity, if possible. From what we read in the papers, there seems to be considerable feeling in the United States toward extending recognition to the rebel faction, and we would like to have some such things brought out to show what manner of so called "warfare" these people are carrying on. The wanton destruction of a large property that gave a good living to thousands of people, cannot be construed to be of any military advantage or necessity, the Carranzistas having weakly claimed that they destroyed the place in order to prevent the Federals from getting the coal for operating their trains, etc.

The writer would suggest that his name be withheld from any prominence, as he is staying in Mexico at this time looking after the interests at Agujita.

Thanking you for anything that you can do toward this matter, we are,

Yours very truly,
Cia. Carbonifera Agujita y Anexas, S. A.

A Modern Distribution and Storing Plant

By Alfred Gradenwitz*

SYNOPSIS—An efficient electric system designed to accumulate coal coming from the separation plant and intended for local consumption. This plan of transportation not only connects the home sales station with the separation plant, but permits two boiler houses, unfavorably located, to be supplied with coal. The line comprises no less than 27 curves, and is automatic in practically every detail.

⁂

Collieries are dependent on a suitable storing plant to make up for any fluctuations in the actual requirements, and to be able to acumulate sufficient stocks for the home sales which are generally crowded into a few hours of the day. Apart from the coal extracted from the mines, that coming from the dressing floors and separation plants has to be stored in separate bunkers.

The electric telpher line of the Deutschland mine, at Schwientochlowitz, Germany, which was designed and constructed by Messrs. Adolf Bleichert & Co., of Leipzig, is intended for accumulating the coal coming from the separation plant, exclusively for home consumption. While it would have been practically impossible with any other mechanical transporting device, to provide for a connection between the separation plant and the home sales station (separated from the former by several buildings), the telpher line here described proved especially advantageous insofar as it allowed at the same time the two boiler houses situated most unfavorably in regard to the separation plant, to be fed with coal. What local difficulties had to be overcome, can be inferred from the fact that this telpher line comprises no less than 27 curves.

Overcoming the Difference in Elevation

The rails below the separation plant, on which the trucks are loaded, are situated about 35 ft. lower than those above the bunkers into which the coal is taken. This level difference has been overcome in a most simple way by a cable-operated inclined lift, according to the "Bleichert" patented design, which has also been used advantageously for the charging of blast furnaces.

The trucks are, at the beginning of the incline, without breaking their journey, uncoupled automatically from the traction cable kept in permanent motion, being raised by it to the upper end of the incline or conveyed downward as the case may be. At the end of the incline, they are again loosened automatically from the cable, continuing their course with electric operation. This arrangement is far more advantageous than a vertical elevator, insofar as it works with absolute safety, and requires no attendance or superintendence. At the same time, the trucks may follow up one another at intervals as short as possible, thus realizing without any difficulty the greatest outputs. In fact, telpher lines for outputs of up to 300 tons have been designed on this system for the charging of blast furnaces.

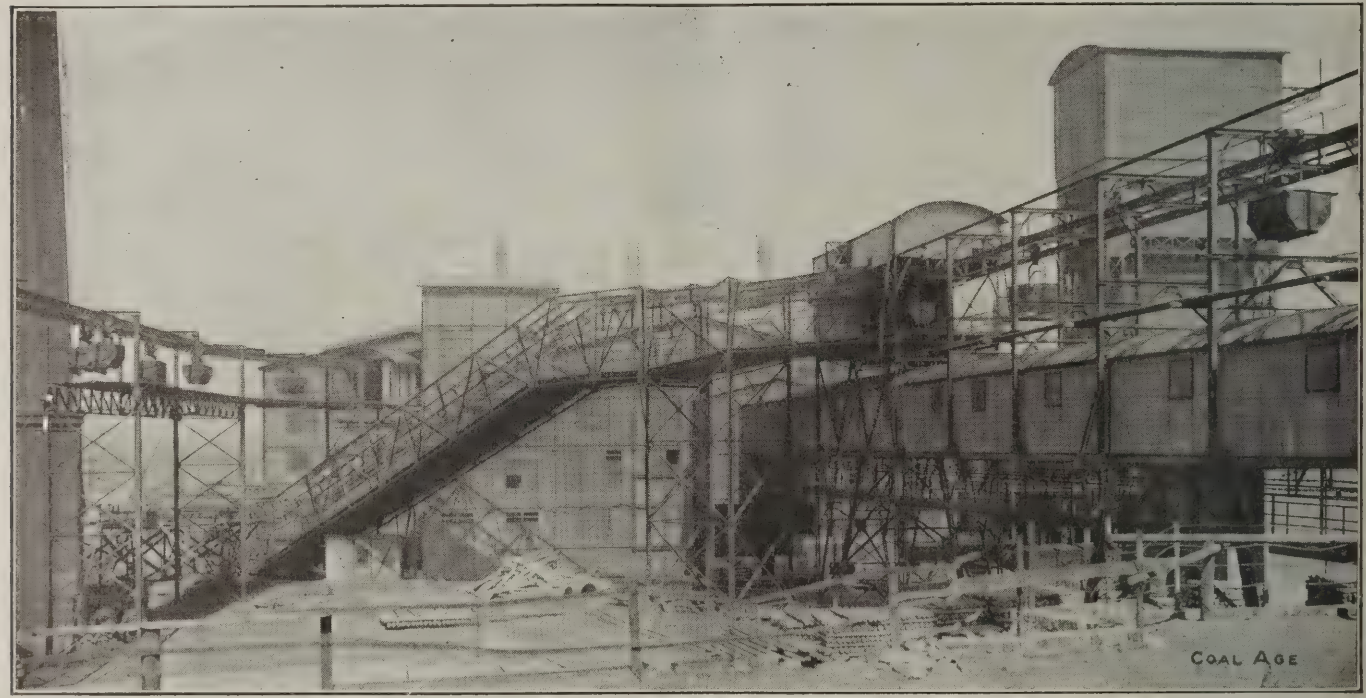

Fig. 1. General View of Electric Telpher Line

The distribution of coal to the various loading stations, the boiler-house bunkers and the various compartments of the unloading hopper, separately for each sort of coal, has been solved in a most satisfactory manner. Whereas in the earlier installations a man had to superintend the unloading, adjusting the stops intended to tip the trucks, Messrs. Bleicherts' adjusdting mechanism allows the operator already in the separation plant to fix the point at which the truck is to be tipped.

This is important because quite a number of different

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*Berlin-Friedenau, Gosslerstrasse 20, Germany.

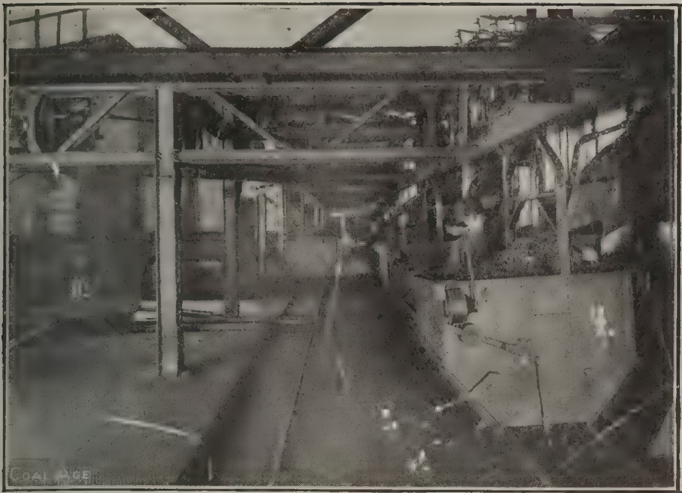

Fig. 2. Loading with Different Grades of Coal

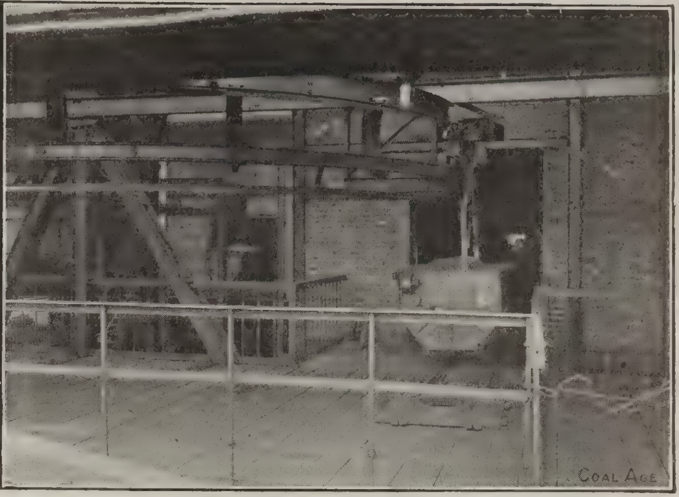

Fig. 3. Loaded Truck Leaving Separator Plant

sorts of coal have to be transported at a time, which would require a permanent adjusting at the loading station, giving rise to mistakes on account of the irregular sequence of trucks. In the Deutschland mine installation, such mistakes are practically precluded, the trucks being properly adjusted in advance.

Method of Operation

The operation of the telpher line may be described briefly as follows: The empty trucks entering the separation plant are kept back by the block system and arranged at given distances apart, in the event of the places in front of the loading chutes being taken up. After the starting of the loaded trucks, they move on automatically, stopping in front of the bunkers, where the operator, by opening a trap, loads the truck with the desired sort of coal (Fig. 2).

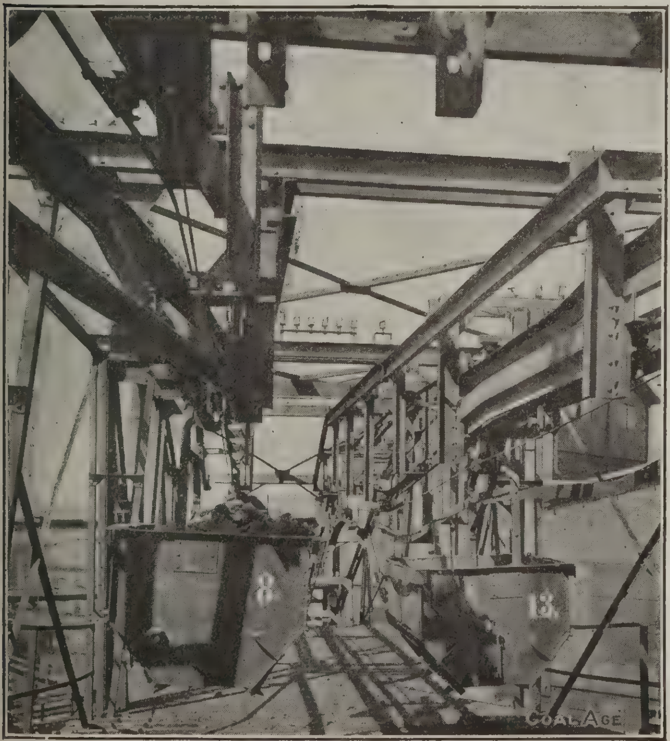

Fig. 4. Upper Section of Tramway

By operating a switch, he then starts the filled trucks, causing these to travel through the whole line, inclusive of the inclined lift and the unloading stations, at a speed automatically controlled, and at a distance apart corresponding to the block-system, tipping at the points adjusted for by the locking frame, without breaking their journey.

The issue from the separation plant, where the trucks deviate in a sharp curve toward the inclined lifts, is shown in Fig. 3, the inclined lift with part of the track traversing the court yard at 48 ft. height being visible in Fig. 1. In the left-hand part of the latter figure, there happens to be visible a section of the Bethlen-Falva Iron Works' telpher line, which is one of the oldest installations of the kind, having been in satisfactory operation since 1905, in spite of exacting working conditions. It may be said, in passing, that the Bethlen-Falva Iron Works in the meantime have had installed another electric telpher line on the same system for the conveying of hot ingots, for their fine-iron rolling mill.

Fig. 4 shows the upper part of the inclined lift with a filled truck just uncoupled, and an empty truck seizing the continually moving traction cable and being conveyed downward.

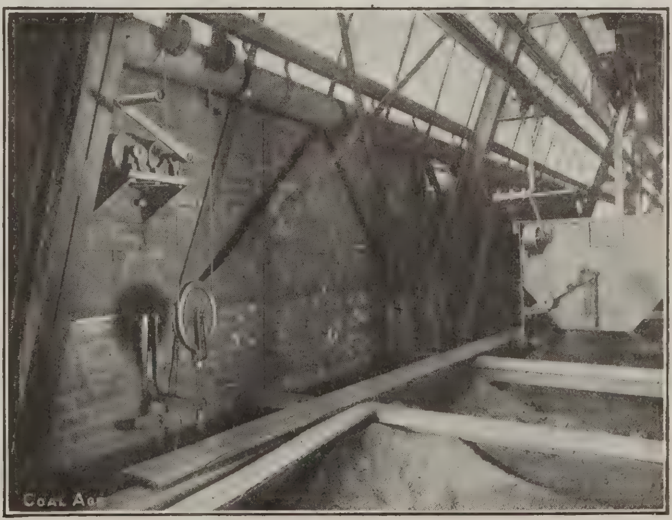

Fig. 5. Automatic Discharge at Boiler House

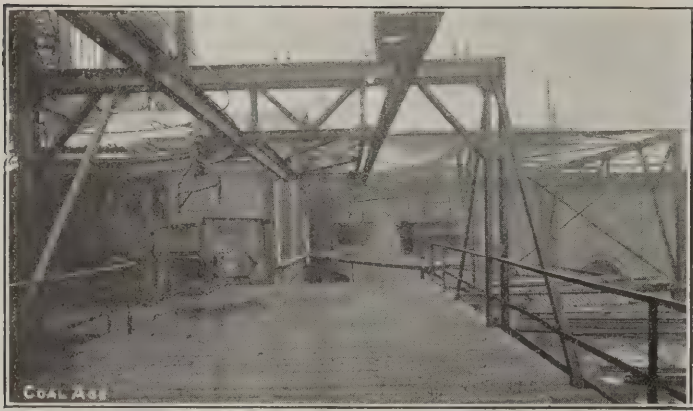

Fig. 6. Installation at Old Boiler House

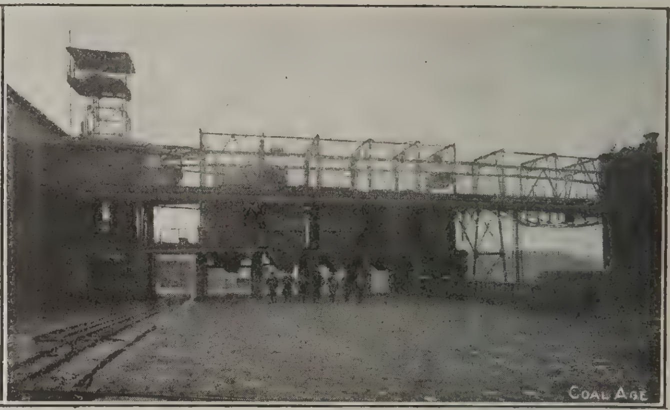

Fig. 7. Loading Hoppers for Home Sales

Course of Travel for Loaded Trucks

The trucks then travel through boiler house I, the home sales bunker and boiler-house II, the tipping, in accordance with the above plan of travel, being effected at predetermined points. In order that the stoker may be in a position accurately to adjust for the point of the boiler-house bunker where unloading is to take place, the stops in the boiler houses, as inferred from Fig. 5, have been made adjustable by means of the small hand-operated winch visible to the left in the foreground, from which an endless traction cable is seen to connect with the stop. A tightening pulley has been provided to keep the cable taut.

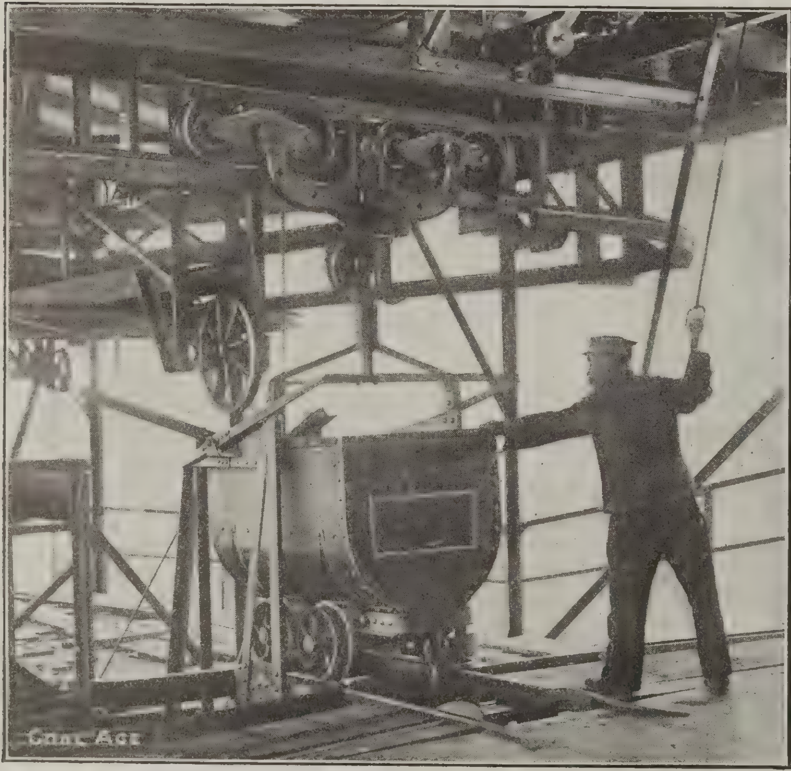

Fig. 8. Transfer Table for Mine Cars

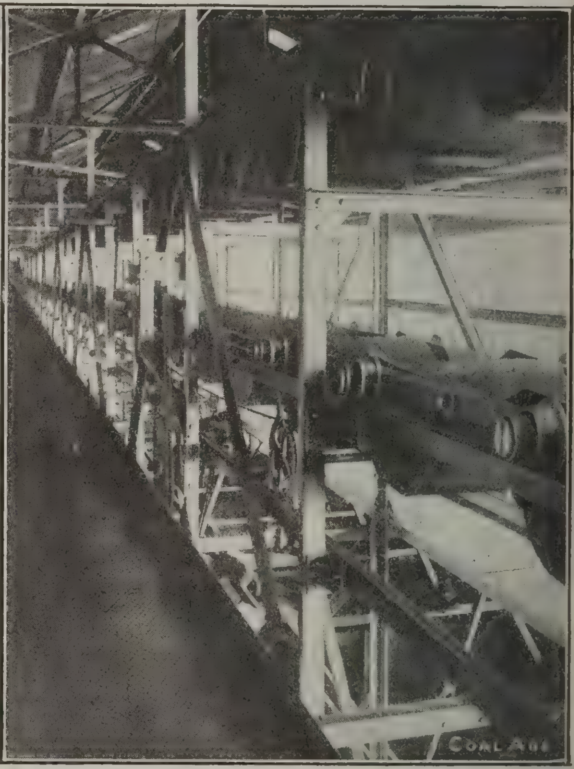

Fig. 9. Conveyor Line in Central Station

Fig. 6 shows the point in front of the old boiler house where several sections of the line are seen closely crowded together. Truck No. 2, coming from the new boiler house, is returning empty to the separation plant; truck 8 is entering the old boiler house filled, and truck 3 is just on its way to the home sales station, after passing the old boiler house. Fig. 7 is a front view of the loading hoppers for the home sales station, which are encompassed on one side by the pit building and the old boiler house, and on the other, by the new boiler house.

Fourteen trucks, each of 1764 lb. useful capacity, travel on the line, which arrangement permits the handling of 50 tons of coal per hour. The telpher line is about 2600 ft. in total length.

The Deutschland mine plant is a typical instance of the ease with which telpher lines on this system allow the most complicated problems to be solved in a simple and economical manner.

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Gas should not be allowed to explode in a safety lamp if it can possibly be avoided. When examining to detect gas the lamp should not be raised higher than will allow the gas to be detected. If the gauze of a safety lamp becomes damaged while in use or if oil is spilled on the same or the chimney becomes cracked, the light should be extinguished at once and the lamp taken back to the light station for examination and repairs.

The United States vs. the Reading Co.

By A. T. Shurick

SYNOPSIS—A review of the latest attack on the hard-coal combine. For the first time the powerful Reading Co. has been put on the defensive. Government's case appears to be well established, but there is much diversity of opinion as to the outcome.

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The partially successful governmental attack on the alleged anthracite trust, which resulted in the dissolution of the Temple Iron Co. and the abolition of certain other conditions, toward the close of last year, appears to have been but the preface of a determined effort to effect a complete disintegration of this combination. While this previous case nominally resulted in the defeat of the operators, it was generally conceded that the results were inconclusive, indeterminate and without any real material effect. But although the court ruled that the government had failed to prove its case in the more vital points at issue, it nevertheless dismissed these "without prejudice."

It cannot, therefore, be considered that Attorney-General McReynolds' renewal of the attack in any way resembles the taking up of a "lost cause." As a matter of fact, all indications point to the contrary. Mr. McReynolds is a serious and determined man and is, no doubt, thoroughly imbued with the righteousness of his case and absolutely sincere in his work. He has been engaged for years, under both the Roosevelt and Taft administrations, in carrying on proceedings against the anthracite companies and he knows the ground thoroughly. His great experience and past defeats have only served to make him a more formidable antagonist.

The Charges against the Reading

The new bill of complaint against the Reading first reviews the organization of the company and its various subsidiaries, together with their present relations. This is followed by a study of the ownership of the remaining available anthracite resources, regarding which the following statement is made:

> This combination is the backbone of the alleged monopoly of anthracite. It controls about two-thirds of the entire deposits, and its supply will outlast by many years that of any producer. In time, therefore, this combination, if not dissolved, will own or control every ton of commercially available anthracite known to exist, and while, in almost any other branch of industry it is at least possible for a monopoly to be broken by the influx of fresh capital, attracted by high profits, against a monopoly of anthracite, the supply of which is limited, there can be no protection—only the law can afford relief.

The Department of Justice then prays that the court find as follows:

1. That the Reading Co., the Philadelphia & Reading Coal & Iron Co. and the Philadelphia & Reading Railway Co. and their directors are engaged in combinations and conspiracies in restraint of interstate and foreign trade.
2. That the ownership by the Reading Co. of the stocks of the Reading coal and railway companies is an illegal combination in violation of the Sherman law, and that the Reading Co. be required to dispose of such stocks; that the dissolution of the Reading group be carried out under the direction of the court and not by persons connected with the management; that in the meantime the Reading Co. be enjoined from voting or receiving dividends from the coal and railway stocks.
3. That the ownership by the Reading Co. of the stock of the Schuylkill Navigation Co. is contrary to the Sherman law and that the Reading Co. be directed to dispose of the Schuylkill Navigation stock under the direction of the court and to persons not Reading stockholders.
4. That the ownership by the Reading Co. of the stock of the Wilmington & Northern Railroad Co. is an illegal combination contrary to the Sherman law and that the lease of the Wilmington & Northern physical property and franchises to the Philadelphia & Reading Railway Co. is also illegal; that the Reading Co. be required to dispose of the Wilmington & Northern stock and cancel the lease.
5. That the lease by the Lehigh Coal & Navigation Co., of the Lehigh & Susquehanna Railroad to the Central Railroad Co. of New Jersey, and the agreements relating thereto be declared illegal as restraints of trade and ordered cancelled unless the following alterations are consented to: Making the rental a fixed sum instead of being based on annual receipts as at present; striking out the covenant requiring the Lehigh Coal & Navigation Co. to ship the major part of its coal via the Lehigh & Susquehanna; striking out the agreement that rates to points common to the Lehigh & Susquehanna R.R. and the Lehigh Coal & Navigation Co.'s canal be fixed by mutual agreement.
6. That the ownership of a controlling interest in the Lehigh & Hudson River Railway Co., and the Lehigh & New England Railroad Co., by the Lehigh Coal & Navigation Co. and the Central Railroad Co. of New Jersey, "while themselves joined in a common interest" constitutes a combination in restraint of trade; that the Lehigh Coal & Navigation Co. and the Central Railroad Co. of New Jersey be ordered to dispose of their holdings in said stocks, under the direction of the court.
7. That the ownership by the Reading Co. of a majority of the stock of the Central Railroad Co. of New Jersey be declared an illegal combination in restraint of trade, contrary to the Sherman law, and that the Reading Co. be required to dispose of its stock in the Central Railroad Co. under direction of the court.
8. That the Reading Co. be declared "in and of itself" a combination in restraint of trade, in violation of the Sherman law.
9. That in view of the intercorporate relations existing, shipments by the Philadelphia & Reading Railway Co. of coal owned by the Philadelphia & Reading Coal & Iron Co. be declared to be in violation of the commodities clause of the Hepburn law, prohibiting railroad companies from transporting commodities owned by themselves.
10. That for similar reasons transportation by the Central Railroad of New Jersey of coal owned by the Lehigh & Wilkes-Barre Coal Co. and by the Lehigh & Susquehanna Railroad of coal owned by the Lehigh Coal & Navigation Co. be declared to be in violation of the commodities clause.

The Reading Financing

One of the most important conditions specified in the Reading suit is that the company shall dispose of its holdings in its subsidiaries to outside interests in no way affiliated with it. Owing to the peculiar financing of the company this is a condition that it may find difficult to comply with. The Reading Company has in past years advanced to the coal company, 73 million dollars, on which interest at the rate of only 1 or 2 per cent. has been paid.

But whereas the coal company has been operating at a loss, the revenues realized from the coal freights has more than made up this deficiency. It is essentially a condition of robbing Peter to pay Paul. Without at least a partial cancellation of this indebtedness the Reading will, of course, not be able to find a buyer. On the other hand, the Attorney General bitterly opposed the action of his predecessor, Mr. Wickersham, when the same principle was at issue in the Tobacco cases and flatly refused to consider any settlement in the Union Pacific-Southern Pacific controversy that did not provide for a well-defined separation of these two companies. There is no doubt, therefore, of his position on this feature and with a precedent now established he should be able to carry his point.

POWER DEPARTMENT

The Buckeye Locomobile

Special Correspondence

SYNOPSIS—With all of her boasted progress along mechanical lines America is often slow in adopting and applying proven methods of economy. A machine is herein described which utilizes the best principles of efficiency for reciprocating engines known to exist and upon which a guarantee of performance can be given, based not upon pounds of steam but pounds of fuel per horsepower-hour.

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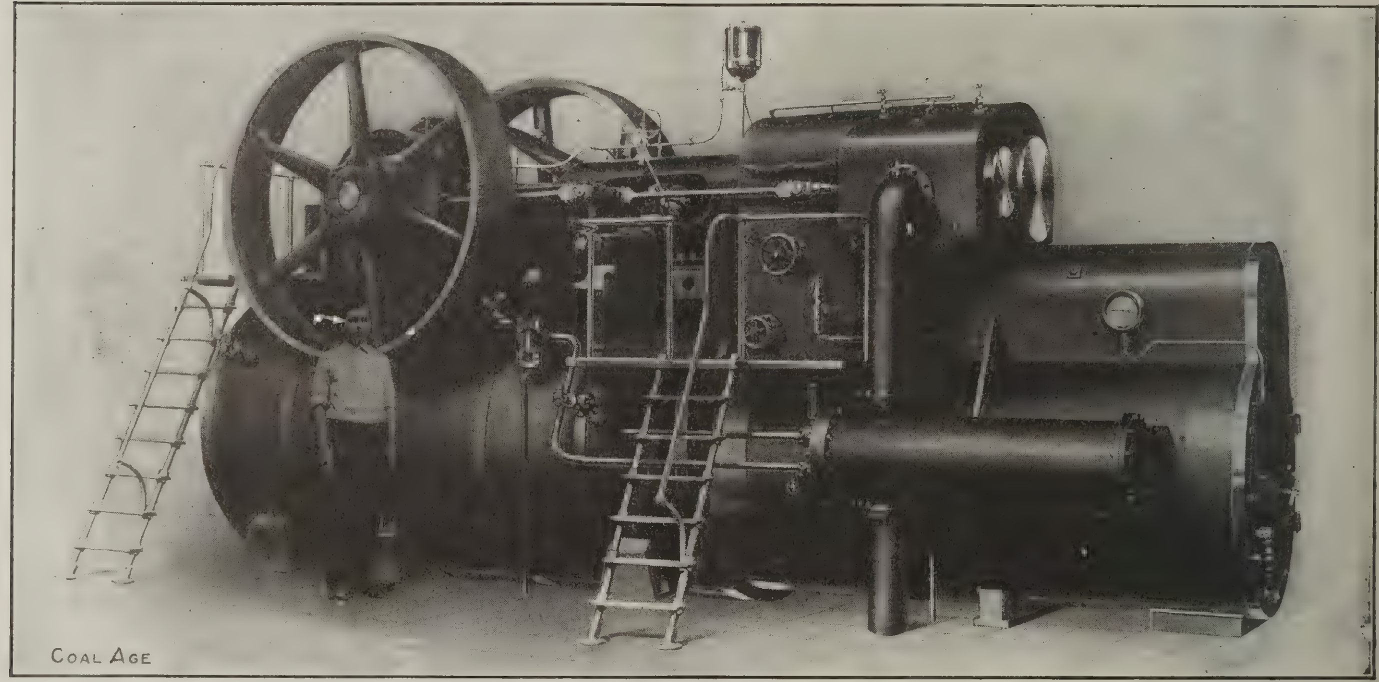
Among the most notable engineering achievements of the past 20 years has been the development in Europe of the high-efficiency steam engine and boiler unit known variously as the "Locomobile," "Overtype" and "Semi-Fixe." The economical results obtained by this device have been so marked that the Buckeye Engine Co., of Salem, Ohio, has made careful and thorough investigation of the principles employed with a view of offering to the American power-using public a machine of equal merit. During the past year they have constructed and tested a unit of this type which is herein illustrated and described.

The Buckeye-mobile is a complete self-contained power plant, consisting of an internally fired boiler on which is mounted a compound engine, the cylinders of which are inclosed in the smoke box. These cylinders are equipped with specially designed piston valves adapted for the use of highly superheated steam. The smoke box also contains a superheater, a reheater and all the necessary piping both for leading the steam from the boiler through the initial superheater to the high-pressure cylinder and that which conducts the steam from the high-pressure cylinder through the secondary superheater or reheater to the low-pressure cylinder.

The superheaters are inclosed in a special casing whereby the hot gases emerging from the boiler tubes are compelled to traverse first the initial superheater and next the reheater before being discharged into the smoke box proper.

The unit comprises also a boiler-feed pump driven directly from the engine valve gear, a closed feed-water heater in the exhaust line from the low-pressure cylinder and a suitable jet or surface condenser with a rotary air pump driven from the main shaft of the engine.

The initial superheater is a single coil of seamless steel tubing through which the steam passes in a direction counter to that of the hot gases. The reheater consists of two headers joined by a large number of small seamless tubes. An effective steam-jet blower enables the operator to thoroughly remove all soot and dust from these superheaters as well as the boiler tubes as often as may be necessary.



The Complete Self-Contained Unit. Note Size of Boiler Compared to Engine

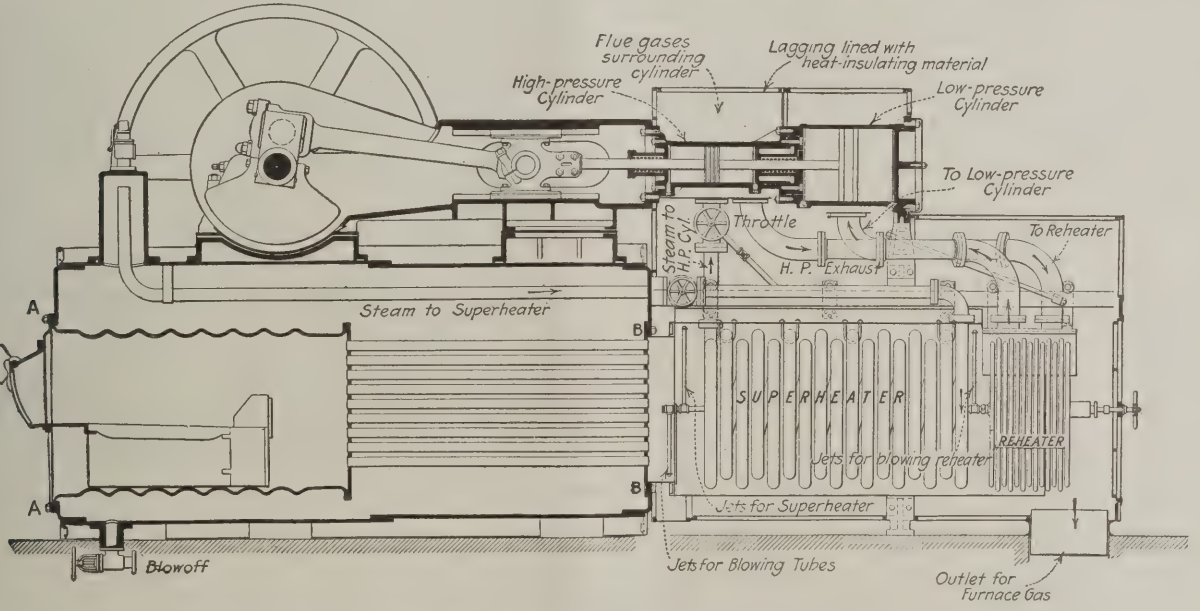
In order that the boiler may be thoroughly inspected and cleaned, the furnace and tubes are made removable by simply unscrewing a row of bolts on each end of the boiler. The boiler is supplied with a water column, injector, safety valves, blowoff valve, etc., to conform with the various state laws of the country.

Type and Mounting of Engine

The engine is of the center-crank type and is arranged for belting to line shaft, generator or other machinery or a generator may be driven direct through a flexible coupling. The engine bed-plate is rigidly secured at the main bearing end to a massive saddle which spans about one-third of the boiler's circumference. The guide-barrel end rests on a small saddle and is free to slide thereon, thus relieving the bed from the effects of the expansion and contraction of the boiler.

The piston rod passes through metallic packings of a special design which have proven their value for use with high superheat. This kind of packing is also used on the high-pressure valve stem. The unit is provided with suitable platforms, ladders and railings, giving access to all points requiring observation and adjustment.

The engine bearings are lubricated by a simple and effective gravity-oiling system, all the oil fed to the machine being gathered at one point and passed through a filter preparatory to being used over again. In the main bearings this system is supplemented by chain oilers. Both cylinders with their valves and piston-rod packings are served by a force-feed lubricator driven from the valve gear.



Cross-Section through Machine, Showing the Various Elements

This unit through its effective utilization of heat makes possible a power cost hitherto unobtainable by any type of small or moderate-sized steam plant. Small installations as a rule are wasteful of fuel, coal consumptions of 5 to 8 lb. per horsepower-hour being quite common. The cause for this may be found in the disposition to employ simple high-speed noncondensing engines using 30 lb. of steam or more per horsepower-hour and the failure to provide the heat-saving auxiliaries commonly installed in large plants. Radiation losses are relatively greater in small engines, boilers and piping than in large plants.

Economy tests of the Buckeye-mobile show that one horsepower can be generated on between 9 and 10 lb. of steam per hour or a trifle over one pound of coal. The fuel consumption curve is nearly flat, that is to say, this excellent economy is obtainable not only at normal load but at practically all loads above 50 per cent. of the rating and therefore the efficiency of the plant is varied but little by a changing load factor.

This expenditure of fuel not only represents that necessary to generate one horsepower at the engine flywheel but includes also the driving of the boiler-feed pump and condenser air pump. This unit makes it possible for the builder to make and fulfill a guarantee of a certain number of pounds of fuel per net delivered horsepower as against the usual custom of guaranteeing pounds of steam per horsepower.

Since one manufacturer makes and delivers the complete unit a division of responsibility between the makers of the various elements which enter into the usual type of power plant is avoided. Owing to the compactness of the plant, its simplicity and high efficiency the cost of operation and maintenance is materially reduced. The fact that such a small quantity of fuel has to be handled makes it possible to greatly decrease the labor cost usually chargeable to power-plant operation.

Only a Small Floor Space Is Required

The floor space required by a plant of this design is about one-half that required by any other form of steam plant, making any pretense to economy. The unit is extremely accessible in all its parts and has shown in practice a reliability fully equal to if not superior to that of any other prime mover. It is built in sizes from 75 hp. to 600 hp. and is applicable to all power purposes. It ordinarily operates condensing, but where exhaust steam is required for heating purposes the machine operates noncondensing with moderate increase in fuel consumption. In contrast with the internal-combustion engine the Buckeye-mobile is capable of utilizing any available fuel, coal, oil, lignite or refuse.

In the Buckeye-mobile, owing to the intimate connection between all the elements of the plant, there is no radiation loss from pipe lines since all steam lines with their fittings and valves are located in the smoke box and jacketed by the hot flue gases. Radiation from both high- and low-pressure cylinders is prevented by the same means, since both the cylinders and their valve chests are exposed to a current of hot waste gases. Radiation losses from the boiler are reduced to a minimum through the adoption of an internal furnace and effective jacketing of the boiler shell.

Inasmuch as the feed and air pumps are directly driven from the main engine the small amount of power required to drive them is produced with the same efficiency as that shown by the main engine.

The low steam consumption shown by engine proper reacts in every way to the advantage of the various elements of the unit. For example, since the engine uses only 9 to 10 lb. of steam per horsepower-hour as against 20 to 30 lb. required by other machines of like horsepower it is obvious that the capacity of all members of the unit whose function it is to evaporate, convey, superheat or condense this steam may be reduced in like proportion, thus decreasing radiation losses and power required to operate auxiliaries. Since but 9 to 10 lb. of steam are evaporated per horsepower-hour, the loss of heat to the ash pan and chimney is likewise reduced.

Inasmuch as the various elements which go to complete the power plant of the usual form are purchased from a number of different builders, it is seldom that all parts are properly adapted to each other, either as to capacity or suitability of type. Since the Buckeye-mobile is a product of one builder who is free to choose the most suitable conditions as to steam pressures, superheat, etc., he is enabled to so proportion all the elements of the unit as to secure the utmost efficiency of heat utilization consistent with mechanical simplicity and flexibility of application.

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Graphite in Boilers

For a period of ten weeks I have been experimenting with graphite as a scale remover, says E. R. Pearce, in *Power*, of Aug. 26, 1913, and find that it proves satisfactory in our boilers. As the action of the graphite is very slow, various boiler compounds have been mixed with it, the idea being to soften the scale a little quicker and allow the graphite to get to the plate sooner.

After three trials, in which careful observations were made, the best results were found to be obtained when using a mixture composed of ½ lb. of graphite mixed with 1 lb. of soda ash, and feeding the mixture at the rate of 1 lb. of mixture to each 20,000 lb. of water. This mixture should undoubtedly vary with the nature of the feed water and working conditions.

The mixture is introduced along with the feed water, and feeds constantly through an ordinary composition feeder, the ash and graphite being thoroughly mixed dry and put into the feeder.

On closely examining the scale which has come away of its own accord, the surface which has been next to the shell will be seen to be dotted with graphite specks. These will be quite clear under a good glass. It has been our experience that practically no scale forms where the old has come off when graphite has been used.

The action of graphite in removing scale is not clear, but it certainly removes the scale, and I am under the impression that if one were to well rub the plates of a new boiler with graphite and water, or some other moistening medium, no trouble would be experienced from scale. It would be interesting to all engineers if some one who has a new boiler going into service would try the experiment and publish the results.

I am shortly going to try graphite in one plant that is badly scaled, and as many chemical works and other factories use the water before it comes to this mill, compounds have all failed, the feed not being of the same composition three hours a day. The only way to use this water is to allow the boilers to scale so as to protect the plate from the corrosive water. The scale is now so heavy as to subject the boiler to bagging at high pressures and temperatures.

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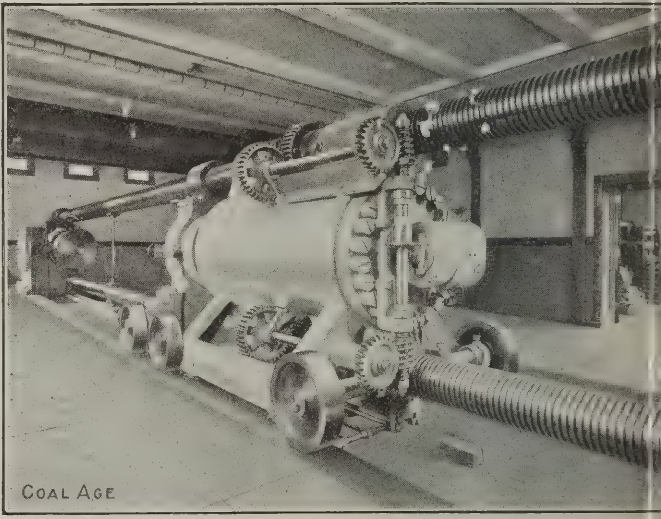
The World's Largest Precision Testing Machine

The accompanying illustration is a view of the testing machine, recently installed by the U. S. Bureau of Standards, Washington, D. C. This machine is used for testing columns, blocks, beams, girders and other shapes of steel, wood, concrete or materials employed in construction, in order to determine the breaking strength, spring under load, and other engineering data.

This machine is sufficiently large to test specimens of any length up to 34 ft. It can exert a pull of 1,150,000 lb., or a compression of 2,300,000, yet is sufficiently delicate that the pressure of a finger upon it will be registered.



General View of Machine

The machine consists of two principal parts connected by two enormous screws; one part, the further one in the illustration, is stationary, and contains the mechanism by which the force exerted on the specimen is measured. The other, called the press, is movable, and consists essentially of a hydraulic cylinder mounted on wheels. It will be noted that the head of the hydraulic piston is carried upon wheels of its own, and can move independently of the cylinder. The oil which is used to produce the hydraulic pressure is supplied through a pipe which telescopes or elongates as the press is moved.

In testing, the press is moved to the proper point by the small Westinghouse motor, seen mounted upon it. The specimen to be tested is then placed in the machine. If it is to be placed under tension, each end is gripped by jaws, if it is to be subjected to compression, it is held between two heavy plates. The hydraulic piston is then slowly forced forward or pulled back, until the specimen is ruptured or crushed.

A Deane pump, driven by a 20-hp. Westinghouse motor, supplies the oil for operating the hydraulic piston. This pump is capable of delivering a pressure of 3500 lb. per sq.in.

EDITORIALS

The plan of providing baths for miners at European collieries has met with such favor that it is safe to predict the general installation of such facilities at all the important mines. Some points from foreign experience are worth noting. Investigation shows that in estimating for such a plant, eight gallons per man should be allowed, and the water maintained at a temperature of 100 deg. F. Six cents per week per head will cover all running charges, including soap and towels. In Westphalia the average capital outlay amounts to $25 per head. Where baths are provided, they have proved to be an important safeguard, owing to less liability of matches, pipes, cigarettes, etc., being inadvertently taken into the mine. It is also true that home conditions of miners are more satisfactory, both from social and moral aspects.

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Legislation and Accidents

The present is an age that might properly be termed "The Legislative Era." When a casualty occurs on one of our railroads, in one of our mines, or at some industrial plant, a cry goes up for more stringent laws. The end that we seek to reach is laudable, but the hasty methods pursued in an attempt to quickly satisfy public clamor are much to be condemned.

Great Britain has likewise passed through a period of legislative activity, and the results obtained may be interesting to us as an indication of what we may ourselves experience. Sixty years ago the accident rate in British mines showed that one man was killed each year for every 249 employed. Conditions in the mines were gradually improved, so that half a century later the deaths equaled only one in 779. About this time (1900) there was a common demand for scores of new laws, designed to cover every possible contingency that might permit of an accident. The result was innumerable acts, which were passed with such rapidity that it was quite impossible for mine owners to observe in letter all the new regulations intended to govern coal mining.

The outcome of this condition was an increase in the British coal-mining death rate. In 1905-9 fatalities reached one in every 764 employed, while in 1910-12 it had risen to one in every 689 employed.

A particular cause for this increase in mining hazards was the inflexible nature of the "Eight Hours Act." This new law limiting the time of employment to an eight-hour shift is applied to all districts, mines and men, regardless of local, natural, economic or individual circumstances.

All around there is more rush and less care. In order to maintain output under the restricted hours, the owners have in many cases been speeding up the work at the expense of safety. More men are needed than heretofore, and there is a tendency to exercise less care in the selection of experienced miners.

Then there is the new one-sided "Workmen's Compensation Act." This law, by insisting upon the same compensation for an aged and delicate miner as for a younger and stronger workman, puts age and experience at a discount, and youth and recklessness at a premium. In places where these older men were weeded out, the result was an increase in the accident rate.

Any law which causes the elimination of aged, skilled and cautious men, spelling preference for young, inexperienced and reckless workmen is certain to encourage the introduction of more hazardous methods. It means an acceleration of haulage and hoisting, hasty and careless repair work at the week end, neglect of bar-setting and propping, and an inevitable increase of danger and death.

It should be understood by everyone that the coal-mining industry is a business where both the natural and economic circumstances vary more widely than in any other occupation. Great care must, therefore, be observed when we attempt to impose uniform working conditions upon all the owners of our coal mines. It is useless passing act after act and issuing regulation after regulation for the provision of safety devices and rescue appliances, if, at the same time, the state enforces other measures which aggravate old dangers and create new ones.

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The Mexican Situation

On another page of this issue we print a communication from a large American coal operator located in Northern Mexico, giving details of the damages his company sustained at the hands of the revolutionists. Coal Age has in the past consistently refrained from commenting upon the unfortunate conditions prevailing in that war-ridden country. But a communication, such as the one referred to, coming as it does from an absolutely authentic source, brings the subject home in a way that much of the contradictory and inflammatory articles in the newspapers have failed to accomplish.

In this instance it appears that the rebel soldiers completely destroyed a million-dollar plant in the short space of about two hours. Having just sustained a defeat at the hands of the federal forces, the rebels started out on a campaign of destruction, offering as their excuse that they wished to prevent the government forces from obtaining coal supplies with which to operate the railroad. Those who know the district will appreciate the fact that this was merely an excuse, and a poor one at that. The Lampacitos plant is but a unit in the coal operations of Northern Mexico, and the fact that it is now destroyed will not interfere with the railroads obtaining a plentiful supply of fuel from neighboring mines, or if need be, from this country.

President Wilson's hesitating policy on the Mexican question has sorely tried the patience of the general public. In the meantime further indignities are being heaped on our subjects in that country and their residence there is steadily becoming more and more untenable. It is to be hoped that our government will soon find a sane and satisfactory solution for the problem without having to resort to war and its attendant horrors.

The Dietetics of Dust

He who would keep himself free from aspersions must not only state carefully the idea he desires to convey, but must also be equally clear in declaring what he does not believe and what points he regards as at present too difficult for his decision. So in passing, we now wish to make a preliminary statement, therein pronouncing our faith in stone dust as an immunizer against mine explosions and declaring our great regard for W. E. Garforth, as the discoverer of the advantages of the use of such dust. We would not have our criticism of a mere detail exalted into a denunciation of a wholesome practice which we believe should become almost universal.

But we think that though Mr. Garforth has so wisely given us a solution, partial or complete, of the coal-dust problem, we should not accept without question *all* that he has recommended. We fear that there is a tendency to regard him as a court of highest resort, but we think it would be wiser to weigh his judgments as carefully as we would those of others less eminent.

Mr. Garforth, in his desire to select dusts which will not injure the internal organs of the operatives exposed to their influence, has subjected the powdered materials to several tests. He has, for instance, taken their specific gravities to determine which of them will rise most easily to meet the advancing flame of an explosion. He has endeavored to ascertain what magnetic particles are in the dust as such materials are likely to be hard and gritty in the lungs. He has investigated the presence or absence of carbonaceous matter, for such material negatives the effect of incombustible dust. Material, such as is found in the roof at the Bruceton galleries, is hardly any better than the dust of a mine where the coal dust has been immunized with the quantity of stone dust recommended by Mr. Garforth.

In these inquiries we follow Mr. Garforth with approval. But he makes other tests which may be of value, but of which we cannot see the use. In fact, we may draw unfavorable conclusions regarding certain dusts from indications which his method of reasoning proves less harmful than other dust, and even entirely innocuous.

Mr. Garforth immerses the dust in digestive fluids to see what proportion of the material is thus removed. He argues that the irritating edges of the inhaled particles can be smoothed away by solution. If it is the action of the dust on the digestive organs which is in question, this might appear to have some reasonable validity. But the objection to dust has been that if sharp it will irritate the lungs and not that it is injurious to the alimentary canal. If the dust comes in contact with the salivary secretions, it will probably never reach the bronchial passages, so that its ability to dissolve in the secretions of the mouth is not an important factor. The dust in the lungs is subjected only to the solvent powers of perspiration and not to all the dissolving actions of the many fluids in the human body.

The digestive fluids of the various organs of the body are peculiar to those organs. The use therefore, of lactopeptine, pepsin, pancreatin, diastase, lactic and hydrochloric acids in tests of dust would be of value only if any like fluids, peculiar under all normal conditions to certain organs, are created in one specific organ, to wit, the lungs, which are not known to generate such secretions. The pulverulent material not being subjected either in turn or at one and the same time to these fluids will enter the bronchioles and alveoli unchanged and will remain to irritate and inflame their surfaces and make them subject to tubercular infection.

But let us suppose for argument that all the digestive fluids of the body are found in the lungs: Of what value would their action be? If the solvents would dissolve all the compounds in the dust into a harmless fluid, we can see that mechanical injury to the lungs as also to the intestines would be thereby obviated. But, we think that to dissolve a part and leave a part is in all probability worse than useless; the part being dissolved is probably colloidal and soft, the part remaining unaffected is likely to be irritant. In fact is not the dissolved part likely to be the sugar coating to the pill?

The unctuous soluble bodies may merely mask and render harmless the gritty and crystalline substances with which they are mixed. If a rock has much non-colloidal silica, it certainly will not be less objectionable after exposure to solution, for surely the silica crystals will be little digested, if at all.

We believe that perhaps some sort of abrasion or friction test is preferable to any form of test by solution. The amount of material abraded on a surface fed with such dust or the angle of rest of bodies sprinkled with it would serve to show its quality as a lung irritant better than any test of solubility or any chemical analysis. We prefer the friction test, however, as it gives the condition of the unaltered dust, whereas abrasion comminutes that dust and may accentuate or minimize its gritty characteristics. The microscopic examination also has merits.

In fact, it would be well that a careful investigation of the best test for dust be made lest we exalt a system of elimination, which will give all the honors to a dust of undesirable character.

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The Small Mine Power Plant

The question of power for mining purposes is an ever-present one. This applies with particular emphasis to the isolated plant or mine which may be, and frequently is, beyond the reach of any central-station transmission line.

Heretofore the small mine has almost invariably been operated by a steam plant, which was in many cases an aggregation of misfits—engines too small or too large, possibly antiquated in design, and certainly ravenous in steam consumption; boilers which were too big or too little for the amount of steam required, probably bricked in by some local mason not accustomed to laying firebrick, and a system of steam and water piping which might be but ill adapted to the work in hand, and with but scant provision made for expansion and contraction.

During the past few years many such plants have been driven to the acceptance of central-station power which, even at a comparatively high price, is more economical than the prevailing type of isolated steam plant.

It is with no little interest, therefore, that we print on another page the description of a new American production, or rather an American adaptation of a machine which has long been successfully used in Europe. When the entire power-producing apparatus—boiler, engine, condenser, superheater, etc.—is constructed in one self-contained unit of remarkably high efficiency by a single builder, it would appear that the power problem of the small isolated mine had been at least successfully solved.

Legal Decision

Railroad Company's Liability for Discrimination—The ıeasure of damages recoverable against a railway company ·y a mine owner for unjust discrimination against him in efusing to furnish switching facilities, was the difference ·etween the market price of his coal received after the disrimination ceased and the higher price which he would have eceived for such coal as could reasonably have been mined nd shipped during the period of the discrimination. The ailway company cannot excuse the discrimination on the round of a shortage of cars; it being bound in any case o treat all shippers alike. (Pennsylvania Supreme Court, ox vs. Pennsylvania Railway Co., 87 Atlantic Reporter 581.)

Taxation of Coal in Place—A lease covering "all the merhantable anthracite coal in, upon and under" certain lands, nd all certain described veins of coal on the premises, onstitutes a sale of the coal in place, thus severing the ownrship of the surface from the minerals and making the essee liable for the taxes on the coal from the date of the ale, in the absence of agreement to the contrary. But if he lessor voluntarily pays the taxes for several years, he is ot entitled to recover the amounts so paid from the lessee nder an implied promise for such reimbursement. (87 Atantic Reporter 601.)

Liability on Order Drawn by Employee—An order drawn y an employee of a coal mining company, in favor of a mine hysician, authorizing the company to deduct a certain mount from the employee's wages and to pay the same to he physician, is, in legal effect, a draft; and the company s not liable thereon until the same has been presented to and ccepted by it. (Washington Supreme Court, Sheets vs. oast Coal Co., 133 Pacific Reporter 433.)

"Employee" and "Contractor" Distinguished—In a suit gainst a coal company for injury to a miner, he is not enitled to recover if he alleges in his complaint that he was n employee and the proof shows that at the time of the acident he was performing a contract to mine coal at a ertain price per ton, uncontrolled by the company as to the etails of performing the work. (Alabama Supreme Court, Varrior-Pratt Coal Co. vs. Shereda, 62 Southern Reporter 21.)

Allowance to Shipper not Amounting to Unlawful Rebate –Allowance by a railway company to a shipper of coal and oke for hauling his own shipments from his mine to the ompany's station does not amount to an unlawful rebate, here the published tariff is uniformly interpreted as inluding such haul, though the rate is specified from the staion. (United States Supreme Court, Mitchell Coal & Coke o. vs. Pennsylvania Railroad Co., 33 Supreme Court Reorter 916.)

Damages Recoverable Against Carrier for Discrimination -Under the direct provisions of an Act of Congress, the damges recoverable against a railway company by a shipper of oal who has been charged the lawful rates on interstate hipments, whereas unlawful rebates were allowed to other hippers over the same route on shipments carried at the ame time, is the pecuniary loss resulting to him in conseuence of the discrimination, and not the amount of the iscrimination in the rates. (United States Supreme Court, ennsylvania Railroad Co. vs. International Coal Mining Co., 3 Supreme Court Reporter 893.)

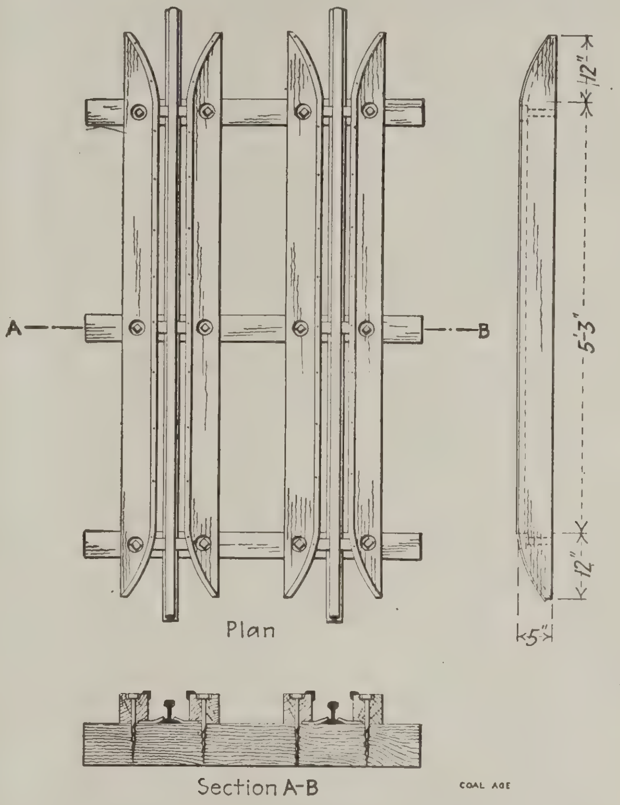
Right to Sue for Discrimination as to Cars—In interstate ommerce before suit will lie against a railway company for iscrimination in allotment of cars, in favor of plaintiff's ompetitors, a ruling of the Interstate Commerce Commision must be obtained, declaring that the company adopted an nreasonable method of distribution. (United States Supreme Court, Morrisdale Coal Co. vs. Pennsylvania Railroad o., 33 Supreme Court Reporter 938.)

Validity of Coal-Mine Regulation—A state law requiring ntries in coal mines, where employees are required to drive ine cars, to have an unobstructed space of at least two et wide outside the rails of the track, such as is in force Indiana, is a valid regulation, and not unconstitutional beuse it applies to bituminous coal mines and not to block oal mines. (United States Supreme Court, Barrett vs. State Indiana, 33 Supreme Court Reporter 692.)

Buyer's Remedy on Seller's Failure to Deliver—Under a ontract for a sale of coal and on the buyer being unable secure delivery according to the agreement, he is entitled buy coal at the market price at the nearest market and old the contract seller for the difference between the price aid elsewhere and the lower contract price. (California upreme Court. J. J. Moore & Co. vs. J. S. Guerin & Co., 132 acific Reporter 1038.)

Rerailing Device

The automatic rerailing device shown herewith is successfully used for mine cars in electric-haulage service at the Shamrock mine in the Herne district, Germany. It is described in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1. The guide blocks consist of oak posts about 5 in. square and 7 ft. 4 in. long, beveled at the ends to direct the car wheels. These rerailing blocks are usually placed behind the switch and fastened to the ties by wood screws. On the inside they are faced with angle irons, about 1½x1½x¼ in. in size.



Plan, Elevation and Section of Rerailer For Mine Cars

COMING SOCIETY MEETINGS

First Aid Meet., Philadelphia & Reading Coal & Iron Co. —The annual meeting of this company will be held at Lakeside Park, East Mahanoy Junction, Penn., Sept. 20.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremen's Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

American Mine Safety Association—The second meeting of this society will be held at the Bureau of Mines, Pittsburgh, Sept. 22-24. H. M. Wilson is chairman.

National Safety Congress—The second meeting of this body will be held at the Hotel McAlpin, New York City, Sept. 22-25. C. L. Close, 71 Broadway, is chairman, the office of the secretary being 2135 Green St., Harrisburg, Penn.

American Mining Congress—This society meets for its 16th annual session at Philadelphia, Oct. 20-24; the secretary is J. F. Callbreath, who has opened quarters in the Land Title Building.

Coal Mining Institute of America—Winter Session meets Dec. 4 and 5 at the Fort Pitt Hotel, Pittsburgh, Penn. C. L. Fay, secretary, Wilkes-Barre, Penn.

SOCIOLOGICAL DEPARTMENT

Rules for Motormen

The *Engineering and Mining Journal* quotes the following rules for motormen from the Inland Steel Co.'s book of rules and with trifling changes they would serve for use in coal mines:

(1) Operators should see that their motors are in good working order and furnished with the necessary tools, supplies and signals. They should thoroughly inspect the motor and test the brakes at the beginning of each shift; see that they have a supply of sand; and immediately report any defects to the master mechanic.

(2) They should not leave the motor except in case of necessity, and then have some competent person in charge. No one except motormen and electricians should be permitted to operate the motors.

(3) Operate cars at such a speed as to have full control at all times. Avoid bumping cars violently.

(4) The trolley pole should follow and not lead the motor, except in places where this is impossible. When the trolley pole is ahead the motor should be moved slowly.

(5) The trolley pole should not be turned while the motor is in motion.

(6) There should be a red light on the advancing end of all trains when the motor is not in front and the light on the motor should be kept lighted at all times when the motor is in use.

(7) Motormen should ring the bells on their cars at frequent intervals and especially when approaching crossings, curves, narrow places in the drifts or crosscuts, or points where men are known to be working on or near the track.

(8) Motormen should promptly report any defective condition of electrical equipment to the electrician, mining foreman or shift boss.

(9) No one except motormen and brakemen should ride on a motor or car without special permission from the superintendent or foreman.

(10) Men not employed as motormen or switchmen should not couple cars, throw or alter the lineup of switches.

(11) Trammers, or other employees, should not leave cars at or near switches or crossings, in such a position that they will not clear motors or cars moving on another track.

(12) When cars are pushed from where they have been filled to a point where they can be handled by the motors, the trammers should notify the crew of the motor either by remaining near the cars or by placing lights on them. The same rule should be followed in the case of timber trucks or other equipment left standing on the tracks where motors are liable to approach from either direction.

(13) Men having occasion to work on motor-car tracks should protect themselves by placing blue lights on the track.

(14) Do not place any strain on mine timbers when replacing cars on track.

(15) Do not carry high explosives on electrically operated cars.

(16) Brakemen should always carry lanterns.

(17) Brakemen should not ride on the front end of cars except in case of urgent necessity.

(18) Operators and brakemen should exercise great care not to get caught between cars and timbers. When riding, they should not stick their feet out at the side of the car, as they are apt to do if in a kneeling position.

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Qualifications for Rescue Work

S. J. Bridges describes the recovery work at the Cadeby Main mine, in the *Colliery Engineer,* and incidentally says: A man who volunteers for training should be physically strong, and have good lungs, and no heart troubles. When passing the doctor he should be quite candid in answering questions, and if he has the least doubt of his own nerve, he had better not take on the work, as he will be sure to hinder the work of the team to which he belongs, and may lose his own life and cause others to do the same. The writer has seen men attempt to do this work who bravely tried to do what they believed to be their duty, but owing to physical unfitness were incapable of proceeding, and had to be brought out by their comrades.

In other cases men otherwise fit have been kept at work too long without a proper interval for rest, and have returned to the work when they were not in a condition to stand it. The breathing of an artificial atmosphere acts differently on some men from others. Some of the men came out with pulses beating at 110 per min., and even more, and were soon all right again; others left the mine and were unable to go in again that day. In no case were the men able to do the two hours' work with which they had been tested.

The Unnerved Rescuer

The captain of a team should be an observant man. He must watch his aides and his apparatus while at work. Moreover his time limit must be controlled by the weakest of his party. Also when his team has been working several shifts and is accustomed to the work and apparatus, if he should then be obliged to take in a reserve man for the first time, he will have to watch him carefully, or his new comrade may cause a disaster. Especially is this the case when his men find dead bodies. The first seen and handled give most men a severe shock; this generally wears off, but a captain whose team does such work for the first time is in no enviable position.

If he has a man who faints or collapses, his task is then comparatively easy, but if the new rescue man loses his head and commences to run hysterically, falls and endeavors to run again, the captain and his men will be in great jeopardy. Their own apparatus can only be

vorn by exercising great care, and to have to hold or
arry a man frantic with fright is an impossibility, and
captain who meets with such an experience will be
ery fortunate if he and his comrades get out safely.

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Don'ts for First-Aid Men

By Allen S. Snyder*

Don't touch a wound with the hands.
Don't disturb blood clots.
Don't be rough with the patient.
Don't probe for a bullet or any other body imbedded
the flesh.
Don't wash wounds unless you sterilize the water.
Don't pull or tear off clothing—cut it away.
Don't attempt to remove pitch, varnish or wax from a
rned surface.
Don't bring ammonia too close to the nostrils.
Don't touch the eye with dirty fingers or an unclean
oth.
Don't put bandages on too tight.
Don't let the patient know his condition is serious.

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Program of American Mine Safety Association

On Sept. 22, 23 and 24 a large number of prominent mining
n, surgeons of mining companies, and the miners con-
:ted with the rescue and first-aid work from many parts
the United States will attend at Pittsburgh the second
eting of the American Mine Safety Association. Western
nsylvania and the Pittsburgh district in particular will be
gely represented. H. M. Wilson, chairman of the executive
nmittee of the American Mine Safety Association, says
t the reports received indicate that the meeting will be
gely attended, McAlester, Okla., Trinidad, Colo., and other
ally distant points sending big contingents of men who
interested in anything which will add to the safety of
ir mining operations. An interesting program of papers
l discussions has been prepared, and arrangements have
n made to visit points of interest in and about Pittsburgh.
Handsome prizes have been offered for the men who com-
e in the mine-rescue contest at Arsenal Park on Sept. 22.
Draeger Oxygen Apparatus Co. has donated an oxygen
alator, complete in a box; the Hirsch Electric Mine Lamp
will present a Hirsch silver-plated miner's electric cap
p, and the American Mine Safety Association provides
dsome medals which will be given individual contestants.
ries for this event have been received already from the
n-Mary Coal Co., the H. C. Frick Coke Co., and the
stmoreland and Jamison Coal & Coke Companies.
At the same time there will be held a first-aid contest
ewhat similar to those held elsewhere in the mining
ons. For this a number of handsome prizes have also
received, notably from Johnson & Johnson a first-aid
net and also a first-aid instruction outfit; from Bauer &
k a first-aid cabinet; from the American Red Cross and
American Mine Safety Association a set of medals for the
vidual contestants. The following entries have already
received for this event: Consolidation Coal Co. (two
ies), Wisconsin Steel Co., Allegheny Coal Co., Rochester
Pittsburgh Coal & Iron Co., Allegheny River Mining Co.,
er Hill Connellsville Coke Co., Penn-Mary Coal Co.,
ghiogheny & Ohio Coal Co., Oliver & Snyder Steel
Puritan Coke Co., Pittsburgh Terminal R.R. & Coal Co.,
or Gas Coal Co., Penn Gas Coal Co., Pittsburgh Balti-
e Coal Co., New Alexandria Coal Co., Westmoreland Coal
Jamison Coal & Coke Co., Vinton Colliery Co.
he Bureau of Mines has arranged a big experimental ex-
ion at their mine at Bruceton. This will be the first ex-
on exhibit given at the mine since its completion. There
an experimental explosion in the mine in 1911 on the
sion of the National Mine Safety Demonstration, and
her in 1912, but in both cases the mine was as yet only
ly opened, and the various electric recording apparatus,
the apparatus for controlling the explosion had not been placed, so that practically all that the mining public could see was an explosion of dust. On Sept. 23, however, it will be possible for those interested in such matters to see just exactly what causes the explosion; how the explosion wave acts; the speed and the pressure and other important items, as these will all be automatically recorded in the instrument room. A number of rescue men fitted with artificial breathing apparatus will enter the mine immediately after the explosion, so as to illustrate how they can go into a mine while it is still smoking and full of gas.

On the evening of the 23d a local committee of members of the American Mine Safety Association and the Bureau of Mines will give a smoker in the Fort Pitt Hotel to the visiting mining men. Music is expected, and there will be an exhibition of motion pictures exhibiting safe and unsafe practices in mining, and illustrating methods of digging coal, and of handling it both underground and on the surface.

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First-Aid Meets

Invitations have been sent out for the fourth annual contest of the first-aid corps of several coal companies of the Shamokin region, to be held at Edgewood Park, Shamokin, Sept. 13. The companies to be represented in the contest are Susquehanna Coal Co., Mineral R.R. & Mining Co., Summit Branch Mining Co., Lytle Coal Co., and Lykens Water Co.

Considerable interest has been manifested at all the collieries under the control of the Lehigh Valley Coal Co., in the selection of first-aid teams from each division to fight for the championship of the entire company. The ten teams representing the various collieries of the Lackawanna division, with headquarters at Pittston, Penn., held a four-event contest to determine which team should represent the division, with the result that Westmoreland colliery was awarded first place with a percentage of 100. The Exeter colliery outside team finished second, with a rating of 99¾. Other collieries represented were William A. Heidelberg No. 1, Seneca, Stevens, Maltby, and two inside teams from Exeter.

The four events were as follows: (1) Open wound over the right temple, fracture of the left collarbone and fracture of the jaw. (2) Gas burns on face, head and left arm. (3) Fractured ribs on the left side and fractured left arm. (4) Compound fracture of the left leg and simple fracture of the right upper arm. The members of the winning teams are as follows: Westmoreland, James R. Morris, Capt., Edward Reap, Thomas Ridgly, Walter Jacoby, Joseph Johnson, Fred Halpin, subject; Exeter Outside, Charles Kluck, Capt., Charles Marlow, John Akens, Robert Reid, William Finn, Benjamin Thomas, subject. The Westmoreland team will represent the division at the meet to be held at Hazle Park, Sept. 13.

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Weyanoke Gardens

The Weyanoke Coal & Coke Co. of Giatto, Mercer County, W. Va., has for five years given prizes for the best gardens at their mining villages, and has given the householders stable litter and lime to fertilize their flower and vegetable beds. The prizes amount every year to $110. The first prize was $20 and the other nine formed an arithmetical series diminishing regularly by $2. An additional $5 was given to the lady having the prettiest flowers, and a porch settee to the lady whose flower display was next in order of merit. The judges this year were Judge H. A. Ritz of Bluefield, E. A. Schubert, industrial agent of the Norfolk & Western Ry. and W. O. Frith of the "Princeton Progress."

Special consideration was given to the sanitary conditions around the houses, and the difficulties of location on the steep hillsides were also given due weight in according relative merits.

It was noted that those tenants who were not seeking to obtain a prize were keeping more sanitary and orderly premises than they were last year. The shower baths which the company was constructing last year have been completed, with compartments and lockers for the benefit of the miners. Five baths are set apart for the white and five for the colored employees, and they are all largely used and appreciated.

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If the old workings in a mine are roughly stopped off there is always apt to be leakage of the confined gas, which fouls the air and may sometimes cause an explosion. There is always the possibility of inflammable gas gathering in old workings, in dangerous quantities when they are shut off, and the miners may accidentally hole into these old workings and cause an explosion; or this gas may be driven out, by roof falls, into the live workings and an explosion result.

Instructor in first aid, Cambria Steel Co., 1005 Somerset
Winber, Penn.

DISCUSSION BY READERS

The Liquor Problem in Mining

As to whether the drink evil is increasing or decreasing among miners, at this time, is not made very plain by the arguments that have been used on either side of this question; nor yet whether the drink evil increases or decreases with the advance or fall of wages. Opinions seem to differ, also, as to the best and most successful plan or method to be adopted for decreasing this evil among miners, as various suggestions and opinions have been advanced.

W. P. Oakes, vice-president of the Sunnyside Coal Co., Colo., in his argument for a mining-camp canteen, Coal Age, March 15, p. 420, makes the following statement:

> It is useless to argue against the existence of a saloon of one sort or another in or about a mining camp. If the men cannot get their beer, or whatever they want to drink, they will buy it from bootleggers, ... or they will go to some other camp where they can obtain it.

Are miners, as a class, down to the point where they *must* have drink? Does giving miners more opportunities and better facilities to drink, decrease the drinking? Will the establishment of more club and drink houses, in mining camps, solve or reduce the drink habit among miners? Is it not true that the more opportunities drinking miners have to drink and the less restraint they are under in this respect, the more they drink; and the more they drink, so much the more they want to drink; and the more unreliable and worthless they become as miners and the less valuable as citizens.

The tendency and influence of all saloons and drink houses are downward. They are not the places where the best thoughts are cultivated. Even in the best clubs or drinking houses, in mining camps (if there be any best), there is no moral and uplifting influence found. On the other hand, the influences in far too many of these drinking dives are foul and well adapted to the growth of idleness and anarchy. Why, then, establish any of these degrading institutions, hoping thereby to refine and reform drinking miners.

It requires no long argument to convince the average man that there is not so much drinking in a mining camp where the drink is difficult to obtain, as where it is plentiful. I admit it can scarcely be removed so far or made so difficult to get, but that the confirmed drinker will manage, in some way, to get it, at times. But the boys will not go to the same expense and trouble to get it as the old drinker. In a few years these boys will be men—men who care nothing for drink and drinking resorts. On their account, the saloons and drinking clubs should be removed from all mining camps. By the proper enforcement of law, saloons, drinking clubs and bootleggers can all be removed from mining camps and none should be more interested and more active in this movement than mine officials.

The solution of the liquor problem in mining is in the direction of enforcing and obeying laws, education and the improvement of conditions. The coal mines of the country need officials with more disciplinary powers and less drinking habits; men who have the confidence and respect of their best miners; men who are strictly sober and temperate themselves; men who take interest in bettering the physical and intellectual condition of the miner, by furnishing him with better houses, better streets, better sanitary conditions in the mine, better ventilation, better schools, better discipline and better system. These things will have a greater tendency toward reducing the drink habit among miners than the establishment of the canteen, in mining camps.

John Rose,
District Mine Inspector.

Dayton, Tenn.

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The Mine Air Current and Explosions

The contribution of Mr. Parfitt on this subject, Coal Age, Aug. 9, p. 208, while interesting as a paper on ventilation, fails as a reply to the discussion on the Cincinnati mine explosion. The main feature of that discussion was the effect of the mine-ventilating pressure to increase or decrease the gaseous condition of the mine. Mr Parfitt makes no mention of this important factor, but draws attention to the fact that the pulmonary diseases suffered by miners are brought on by the vitiated atmosphere of many mines. This fact is commonly admitted by all.

At least one mine inspector, in England, has referred to the premature death of miners caused by insufficient ventilation. However, I fail to find in the previous articles, by myself and Mr. Verner, any reference suggesting such unsanitary conditions in the Cincinnati mine. Any argument along this line would naturally be taken as referring to conditions some time back, as, under the present system of mine inspection, if an inspector finds the ventilation of a mine inadequate, he simply shuts down the mine. We can, therefore, assume that there is sufficient air traveling in the average modern mine to make the workings sanitary, in every respect, and thus eliminate this question from the discussion. But, after all has been said and done, mine explosions still continue, which we are apparently helpless to prevent.

Mr. Parfitt is wrong in supposing that I suggested that the ventilating current diminished or prevented the outflow of gas from the strata. My claim was (July 5 p. 25) that while the exhaust system of ventilation allows the expansion of gas accumulated in the gobs, the compressive system of ventilation acts to drive this gas back and counteracts, to a certain extent, the effect of a falling barometer. In this reference, I only considered the relative tendency of these two systems of ventilation to increase or decrease the outflow of gas from the gobs. I also drew attention to the fact that the ventilating pressure could be increased, if desired, by the use of a regulator, without increasing the quantity of air in circulation.

The relative effect of the two systems of ventilation that I have mentioned may be illustrated by supposing that the ventilating pressure required in a certain mine is equivalent to a 2-in. water gage or $5.2 \times 2 = 10.4$ lb. per sq.ft. If the atmospheric pressure is 14.7 lb. per sq.in or $14.7 \times 144 = 2116.8$ lb. per sq.ft., the actual pressure on the air, in the compressive system, is $2116.8 + 10.4 = 2127.2$; and in the exhaustive system, $2116.8 - 10.4 = 2106.4$ lb. per sq.ft. The difference of pressure between the two systems is, therefore, twice the ventilating pressure or, in this case, $2 \times 10.4 = 20.8$ lb. per sq.ft.[*]

In the extraction of coal, there are many causes that operate to prevent the roof from settling uniformly; and it is commonly estimated that one-sixth of the original space occupied by the coal is available for the accumulation of gas. On this basis, 10,000 cu.ft. would be a small estimate for the possible accumulation of gas in old workings. Since the ratio of expansion of gas is equal to the inverse ratio of the pressure it supports, the expansion of this volume of gas, due to a fall of barometer from, say 30 to 29 in., is determined by the proportion

$$29:30::10{,}000:x = 10{,}345\ \textit{cu.ft.}$$

The quantity of gas thrown out onto the airways, by this fall of barometer, would be $10{,}345 - 10{,}000 = 345$ cu.ft. The danger would be greater if this fall of barometer took place suddenly or at a time when the ventilating current was impeded; or when, for any reason, proper attention was not given to the change of pressure. In this connection, it is important to notice that the waste places in mines where gas is liable to accumulate and often difficult to remove, can frequently be kept clear of gas by drill holes sunk from the surface, through which the gas may escape when the compressive system is employed.

It is worthy, also, of note that mines in which large quantities of carbon dioxide are generated will generally require a greater ventilating pressure in order to effectively remove this gas. The reason is due to the greater specific gravity of the gas, which causes it to sink to the low places in the mine and to offer an increased resistance to the ventilating current. The air has a tendency to pass over this gas, unless the same is distributed by the passing of cars or other cause. My own observation leads me to conclude that where a shorter airway is more or less obstructed by the presence of blackdamp, the air current will often travel a longer route, owing to the increased resistance in the shorter airway, caused by the gas. A higher ventilating pressure might, in a degree, overcome this difficulty.

In closing I want to say that the increase of ventilating pressure, or the use of the exhaustive or compressive system of ventilation, as I have suggested, does not imply a depletion of the ventilating current to which Mr. Parfitt alludes.

ROBERT McCUNE.

————,Penn.

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Recovering Thin Overlying Coal

I noticed the question of J. H. S., COAL AGE, Aug. 30, p. 319, who asked for the best method of drawing back the pillars in a 7-ft. seam of coal overlaid with from 4 to 7 ft. of sand slate, and, at the same time, recovering the 21 in. of coal above this slate.

I want to say, in the first place, that this mine should have been worked on the longwall plan, from the start. The mine should have been opened on the triple-entry system and cross-entries or headings driven to the boundary, to the right and the left of the main entries and 300 ft. apart. These headings should then be crosscut at the boundary line, from one to another, thereby forming a long line of working face, each section being 300 ft. in length.

Work should then be started on the retreating plan, and three rows of posts should be carried along the face to break the sand slate forming the roof. The back row of posts is drawn and the posts reset as the work progresses. It may be necessary to shoot the sand slate, at first, in order to start the break; but when this is once started the posts will be sufficient to break the roof. It may happen that explosive gas will be found in the upper seam overlying the slate and proper precaution should be taken in this regard.

I note, however, that you say this work has all been driven to the boundary line on the room-and-pillar system. In that case, the only thing left to do is to retreat, as above stated. Whether the rooms have been turned as right-hand or left-hand rooms will determine the question of where the work should be started. If the track follows the straight rib, the work of drawing back the pillars will be comparatively easy; but if the tracks are in the middle of the rooms, it makes a hard proposition, as the waste is said to have been stored in the rooms, which are probably full to their capacity. The width of the rooms or thickness of the pillars is not mentioned, but it looks as if the work of recovering the thin seam of coal above the slate will cost more than the coal is worth. I would say, if you can get all the pillar coal, you will be doing well.

SAMSON SMITH.

Mineral, Va.

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Fire Protection in Mines

Referring to the question of adequate fire protection at mines, which has been recently mentioned in these columns (COAL AGE, July 26, p. 136), I notice that many of the mines I visit are neglecting this matter. I consider it of the greatest importance that mine officials should give closer attention to the protection of their properties from fire; and, in urging this important point, I want to make a few suggestions.

[*As a matter of fact, the difference in the actual pressure on the air, in the use of these two systems of ventilation, or twice the ventilating pressure is so slight as compared with the atmospheric pressure that the relative effect on the expansion of gases in the void or abandoned places, in mines, is almost inappreciable. Likewise, the relative effect on the emission of gas from the strata is practically inappreciable. There is, however, a great advantage possessed by the compressive system of ventilation as compared with the exhaustive system. This advantage relates to the mine pressure, in the compressive system, being greater than that of the atmosphere; while, in the exhaustive system, it is less than that of the atmosphere. As a result, the compressive system tends to drive the gases that accumulate in abandoned workings out through every crevice, fissure or opening, into the outside atmosphere, thus making these crevices and openings vents to the mine. On the other hand, the exhaustive system tends to draw these gases into the mine workings, owing to the pressure of the atmosphere through the same crevices or openings

Another important relative effect of the two systems of ventilation is that when a fan is running on the compressive system and an accident occurs to the fan or in the mine airway, by which the circulation is reduced and the mine pressure decreased, there is a sudden outflow of gas from the abandoned and void places in the mine that may cause trouble, being sudden and unexpected. On the other hand, when the fan is working on the exhaust system of ventilation, the same accident to the fan or in the airway, would result in an increase of pressure on the gases confined in the abandoned workings and other void places in the mine. This condition favors the exhaust system, but is a condition that should be provided for, as far as possible, by efficient mine equipment and inspection.—Ed.]

In the first place, every mine should have a good map, drawn to a scale of, say 40 or 50 ft. to the inch, and showing all wells or ponds, water lines and fire plugs. The map should show all structures located on the properties, stating brick or frame. Every company should have a properly organized fire-fighting force and a system of signals to summon the men, in case a fire should break out. These signals should be printed in clear, bold type and posted in a prominent place, so that the men could become familiar with them.

In order to maintain all fire appliances and apparatus in good condition and ready for use in case of emergency, I would suggest the following:

1. Wherever fire pails must be kept in places where the water will freeze, it may be almost entirely prevented by dissolving two or three ounces of common salt and as much salsoda in boiling water, allowing this amount of salt to each pail, or four or five pounds to a cask of water.

2. Examine all tanks and pipes, fittings and valves regularly, whether for steam heating, general water service or fire protection. The purpose of this is to see that none are frozen or have been frozen and broken; and to make sure that all are in good condition. If this examination shows that any are liable to freeze, provide the necessary protection to insure the entire system.

3. Open all valves and try all outlets to see that all pipes are free and ready for service.

4. Make it your business to know if all engineers fully understand the purpose and operation of every valve and pipe.

5. Try all pumps at regular periods and see that they are in proper working order. A pump that will not take water quickly is no good in case of fire.

6. Test all hydrants and indicators to see that they drain properly to prevent freezing in cold weather.

7. See that the night watchman is thoroughly versed in the rules and familiar with all valves, pipes, etc.

8. Examine all suction pipes to see that they are not partially clogged at the strainers so as to cut down the efficiency of the pump.

9. Do not let your fire extinguishers go over six months without recharging them.

Some companies have formed fire brigades in which the men take much interest. Another thing I should not forget to mention, as it is very important, is testing the lines of hose. This should be done at least once every three months, using the same water pressure that would be used in case of fire. If the hose is weak or wearing out the test will show the trouble, which should be remedied before it is too late.

If these suggestions are carried out and careful supervision kept, the works should not suffer much from fire.

PENNSYLVANIA ENGINEER.

Pittsburgh, Penn.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

MEASUREMENT OF AIR CURRENTS

The measurement of air currents, in mining practice, involves the careful observation of the velocity and pressure of the current and the accurate measurement of the sectional area of the airway. From these data the volume and power of the air current are determined.

Requirements—The mining laws of the state, in most cases, require a specified volume of air per man, per minute, circulated throughout the mine. In order to meet this requirement, it is necessary to estimate the power that will produce such quantity in a given mine.

The Mine Potential—Every airway and every mine has a certain resisting power, in respect to the circulation of air. For this reason, the same power will circulate different quantities of air through airways that differ only in respect to their size and length.

The formulas of mine ventilation show the following relation of the quantity of air circulated to the power producing the circulation, and the sectional area to the rubbing surface of the airway.

$$\frac{\textit{Quantity}}{\sqrt[3]{\textit{Power}}} \quad \textit{varies as} \quad \sqrt[3]{\frac{\textit{sectional area}}{\textit{rubbing surface}}}$$

Or, say: quantity (cu.ft. per min.) = q; power (ft. lb. per min.) = u: sectional area (sq.ft.) = a; and rubbing surface (sq.ft.) = s; the unit resistance being k, we have

$$\frac{q}{\sqrt[3]{u}} = \frac{a}{\sqrt[3]{ks}}$$

The first of these expressions, being given in terms of the power and quantity of air circulated, may be called, properly, the "potential of the circulation"; while the second expression, being given in terms of the airway, is the "potential of the airway," or the "mine potential." The significance of the term "potential," in this connection, is apparent since it describes the capacity of an airway or mine in respect to the volume of air it will pass, per unit of power.

The Value of Mine Potential—Calling the potential factor X its value for any given mine or airway is calculated by the formula

$$X = \frac{a}{\sqrt[3]{ks}}$$

The value of the potential for the circulation of any quantity (q), by any power (u) or pressure (p), is found by the formula

$$X = \frac{q}{\sqrt[3]{u}} = \sqrt[3]{\frac{q^2}{p}}$$

The value of the potential lies in the fact that it gives to every mine or air split a definite value that enables a correct comparison to be made and the proper type of ventilator and system of ventilation to be chosen.

The Coal Age Pocket Book

CALCULATIONS

Potential of Airway—Calculate the potential of an airway 6x10 ft., in cross-section, and 2000 ft. long.

Solution—The sectional area of this airway is 6 × 10 = 60 sq.ft.; the rubbing surface is 2(6 + 10)2000 = 64,000 sq.ft. The potential of the airway is, therefore,

$$X = \frac{a}{\sqrt[3]{ks}} = \frac{60}{\sqrt[3]{0.00000002 \times 64{,}000}} = 552.6$$

Potential of Circulation—What is the value of the potential factor in the circulation of 60,000 cu.ft. of air ,by 10 hp.?

Solution—The potential of this circulation is

$$X = \frac{q}{\sqrt[3]{u}} = \frac{60{,}000}{\sqrt[3]{10 \times 33{,}000}} = 868.2$$

Find the potential value for the same volume of air circulated under a pressure of 8 lb. per sq ft.

Solution—The potential value, in this case, is

$$X = \sqrt[3]{\frac{q^2}{p}} = \sqrt[3]{\frac{60{,}000^2}{8}} = 766.3$$

Power, Pressure, Quantity—By transposing the formulas for potential, it is possible to calculate the power or pressure required to circulate any given quantity of air against any given mine potential; or to find the air volume a given power or pressure will produce, for any given mine potential.

Example—Find the (1) power, and (2) pressure required to circulate 24,000 cu.ft. of air through an airway 5x14 ft. in section and 3000 ft. long?

Solution—The area and rubbing surface of the airway are: a = 5 × 14 = 70 sq.ft.; and s = 2(5 + 14)3000 = 114,000 sq.ft. The potential factor of this airway is then

$$X = \frac{a}{\sqrt[3]{ks}} = \frac{70}{\sqrt[3]{0.00000002 \times 114{,}000}} = 531.8$$

(1) Power, $u = \left(\frac{q}{X}\right)^3 = \left(\frac{24{,}000}{531.8}\right)^3 = 91{,}900 \textit{ ft.-lb. per min.}$

(2) Pressure, $p = \frac{q^2}{X^3} = \frac{24{,}000^2}{531.8^3} = 3.83 \textit{ lb. per sq. ft.}$

or, $p = \frac{u}{q} = \frac{91{,}900}{24{,}000} = 3.83 \textit{ lb. per sq. ft.}$

Example—Find the volume of air circulated in the same mine, by (1) 10 hp.; (2) a pressure of 7.8 lb. per sq.ft.

Solution—

(1) By 10 hp., $q = X\sqrt[3]{u} = 531.8\sqrt[3]{10 \times 33{,}000} = 36{,}750 \textit{ cu. ft. per min.}$

(2) By 7.8 lb., $q = X\sqrt{Xp} = 531.8\sqrt{531.8 \times 7.8} = 34{,}250 \textit{ cu. ft. per min.}$

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—Under what circumstances may a body of gas fail to be removed after restoring the ventilation?

Ans.—It frequently happens that the brattices, stoppings, air bridges or doors have been destroyed, which prevents the air current from being properly distributed or conducted to the working face or other places where gas may have accumulated. The ventilating current is not properly restored until all these means for the distribution of the air have been replaced.

Another reason why the gas may not be removed when the current is restored is that a heavy fall of roof may have occurred in one of the airways, by reason of which the quantity of air, in that section of the mine, is reduced and the velocity of the air current is insufficient for the removal of the gas. It may happen, also, that gas is being generated, at the point in question, more rapidly than it is removed by the air current, which would make it appear that the gas was not being removed.

Ques.—Would you allow any class of workman to enter a return airway contaminated by gases emanating from a mine fire; and for what purpose?

Ans.—Only such persons as are required for the work of removing the gases should be permitted to enter the airway, and then only for the purpose stated. The men selected for the work should be competent men who are experienced in the handling of gases and the use of the safety lamp.

Ques.—What weight of electric motor will be required to haul four cars, gross weight 3 tons each, up a grade, the tangent of whose angle of inclination is 0.03492. Assume a coefficient of friction 0.025 and a coefficient of traction, 0.16.

Ans.—The gross weight of the loaded trip of four cars is $4\ (3 \times 2000) = 24{,}000$ lb. The grade being slight, practically 3.5 per cent., the gravity pull of the loaded trip is found by multiplying its gross weight by the tangent of the angle of inclination; thus,

Gravity pull, $24{,}000 \times 0.03492 = 838\ lb.$

In like manner, the friction pull is found by multiplying by the coefficient of friction; thus,

Friction pull, $24{,}000 \times 0.025 = 600\ lb.$

The drawbar pull is the sum of the gravity pull and friction pull of the load; thus,

Drawbar pull, $838 + 600 = 1433\ lb.$

This drawbar pull is equal to the tractive power of the locomotive, less the sum of the gravity and friction pulls of the locomotive. Calling the weight of the locomotive w, the tractive power is $0.16\,w$; the gravity pull of the locomotive is $0.03492\ w$ and the friction pull $0.025\ w$. The drawbar pull, calculated from the weight of the locomotive w, is then $0.16\ w - (0.03492 + 0.025)\ w =$ say $0.1\ w$. Equating this value of the drawbar pull with that calculated from the weight of the loaded trip,

$$0.1\ w = 1438;$$

and

$$w = \frac{1438}{0.1} = 14{,}380\ lb.$$

which is the required weight of the locomotive.

Ques.—What weight of rails (20 lb. per yd.), ties, 18 in. apart, splice-bars; bolts and nuts are required for laying one mile of road?

Ans.—One mile of road, assuming a single track, requires $2 \times 5280 \div 3 = 3520$ yd. of rail; and the weight of iron for this track is, therefore, $3520 \times 20 \div 2000 = 35.2$ tons. The number of ties is $5280 \times 12 \div 18 = 3520$. The number of splice-bars will depend upon the length of rails used. For 30-ft. rails, there are $2 \times 5280 \div 30 = 352$ joints, which will require the same number of pairs of splice-bars, and $4 \times 352 = 1408$ bolts and nuts, allowing four to each joint. There will be required, besides, four spikes to every tie, making $4 \times 3520 = 14{,}080$ spikes, or, say 27 kegs of $4\frac{1}{2} \times \frac{7}{16}$-in. spikes.

Ques.—What would be your method of timbering rooms 30 ft. wide, with 10 in. of good slate roof over the coal and a massive sandrock above the slate? How many rows of props would you use, and how far from the face should the first row be placed? The coal is cut by mining machines.

Ans.—The depth of the cover and thickness of the coal not being given, it may be stated, in general, that the posts should be set in rows parallel to the face and staggered. The distance of the posts apart will depend on the depth of cover, thickness of coal, the width of room pillars and the character of the floor. Under the conditions stated, there being a good roof slate, 10 in. thick, if the floor is reasonably good, the first row of posts should be set 6 ft. from the face, and 3 or possibly 4 rows of posts will be required to properly control the weight on the coal face, owing to the massive sandrock above the slate.

Ques.—How should props be placed if the top is broken and the bottom solid?

Ans.—Much will depend on the character of the broken roof. If the roof is an interlocking slate, a systematic system of timbering will generally prove the best; but if the breaks occur in such manner as to render the roof treacherous, it will generally be necessary to place the timbers where they are most needed; but, in this case, a close watch must be kept of the roof by a competent, experienced person, to insure safety.

Ques.—Find the diameter of a shaft 90 ft. deep, from which 261 cu.yd. of material have been excavated.

Ans.—First reduce the cubic yards to cubic feet; thus, $261 \times 27 = 7047$ cu.ft. Then find the sectional area, by dividing the cubical contents by the depth of the shaft; thus, $7047 \div 90 = 78.3$ sq.ft.

The diameter corresponding to this sectional area is then calculated by the formula

$$d = \sqrt{\frac{a}{0.7854}} = \sqrt{\frac{78.3}{0.7854}} = say\ 10\ ft.$$

COAL AND COKE NEWS

Washington, D. C.

On Sept. 3, the Attorney General of the Uuited States made public the fact that it was intended by the government to attack the so called anthracite-coal monopoly through the Reading R.R., and its affiliated concerns. This was followed by developments of a similar kind later in the week which showed conclusively the existence of an intent to press on along the same lines.

The plan of the government as now understood is to make a general assault on the anthracite-coal combination and to take up one by one the different elements in the trust so called, applying if possible a uniform type of method to the dissolution of the several elements, or if that prove impossible varying and adapting the methods as circumstances seem to demand. The suit against the Reading and a similar proceeding undertaken later against the Lackawanna, are, however, all that are apparently planned at present. It appears to be the disposition to wait and see how the methods employed in these suits seem to work and how the courts regard the propositions put before them by those who are engineering the cases in question.

An interesting feature of the Reading suit is seen in the fact that it includes an onslaught upon the road because of its alleged violation of the commodities clause of the Interstate Commerce Act. It has always been alleged that because of its being organized in a threefold way the Reading was immune from the prosecutions under the commodities clause of the act, but this view is doubted by the Attorney General. He takes the ground that the transportation by the Reading of coal produced by the P. & R. Coal & Iron Co. and transportation by the Central R.R. of New Jersey of coal produced and owned by the Lehigh & Wilkes-Barre Coal Co. violates the provision referred to and asks that such transportation be enjoined.

Other Suits Are Expected

Action taken by the Attorney General of the United States during the past week indicates a disposition to press further in the attempt to secure definite action in the prosecution of the Lackawanna Coal Co. and the Lackawanna R.R. Application is to be made to the federal court in New Jersey for the appointment of a master to take testimony in the case. It is understood that the counsel for the defendants will assent to this application and two assistant attorney generals have been assigned to the work of preparing and carying forward the government's side of the proceedings.

The Lackawanna case is similar to the Reading proceeding. In the latter there are two distinct phases. An attack is made under the legislation on the statute books against combinations in restraint of trade and one is made under the commodities clause of the Interstate Commerce Act. The petition asks in that case, as already noted, that the court ask the Reading company to dispose of the stocks it holds in the Philadelphia & Reading Ry. Co. and the Philadelphia & Reading Coal & Iron Co. The same plan will be followed regarding the Lackawanna.

HARRISBURG, PENN.

The letter sent out by the operators' press bureau deploring the attitude of the miners in refusing to work on holidays thereby restricting the output is resented by the coal diggers who assert that the companies do not follow the rule which they would have observed, closing down the collieries when they see fit without consulting the miners.

That the antnracite mine workers of northeastern Pennsylvania are satisfied with a certain annual income, that increase in pay means less work per man, is the conclusion to which operators have been forced by the present apathy of labor in that region. The public squares are constantly filled with mine workers who are taking a day off and it is confidently predicted that their annual average earnings for 1912 will not exceed those for 1911 in spite of the 10 per cent. increase granted last year.

In addition to their numerous holidays an approximate list of which is here printed, they seize upon the slightest pretext for staying away from work and sporadic "button strikes" abound. The holidays, some of which affect only a part of labor, but many of which close down every mine in the region, are as follows:

New Year's Day, Feast of the Epiphany, Greek Christmas, Greek New Years, Candlemas Day, Lincoln's Birthday, Ash Wednesday, Washington's Birthday, St. Patrick's Day, Annunciation Day, Anniversary of the Eight-Hour Day, Maundy Thursday, the day preceding Good Friday; Good Friday, Holy Saturday, Easter Monday, Odd Fellows Day, Ascension Day, Whit Monday, Memorial Day, Corpus Christi Day, St. Peter and St. Paul's Day, Independence Day, Feast of the Assumption, Labor Day, Feast of the Nativity of the Virgin Mary Columbus Day, Mitchell Day, All Saints Day, All Souls Day, Election Day, Thanksgiving Day, Feast of the Immaculate Conception and Christmas.

In 1911, which holds the high record for anthracite output and working days the mines worked 234 colliery days. This means that the mines were idle 47 days on account of strikes, accidents to machinery in the breakers or disinclination on the part of the miners to work and 84 days on account Sundays and holidays.

The same conditions as described above exist in the bituminous region, and men are also scarce. While there is plenty of work, the men seem to drift from one place to another, not because conditions are any better, but they seem to want the change.

PENNSYLVANIA

Anthracite

Girardville—On Sept. 4, a dynamite explosion in colliery No. 5, of the Lehigh Valley Coal Co., ignited gas which in turn set fire to the workings. In the opinion of some of the firebosses the mine will have to be flooded to cope with the fire. Half a dozen men were overcome by gas and fumes, but were revived and are out of danger.

Wilkes-Barre—Through its attorneys, the Delaware, Lackawanna & Western Railroad Co., on Sept. 2, commenced an attack on the assessment rate of $250 per foot-acre on coal land in this county. The company petitioned court for an injunction to have declared null and void the action of the county assessors in fixing a blanket rate on coal land.

Twelve hundred mine workers, employed at the South Wilkes-Barre colliery of the Lehigh & Wilkes-Barre Co., went on strike Sept. 3, on account of the refusal of 15 men to join the union and wear the button which indicates payment of dues.

Scranton—Because they objected to working with two men, who had not paid their dues in the miners' union, about 300 employees of the central colliery of the Lackawanna Coal Co. went on strike recently. The employees at Sloan shaft, which is a part of the working, remained at their places.

Summit Hill—The Lehigh Coal & Navigation Co. has donated to the borough of Summit Hill, a tract of land adjoining it to be used as a public park, upon which will be erected a soldiers' monument.

Bituminous

Grove City—After a strenuous two months' campaign, conducted by the officers of the United Mine Workers, every mine in the Mercer-Butler district is reported organized. This is the first organization of any account that the Mine Workers have attempted in this field since 1908, when their union was destroyed through the disastrous strike of that year.

Pittsburgh—Those concerned in the deal between the city of Pittsburgh, the Board of Education and the Federal Government, for the transfer of the Magee site, near Schenley Park, to the Bureau of Mines, in exchange for a portion of Arsenal Park, believe that the last obstacle to the prompt consummation of the exchange has been removed, and it is thought that the transfer will be made within a short time.

WEST VIRGINIA

Grafton—A movement has been started in this section, which has as its object the reporting of all coal mined in small quantities for local consumption from what are commonly called "coal banks." It is estimated that the output of these small mines aggregates something like 100,000 tons in a year, which would mean no small increase to the reported production of the state.

Charleston—Twelve West Virginia coal operators, representing the greater part of the coal tonnage on Paint and Cabin Creeks, accompanied by counsel, left Charleston on a special car, Sept. 2, for Washington, in order to be present when the sub-committee of the Senate resumed the investigation into the conditions which existed in the Kanawha district, and the causes which impelled Governor Glascock to proclaim martial law in that territory.

ALABAMA

Birmingham—The Banner mine of the Pratt Consolidated Coal Co. has just been inspected by the mine department of Alabama in regard to its sanitary condition, and the report is exceedingly complimentary to the management, it being in an excellent condition.

KENTUCKY

Whitesburg—The condemnation proceedings recently brought at Whitesburg, Ky., by the Consolidation Coal Co. against John H. Bentley, in order to acquire an acre of ground owned by the latter in the heart of the industrial town of Jenkins, Ky., resulted in a finding by the jury of $43,000 damages for Bentley, the company getting the property for railroad purposes. Bentley had refused smaller sums than this for the property, holding out for $100,000.

Middlesboro—M. R. James, of Charleston, W. Va., has been at Middlesboro, Ky., recently, making investigations form that point of the entire Middlesboro field, in order to determine the power requirements of the various mines in that section, with a view to locating near Pineville or Middlesboro a power plant with sufficient capacity to furnish current to the mines in that section. Mr. James is said to represent Eastern capitalists.

Jenkins—Beginning with Sept. 2 the post offce at Jenkins, Ky., was made a postal depository, the number of miners employed in the vicinity of the town making it certain that a large amount would be placed with the postal savings bank. On the same date the office was moved into larger and more convenient quarters.

OHIO

Columbus—A movement is on foot among the coal operators of Ohio for the formation of a strong organization comprising all of the mining districts of the state. This move is brought about by the fact that the operators must put up a strong fight against the miners union in its efforts to secure the passage of the anti screen bill. Operators in Ohio have not been able to form a strong state organization and as a result they have lost out in their fights with the miners union. It is believed that a meeting of operators will be called at Columbus sometime early in the year or even sooner.

Raymond—Three men were killed and three others seriously injured, Sept. 2, in a cave-in at the Portland mine of the Portland Coal Co., north of Wheeling, on the Ohio side of the river.

Rush Run—Pending an agreement between the operators and the mine-workers' officials, the Rush Run coal miners, who have been on strike for a week, returned to work, Sept. 6. The resumption is the result of a conference between C. J. Albasin, of the Ohio sub-district mine workers, and the operators.

INDIANA

Greenfield—A new trial has been granted in the case of Walter E. Krieble against the United Fourth Vein Coal Co. The case is of interest to coal mining companies because it involves the question of whether a coal company must supply props for the miners' use. A jury in a former trial awarded the plaintiff $12,000 damages for injuries received in a mine accident.

Terre Haute—Warren Soules, owner of 160 acres in Lost Creek township, Vigo County, has sold the coal and mineral rights to the Glen Ayr Coal Co., operated by Job, William and Clarence Freeman of this city, the last-named as manager. The consideration was $20,000. While the price looks high, several thousand acres in Fayette township were transferred sometime ago to Chicago capitalists at a higher figure, especially in the vicinity of the mines operated by the W. W. Ray interests of this city. Six hundred acres were purchased outright at $140 an acre and sixty acres at $300 an acre. The coal underlying the Soules land is said to be the best No. 4.

Sullivan—The Consolidated Indiana Coal Co. has brought suit in the circuit court against the Treat & Rowland Oil Co. to enjoin it from drilling through coal until proper arrangements have been made to take care of gas from the oil well. The complaint alleges that if gas is struck it would endanger the lives of the miners at work and might blow up the mine. It is alleged that although the hole drilled might not pass through an entry, at some future time an entry might be made and the gas well encountered. The suit raises an interesting question.

ILLINOIS

Harrisburg—The first cars were run, in the past week, over the new Southern Illinois Railway and Power Co.'s electric road between here and Eldorado. The road will also extend to Carrier Mills, eight miles south, and this will open up the entire mining field in this section to electric service. It is expected the line will be continued from Carrier Mills through the eastern Williamson County field, touching at Crab Orchard and Pittsburgh, with a terminus at Marion.

Springfield—The Illinois Mine Workers, through the Executive Board, have advanced the sum of $170,000 out of their $1,000,000 treasury fund to aid striking miners in other fields. One hundred thousand dollars goes to the Western Federation of Miners to aid strikers in the copper mines in Michigan, and the $70,000 goes to organization work in the disturbed fields in Colorado and other western states.

Two homes have been ruined and three others badly damaged, near Walden St. and North Grand Ave. during the past few weeks by a slow sinking of the land in that vicinity. This is believed to have been caused by a fall of ground in the south entry of the Peabody mine, which is directly behind these houses.

MICHIGAN

Kerby—Judge Jefferies, of Detroit, has been busying himself with the financing of a proposed coal mine, the shaft of which, it is said, will be sunk on what is known as the Clay Pit farm, near Kerby. It is understood that the leases held on a large area of land in the vicinity of the town will expire this fall, so preparations for mining, will have to be rushed. It is also reported, but without confirmation, that the promoters of the mine plan to produce 100 tons of coal per day, to be used in the operation of the cement plant at Fenton.

ARKANSAS

Fort Smith—It is reported in this vicinity that the coal industry in this field is in the finest condition that it has ever been. Mines are running full time, the only shutdowns being those that are necessary for the making of repairs. All companies have a large number of orders ahead and the relation between the men and operators is more harmonious than ever. It is also stated that the water conditions at Jenny Lind are being improved and the company is endeavoring to comply with the orders of the state mine commissioner as rapidly as possible.

OKLAHOMA

Oklahoma City—Citizens of Oklahoma City have taken definite steps to tap the oil and gas deposits believed to lie beneath the surface of Oklahoma County. A contract has been let for the drilling of a 3000-ft. well near this city, and the actual work will be begun at an early date.

FOREIGN NEWS

Shantung, China—The Shantung Mining Co., a Chinese concern, in 1912 produced 374,604 tons of coal at its Hungchan mine and 199,072 tons at its Sangtse mine, as compared with 288,752 and 170,405 tons, respectively, in 1911.

PERSONALS

David Shertzer has resigned his position as manager of the Conrad Brick Co. to accept the position of general manager of the Hamilton-Parker Fuel Co., a retail coal concern of Columbus, Ohio.

Isham Randolph has removed his offices to suite 1807, Commercial National Bank Bldg., northwest corner of Adams and Clark Sts., Chicago, where he will continue his practice as consulting engineer.

C. H. Hoyt, who represented the New York Coal Co., of Columbus, Ohio, in western Michigan territory has resigned to enter the retail business in Toledo. He has been succeeded by Harry Schweinsberger, an employee in the office of the New York Coal Co.

Colin M. Selph, whose appointment as postmaster for St. Louis was recently sent to the Senate, is president of the Anthracite Coalette Co. For several months past the company has not been operated, but it is likely that work will be resumed the coming winter.

C. M. Means has commenced his investigation into mining conditions in the neighborhood of Scranton for the state department of mines. His particular work will deal with the electrical equipment in the mines, with a view to suggesting possible safeguards to the chief of the state department of mines. If the investigation by Mr. Means in Lackawanna County shows that the electrical equipment in the mines is not up to the standard, his investigation will be enlarged so as to include the entire anthracite field.

TRADE CATALOGS

The Jeffrey Mfg. Co., Columbus, Ohio, Bulletin No. 118. "The Care and Operation of Jeffrey 28A Short-Wall Mining Machine." Twenty-four pages, 6x9-in.; illustrated.

The Buckeye Engine Co., Salem, O., The Buckeyemobile, Bulletin No. 10C. Fifteen pages 8x10, illustrating and describing the Buckeyemobile or American Locomobile.

The Draeger Oxygen Apparatus Co., Pittsburgh, Penn. "Oxygen, the Life Saver." Two hundred and twelve pages, 6x9-in., illustrating and describing various Draeger apparatus.

Henry R. Worthington, 115 Broadway, New York. "Conservation and Distribution of Water for Irrigation." Seventy-seven pages, 6x9-in., descriptive of irrigation and irrigating pumps; illustrated with many halftones and line drawings.

RECENT COAL AND COKE PATENTS

Boiler. G. J. Schanz, Erie, Penn. 1,069,583, Aug. 5, 1913. Filed Nov. 21, 1912. Serial No. 732,668.

Boiler R. Rohan. St. Louis, Mo. 1,069,184, Aug. 5, 1913. Filed Feb. 10, 1911. Serial No. 607,842.

Mine Spider. B. Madera, Brownsville, Penn. 1,069,798, Aug. 12, 1913. Filed June 17, 1912. Serial No. 704,214.

Smoke Consumer—I. Therrien, Quebec, Can., 1,061,143, May 6, 1913. Filed June 15, 1912. Serial No. 703,818.

Mining Implement. W. O. Snelling, Pittsburgh, Penn. 1,071,270, Aug. 26, 1913. Filed Nov. 23, 1908. Serial No. 464,156.

Smoke Consumer—C. A. Rush, La Grange, Ill., 1,061,502, May 13, 1913. Filed Jan. 18, 1910. Serial No. 538,601.

Smoke Consumer. T. E. Lappage, Birmingham, Ala. 1,069,270, Aug. 5, 1913. Filed Apr. 22, 1913. Serial No. 762,817.

Miner's Lamp. C. G. Sallander, Galveston, Texas. 1,068,533, July 29, 1913. Filed Nov. 1, 1911. Serial No. 658,016.

Coal Loading Machine—A. Powell, Uniontown, Penn., 1,061,778, May 13, 1913. Filed May 25, 1912. Serial No. 699,810.

Boiler and Economizer—P. W. Britts, Arleta, Ohio, 1,061,444, May 13, 1913. Filed June 11, 1908. Serial No. 438,001.

Coal Hopper for Windows—W. H. Taylor, Kewanee, Ill., 1.061,427, May 13, 1913. Filed May 24, 1912. Serial No. 699,582.

Miners' Acetylene Lamp—J. Courtney, Forbes Road, Penn.; 1,063,410. June 3, 1913. Filed Jan. 30, 1913. Serial No. 745,167.

Steam Superheaters—J. P. Parker, Philadelphia, Penn.; 1,063,585. June 3, 1913. Filed No. 28, 1908. Serial No. 464,931.

Smoke Consumer. P. F. Schaller and C. Cundt, Paris, France, 1,070,185, Aug. 12, 1913. Filed Sept. 18, 1911. Serial No. 650,006.

Coal Cleaning and Separating Machine. W. S. Ayres, Hazleton, Penn. 1,069.517, Aug. 5, 1913. Filed Feb. 24, 1909. Serial No. 47,699.

Miners' Lamp—S. N. Krieger and C. A. Fidler, Shamokin, Penn., 1,061,385, May 13, 1913. Filed Apr. 13, 1912. Serial No. 690,546.

Improvements in or Connected with Coke Ovens. N. Schuster, St. Stevens House, Westminster, London, S. W. 11,938 of 1913.

Apparatus for Making Coke and Gas. W. M. Carr, Wheeling, W. Va. 1.070.666, Aug. 19, 1913. Filed Dec. 11, 1911. Serial No. 664.950.

Smoke-Consuming Device for Furnaces. C. W. Lup Bradford, Eng. 1,070,148, Aug. 12, 1913. Filed Dec. 10, 191 Serial No. 536,005.

Machine for Washing or Separating Coal. R. S. Benson, Middleton, Eng. 1,069,223, Aug. 5, 1913. Filed June 3, 1912. Serial No. 701,227.

Gas Producer for Generating Rich Gases. R. Lahanssois, Paris, France. 1,068,788, July 29, 1913. Filed Feb. 8, 1912. Serial No. 676,430.

Method of Operating Gas Producers H. L. Doherty, New York, N. Y. 1,069,866, Aug. 12, 1913. Filed Jan. 17, 1911. Serial No. 603,082.

Charging Apparatus for Blast Furnaces—T Lewis, Glengarnock, Scotland, 1,061,349, May 13, 1913. Filed Dec. 23, 1909. Serial No. 534,558.

Safety Appliance for Mine Car Cages—G. E. Huttelmaier, Scottdale, Penn., 1,061,747, May 13, 1913. Filed Feb. 24, 1912. Serial No. 679,581.

Downcomer Construction for Blast Furnaces. J. Kennedy, Pittsburgh, Penn.; 1,064,343. June 10, 1913. Filed Oct. 11, 1911. Serial No. 654,083.

Water-Tube Boiler. J. E. Bell, assignor to Babcock & Wilcox Co., New York, N. Y. 1,070,391, Aug. 19, 1913. Filed Nov. 7, 1905. Serial No. 286,184.

Water-Tube Boiler. H. B. Bradford, assignor to Edgemoor Iron Co., Edgemoor, Del. 1,069,105, Aug. 5, 1913. Filed Sept. 10, 1912. Serial No. 719,515.

Smoke Tube Superheater—W. Schmidt and P. Thomsen. Cassel-Wilhelmshöle, Germany; 1,063,349. June 3, 1913. Filed Oct. 3, 1912. Serial No. 723,661.

Coal-Handling Apparatus. A. C. Johnston, assignor to J. M. Dodge Co., Naugatuck, Conn. 1,069,431, Aug. 5, 1913. Filed July 3, 1912. Serial No. 707,431.

Gas Producer System—G. Akerland assignor to Standard Gas Power Co. Atlanta, Ga., 1,060,807, May 6, 1913. Filed Feb. 21, 1912. Serial No. 675,001.

Improvements in Mounting for Percussive Coal Cutters and the Like. W. Mauss, Commercial Exchange Bldg., Johannesberg, Transvaal; 21,553 of 1912.

A Process for Freeing Slack Coal from Water. W. C. Simon, Essen-on-the-Ruhr, Germany; 1,063,296. June 3, 1913. Filed Aug. 6, 1912. Serial No. 713,621.

Mine Car Wheel—F. C. Hockensmith, assignor to Hockensmith Mine Car Co., Penn Station, Penn., 1,061,746, May 13, 1913. Filed Nov. 8, 1911. Serial No. 659,217.

Baffle System for Stirling Boilers. D. S. Jacobus, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,070,478, Aug. 19, 1913. Filed Jan. 2, 1913. Serial No. 739,721.

Means for Operating Gas Producers. H. E. Longwell, assignor to Colonial Trust Co., Trustee, Pittsburgh, Penn. 1,070,825, Aug. 19, 1913. Filed Dec. 23, 1909. Serial No. 534,615.

CONSTRUCTION NEWS

Sheboygan, Wis.—The C. Reiss Coal Co. will spend $100,000 in enlarging its No. 1 coal dock on St. Louis Bay and has awarded a contract to Wales-Campbell Co. to lengthen the dock 600 ft., widen it considerably and install a complete new equipment of hoists and similar apparatus electrically operated.

Charleston, W. Va.—The early development of 27,000 acres of coal lands recently leased to John Laing, former chief mine inspector and associates, is expected soon. Already the Island Creek branch of the Chesapeake & Ohio R.R. is being extended to the tract and an immense central power plant to furnish power to every operation on the lease, has been located. Work will be commenced immediately in opening 12 mines in the property, and coal will be shipped before the first of the year.

Paducah, Ky.—The West Kentucky Coal Co. has placed an order with the Sherrill-Russell Lumber Co., of Paducah, Ky., for lumber to build thirty coal barges, the total amount of timber required being 1,085,000 ft., or about 73 carloads. Douglas fir, long-leaf yellow pine and white oak will be comprised in the order. The barges will be built during the next few months, at the rate of ten a month, and it is hoped to have them completed in time for the movement of coal down the river for the winter market.

Chicago, Ill.—The Allen & Garcia Co. has been appointed constructing engineer in charge of the new mine of the

American Coal Mining Co. near Bicknell, Ind. It has also been appointed construction engineer to take charge of the new mine of the Shoal Creek Coal Co., near Hillsboro, Ill., which is to be completely electrified and will be designed to have a hoisting capacity in excess of any mine in the state. The Allen & Garcia Co. will have entire charge of these two mines, including the shaft sinking, underground development and all construction work.

Charleston, W. Va.—The Pocahontas Consolidated Collieries Co. is about to let the contract for the construction of a steel tipple at Lick Branch, seventeen miles west of Bluefield on the main line of the Norfolk & Western Ry. The tipple will have a capacity of 3000 tons in 10 hr., and is to replace a wooden one that has outlived its usefulness. It is intended to handle the product of the Lick Branch and Shamokin collieries. The cost will probably be in the vicinity of $65,000, and the tipple must be completed by Apr. 1, 1914.

Mobile, Ala.—Of interest to the Birmingham district is the recent organization of the Standard Steel Co., which will build a large modern plant for the manufacture of structural steel, shapes, etc., at Mobile, Ala. This company is going to expend $5,000,000 on this plant, $800,000 of which will be used for the building of a model town, to be called New Mobile, just out from Mobile. This town will be modeled after the industrial city of the United States Steel Corporation, Fairfield, Ala., near Birmingham, which is considered one of the most uptodate industrial cities in the country.

Dublin, Ala.—The Gas Light Coal & Coke Co., of Birmingham is developing 2000 acres of coal land at Dublin, Ala., on the Illinois Central R.R. in the northern part of the State. It will expend about $100,000 in improvements, including fifty new dwellings, large commissary, etc., modern tipple and washer. The coal will be mined with machines driven by compressed air, and about 175 men will be employed when the mine is fully developed. This mine will tap the hard Black Creek coal, one of the best in the South for all purposes, being especially suitable for gas making. This is the second mine to open up on the Illinois Central R.R., the other one being the Brilliant Coal Co., at Brilliant, Ala., only three and one-half miles from Dublin.

NEW INCORPORATIONS

McAlester, Okla.—The Gap Oil, Coal & Gas Co. has been organized at McAlester with a capital stock of $40,000. The incorporators are U. G. Crane, R. G. Chandler, of McAlester, and H. B. Rowdy, of Kiowa.

Indianapolis, Ind.—The Middle States Coal Corporation of New York, has certified to the Indiana secretary of state that $560,000 of its $2,000,000 capital stock is represented in Indiana, with headquarters in Indianapolis.

Chicago, Ill.—The Monarch Coal & Supply Co. has been organized with a capital stock of $10,000 to deal in coal, wood, coke and lumber. The incorporators are Frank J. Kolar, Guy Vanschock, and W. Arnold Amberg.

Middlesboro, Ky.—The J. T. Reed Coal Co. was organized recently at Middlesboro, Ky., with a capital stock of $5000, by James T. Reed, H. A. McCaney and R. E. Samuels. The company will conduct a small operation in the Middlesboro field.

Aberdeen, S. D.—The Haynes Coal Briquetting Co. of North Dakota has been organized with headquarters at Haynes, and business office in Chicago. The capital stock is $350,000 and the incorporators are R. D. Ruffin, H. G. Adams, W. P. J. Dinsmore, John W. May of Chicago, and James S. Sebree of Pierre.

Charleston, W. Va.—The Pocahontas Coal & Land Co. has been incorporated with an authorized capital stock of $50,000. This firm will have offices at Marlinton, Pocahontas County, and chief works in the Edray district of the same county. The incorporators are Hubert Echols, F. R. Hunter, S. L. Hogsett, J. W. Prie, and J. K. Marshall, all of Marlinton.

INDUSTRIAL NEWS

Castle Gate, Utah—The Castle Gate Coal Co. has recently placed an order with the Link-Belt Co. for a complete shaking screen and picking equipment, including a Link-Belt rotary tipple.

Cleveland, Ohio—The Cooke-Wilson Co., of Ohio, has removed its offices from 614 Columbia Bldg. to 1114 Williamson Bldg., Cleveland, Ohio, and will be at its new quarters on and after Sept. 8.

Ruffsdale, Penn.—The Link-Belt Co. has received a contract from the Winona Coal & Coke Co. of Ruffsdale, for a complete retarding conveyor and shaking screen equipment for their new tipple at Coffman, West Va.

Columbus, Ohio—The Jeffrey Mfg. Co. has recently sold the Delaware, Lackawanna & Western Railroad Co. twenty 7-ton and two 15-ton locomotives, together with some conveying machinery which will be used in the latter company's mines.

Johnstown, Penn.—The Operators Coal Co., of Johnstown, is securing title to a tract of 6000 acres of coal and 1000 acres of surface in East and West Wheatfield Townships. This is the tract of coal that the Pressed Steel Car Co. tried to purchase several years ago.

Chicago, Ill.—Due to its growth of business, the Allen & Garcia Co. has established an electrical department. This department will be in charge of W. F. Corl, who has had long experience in electrical power and mining work, in design, construction, maintenance and operation.

Salt Lake City, Utah—The Standard Coal Co. of Salt Lake City has placed a contract with the Link-Belt Co. for furnishing a complete shaking screen and conveying equipment, including a new type revolving dump and a re-screening equipment. The entire supporting structure will be of concrete.

Nashville, Tenn.—During 1912, the State of Tennessee produced 6,587,754 tons of coal, valued at the mines at $7,422,703. This exceeded the production of 1911 in both amount and value. During that year the state produced 6,466,224 tons, valued at $7,071,376. It is further believed that the 1913 production will exceed that of 1912.

Mansfield, Ohio—The Ohio Brass Co. is now manufacturing all-wire rail bonds, with pin-driven terminals. The new bonds embody the same features which have characterized the older type, that is, terminals and body made of the same strands, and the strands protected by thin copper sleeves at the point where they are welded together to form the terminal.

Pineville, Ky.—The Wilhoit coal properties in Harlan County have been taken over by N. J. Moss & Sons under the name of the Moss & Sons Coal Co., and will be under the management of Ray B. Moss. W. L. Moss is president, J. M. Moss is secretary and treasurer and Ray B. Moss general manager. The Wilhoit mine is one of the biggest and best properties in Harlan County.

San Francisco, Calif.—Judge Maurice T. Deeling, of the United States District Court, on Sept. 5, ordered a fine of $2000 imposed on the Western Fuel Co., and directed the imprisonment of D. C. Norcross, secretary of the company, for contempt because of the refusal to produce the company's books before the federal grand jury, which is investigating alleged customs weighing frauds.

Liverpool, Eng.—It is estimated that the quantity of coal consumed by vessels engaged in international commerce is about 55,000,000 tons per annum, valued at approximately $180,000,000. It is probable that the total price is even higher than this, for on a large proportion of the coal supplied at foreign coaling stations, immense freight charges have to be paid in view of their remote situation.

Dublin, Ireland—The situation brought about by the strike of transport workers in Dublin has been rendered more acute by a lockout in the coal trade. The merchants at a meeting decided that they would no longer employ men belonging to the Transport Workers' Union, which organization, they say, will not permit its members to deliver the coal of certain firms with which the union is at loggerheads.

New York, N. Y.—Ex-senator John C. Spooner, as counsel for the American Coal Products Co., Barrett Mfg. Co., and 23 other defendants in the government dissolution suit against the so called Coal Tar Trust, appeared before Judge George T. Holt, Sept. 4, and stated that his clients had, within the period prescribed, complied with the requirements of the decree of the Federal District Court made in the Sherman Law suit. The combination complained of is now considered to be legally dissolved.

Danville, Ill.—The fiscal year of 1912-13 was the most successful from the standpoint of accidents that has ever been experienced by the Dering Coal Co. in the Danville district. Despite the fact that the roof is the most treacherous in the state, and that the coal is shot off the solid, there has not been one fatal accident for the entire year. This company operates three mines in this district, the average number of men employed during the winter months being 1200, and during the summer, 900.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite market slowly readjusting itself to the fall trade and at the moment rather inactive. Bituminous maintaining its strength in the face of some adverse developments. Car shortage becoming more general.

The hard-coal market is now experiencing the uncertainties incident to a transitional period between the summer dullness and winter activity. While generally inactive, the first indications of improvement are beginning to appear. Prices on the whole are being well maintained, with the exception of the individuals, who, of course, are always ready to meet adverse conditions with concessions on the regular company circular. The handling of the new Pennsylvania State tax on anthracite is also causing some interesting manipulation in the market. Production is still being restricted, and will probably continue so throughout the balance of the current month, but indications point to a heavy demand this fall, and buyers who do not obtain their supply are liable to find themselves in a critical position within the next 60 or 90 days.

The withdrawal of the railroads from the Eastern market is the principal feature in the bituminous situation. These roads have been unusually heavy buyers for several months, and in fact have formed the backbone of the abnormally strong trade prevailing in bituminous. The disappearance of this sustaining power has introduced an element of uncertainty into the situation.

While the market has by no means developed any important weakness, shippers are, nevertheless, more willing to contract for deferred delivery and the situation is not so clear as it has been recently. A few water cargoes of consignment coal shipped into New England have not been well received, and unless inclement weather intervenes, the trade will be decidedly easier. The past conservatism has left much free coal on the open market, and sellers are showing a noticeable disposition to look for business. However, there is still a good demand in the prompt market, and as the season advances this will naturally improve.

The situation in the Pittsburgh district is less strong than formerly, the complaint being that too much coal was kept free for use in the spot market; no actual weakness has developed at the moment, and prices are being well maintained, but the demand for free coal is scarce. However, with the production well covered by contracts the conditions are by no means serious. In Ohio the hot weather and the holidays have caused the market to become rather inactive. The car shortage is steadily becoming more serious, and the Lake shipping is being somewhat delayed. The domestic business is the chief feature in the local situation, while the demand for steam and railroad coal is also good, with some buying in the open market; the Lake movement is being curtailed by the lack of sufficient transportation.

The dumpings at the Hampton Roads piers have been only fair during the week, and are mostly for shipment into New England. There is still a heavy movement from the mines, and operators are pushing their men for all the possible tonnage they can get. The situation in the Southern market is still unchanged, and the demand continues good, with an active fall business anticipated; the car shortage is becoming more noticeable.

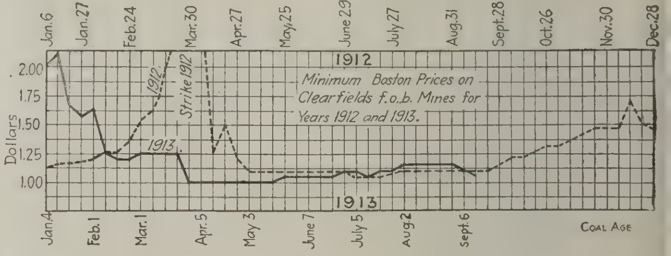
Conditions in the Middle Western market are bettering, with prices showing an advancing tendency. There is a lack of railroad equipment here, in addition to which some mines are experiencing trouble from other sources, such as insufficiency of water and numerous holidays.

BOSTON, MASS.

Pocahontas and New River remain firm, but with signs of an easier market later. Georges Creek in short supply with operators declining orders. More disposition on the part of Pennsylvania operators to seek future business. Anthracite strong.

Bituminous—The Hampton Roads coals remain firm, but the outlook for later in the fall is not so clear. Most of the shippers are offering at the contract figure for deferred delivery but they are still well supplied with spot business. There is increasing interest in the question whether stocks in this territory are piling up so fast that there will be a slackening demand within a few weeks. There are a few instances of cargoes shipped on the market which have not been well enough received to warrant much development along that line and it is being predicted that unless bad weather intervenes to slow up the movement the situation is likely to be decidedly easier. At the same time, prompt coal is hard to get and the advancing season, at least, is in favor of its continuing so.

Georges Creek for prompt loading is also hard to secure except on contract and more or less tonnage intended for Baltimore loading has been diverted to Hampton Roads where the dispatch is now about normal.



There is practically no news on the Pennsylvania grades. The operators seem still to have the situation well in hand although there is more disposition on the part of some to look now for late fall business. With so much conservatism in the attitude of the seller it is beginning to be wondered what is to become of the free coal that has been reserved for October and November. All-rail the movement is steady, with no material change either as to price or the volume of coal shipped.

Anthracite—The companies have ample business in hand for weeks to come and orders are still forthcoming for September coal. The prospect is excellent and the trade generally is in a wholesome condition. Individual coals are being offered at figures nearer the July than the September circular, but such cases are becoming rare and are not regarded as significant.

Quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*...............	$1.05@1.45	$1.35@1.60	$1.67@1.77	
Philadelphia*..........	2.30@2.70	2.60@2.85	2.92@3.02	
New York*............	2.60@3.00	2.90@3.15	3.22@3.32	
Baltimore*...........	....	....	2.85@2.95	
Hampton Roads*........	....	....	....	$2.85@2.90
Boston†...............	....	....	....	3.90@4.05
Providence†..........	....	....	....	3.83@3.93

NEW YORK

Anthracite uncertain but generally dull, with considerable coal still going into storage. The withdrawal of a number of railroads from market the feature in the bituminous situation. The effects are indeterminate as yet, but no weakness has developed at the moment.

Anthracite—Considerable uncertainty prevails in the local hard-coal market, some of the operators reporting that they are already unable to produce sufficient coal to supply all their orders. This condition, however, is probably due to the intermittent way in which the mines have been working, because of the restriction in output and the numerous holidays. Even those taking this optimistic view of the situation are free to concede that it is not due to any particular activity in the demand, but rather to the seeming impossibility of keeping production up to normal. There is a good supply of cars, but a decided shortage of labor.

Other producers are finding the market decidedly easier, if not dull. Much coal is being put into storage and the mines are only planning on working five days per week throughout the current month. Considerable pea is going into storage and chestnut is easy; stove coal is about the only grade on which there seems to be any insistent demand. However, the market is beginning to show some signs of activity, and all of the companies are anticipating a big business this fall and winter. Consumers who neglect to cover their requirements until late in the season, may find themselves in difficulties.

Prices remain practically unchanged with the exception of a small advance on chestnut and a somewhat stronger tone on barley. We quote New York hard-coal market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	....
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.35@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.30@2.70
Rice	2.25	2.25	1.95@2.20	1.70@2.20
Barley	1.75	1.70	1.70	1.40@1.70

Bituminous—The feature of the soft-coal market during the week was the sudden and unexplainable withdrawing from the market by a number of railroads, notably the Boston & Maine, the Boston & Albany, the Grand Trunk and the New Haven. These companies have been active buyers for some time, frequently inquiring about the prospects for doubling their orders. As a matter of fact, they have been the predominating influence in the abnormally strong conditions prevailing in the bituminous market, and the unexpected withdrawal of their support has undoubtedly introduced a great deal of uncertainty into the situation. It is even generally believed that the pursuance of this policy will eventually place the market in a critical position. One large operator is of the opinion that the roads will not again be in the market for about 30 days.

Aside from a somewhat indefinite weakness in the low-grade coals, the market fails to show any indications whatever of a break as yet. It is a trifle spotty, particularly locally, but it is hardly conceivable that it can suffer any very important reverse because of the large amount of contract business signed up. There is not much free coal in the open market, nor is there much demand for it. While the mines seem to be producing all the tonnage required, it is doubtful if a very material increase could be made, should occasion demand, because of labor difficulties of various kinds in the mining regions. The local prices have not changed any, and the market is still quotable on the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

PHILADELPHIA, PENN.

Rumors of a slight weakening in the strong bituminous market. Prices are occasionally being made at a concession due to heavy consignments in this direction. Some coals, however, are still hard to get at any price, and there is really no material setback from the favorable conditions that have prevailed.

The first faint indications of activity in the anthracite-coal trade have begun to make their appearance. Inquiries are becoming more frequent in both the wholesale and retail trade, and the orders are being received in more volume than has been the case during the last two months. While this change is not marked as yet, at the same time it is a healthy premonition of better things to come.

The inception of the winter is likely to find the trade in a position to meet almost any contingency. Nearly all the companies have large stocks of coal, of all sizes, and are reasonably sure that the conditions of last winter when a fuel famine stared some localities in the face, will not be repeated. This is dependent, however, upon the fact that conditions remain about normal; any unusual demand, or an exceedingly strenuous winter is not likely to be covered under this statement.

The month of October usually marks the period when activity in this branch of the trade sets in, and there is nothing to indicate at the present time that this year will prove the exception. Prices are well maintained, with the exception of the individual operators, who are making conditions to fit the case, and while these concessions, as a rule, are not much, the aggregate amounts to considerable and proves an acceptable inducement for buyers, not to mention the absorption of the state tax, which is only added under the tacit understanding that it will be deducted when settlement is made. The manipulation of this tax for business would make interesting reading, and has been the means of diverting many dealers from their regular sources of supply.

BALTIMORE, MD.

Demand excellent for this season but the market is showing the first signs of weakness. Cheaper fuels at tide. Low-grade coals and coke easier.

While it is admitted in many places that there are some signs of weakness in the market, these are the first to be noted for a number of weeks past and they are not important as yet. While there was no great accumulation of coal at tide here, reports from Norfolk, Philadelphia and New York are to the effect that considerable cheap coal is being offered at those points. The rush of fuel to tide and to terminal points generally is conceded to be having its effect.

Better grade coals are holding their own in excellent shape, but there are numerous reports of offerings of poorer fuels at prices considerably below what has been the rule for several weeks. No one is willing to admit that this marks the beginning of anything like a slump in the soft-coal market. All believe that the trade is so well covered with contracts on the higher-grade fuels that these are protected come what may, and that the natural demand for the other class of coal will be such as to prevent any decided drop in prices.

The growing uncertainty concerning coal cars on the railroads feeding this territory is also a feature in the situation. Already there are times in the Fairmont and Somerset districts when the lack of cars is being keenly felt. For the present, there is plenty of fuel to meet the demand.

Coke has also eased off, and some of the producers are now seeking a market. Offerings of West Virginia coals at from $2 to $2.40 were heard during the week, with Connellsville held at from $2.25 to $2.60. The very warm spell has slacked up the anthracite trade here. The first days of the month saw a number of deliveries for September account, but the rest of the month is likely to be slack. The orders already on the books, however, seem to give promise of a very busy October.

PITTSBURGH, PENN.

Mines working at substantially full capacity on contract business, with very little prompt demand. Some uncertainty at mines not contracted to full capacity, expecting to sell prompt coal. Connellsville coke price still maintained, though with some difficulty, and further curtailment in output expected.

Bituminous—Mines in the Pittsburgh district continue to work at substantially full capacity, with fair labor supply and practically adequate car supply. About all the coal mined is applied against contracts, there being very little disposed of on prompt sales. Demand for free coal is decidedly light, but offerings are equally light. The situation does not appear to be altogether as strong as formerly, it being claimed there is an element of weakness through so many operators having contracted for less than their full output, expecting to dispose of considerable tonnages in the prompt market, and it now seems improbable that any large demand will develop in this direction. Thus far no actual weakness has appeared. Regular prices are well maintained, and we continue to quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¾-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

There is a tendency among Connellsville coke operators to market coal instead of coke, arising in part from a belief that there will be a good demand for coal and in part from a desire to curtail coke production in order to maintain prices. One interest having two small plants has already announced its intention of blowing out the ovens and shipping coal.

Connellsville Coke—Operators have had more trouble than for July and August in closing up for September such furnaces as were not covered for longer periods. There have been rumors that some coke went at concessions from the $2.50 price, but these cannot be confirmed as relating to first-grade coke. At any rate, the major portion of the tonnage required for September has been taken at the fall price, with two or three consumers not yet fully covered for the month. The New Jersey Zinc Co. is understood to have purchased 25,000 or 30,000 tons for delivery from September over the last four months of the year at $2.50, but guaranteed against decline. It is stated on the part of certain operators that they will further curtail production to meet the situation. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $3; contract foundry, $3 per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 30 at 403,030 tons, an increase of 33,554 tons, and shipments at 405,115 tons, an increase of 35,792 tons. This makes the tonnages larger than the average for July and August, which was about 380,000 tons weekly, while the average in the first half of the year was 409,000 tons weekly. It is hard to understand how production and shipments could have been so large lately, considering the material decrease in pig-iron production, but as to shipments in the week ended Aug. 30, it is to be remembered the holiday at the beginning of the following week was doubtless being provided for.

BUFFALO, N. Y.

Bituminous as hard to get as ever. Cars growing scarcer and flat cars unobtainable. Canada still very short of money. Railroads buying considerable soft coal. Anthracite dull.

Bituminous—There is no increase in the bituminous supply. It has been a long time since there has been a car of unsold coal in this market and there is no prospect of any right away. The consumption is brisk and the movement of cars not what it was. The indications are that consumers will soon be obliged to take anything in the shape of steel hoppers that they can get. Shippers with contracts for delivery in low-side, flat-bottomed equipment say that they are away behind because they cannot get the cars. If there is a falling off in consumption anywhere, it is in Canada, and that is entirely on account of the money scarcity. What ready cash was not absorbed in land speculation has now been sent to the Northwest to move the crops.

Some of the Pennsylvania mines are considerably hampered by lack of water, so that it would be impossible to increase the output to any great extent, even if miners were plentiful and all disposed to work. The railroads are also in the market and they probably would not buy any more now than they needed if they did not look for a shortage before long. The Buffalo market is quiet enough, as the distance from the mines is not great, but it is a hard matter to get shipments through such a terminal point as this and as the season advances the difficulty will increase. It will not answer to allow a consignment to take its natural course from the mine to the consignee if he is at all near the end of his supply. When the grain crops begin to move freely there will be a lack of motive power to add to the other difficulties.

The quotations of bituminous remain strong at $2.90 for select Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run, and $2.15 for slack, which is especially strong.

Coke—There is some increased stiffness in the price of coke, said to be on account of shutting down of a good many of the ovens. Dealers now say that they cannot get the best Connellsville foundry short of $3 at the ovens, which would make the price $4.85 here without any profit to the jobber anywhere. Stock coke is as scarce as ever.

Anthracite—There is a return of warm weather that keeps the anthracite market dull, but people are now coming back from their vacations and they will go to buying as soon as the cool weather sets in. There is some special competition everywhere on account of some companies failing to make the addition to prices caused by the Pennsylvania tax; it is generally believed that the tax will never be collected.

Anthracite shipments by lake are not so heavy as formerly, on account of the congested condition of the upper-lake docks, but for the week were 148,000, for the month of August, 742,215 tons and for the season to September, 3,308,421 tons, as against 1,782,933 tons for the same time last season.

TOLEDO, OHIO

Hot weather and holiday cause the market to become inactive. Car shortage developing. Lake shipping somewhat delayed.

The coal trade has been rather inactive here during the past week, owing to the extremely warm weather. Labor Day following the Sunday holiday also made business dull. The demand for domestic coal has fallen off considerably but it is expected that as soon as the weather becomes cooler, business will open up briskly. There is considerable complaint among shippers of a car shortage but there has been little difficulty experienced here from this source as yet. Coal men generally, however, predict a shortage a little later when the crops begin to move more freely.

The city of Fremont, O., which suffered severely from the high waters of last March is already in the midst of a car famine and is anticipating an increase in the price of coal there this winter. Fremont is located on the Wheeling & Lake Erie railway, one of the largest coal carriers in the state and a congestion on this road is bound to affect Toledo. The lake shipping has been somewhat delayed owing to the short shipments but all the docks are working as hard as possible loading boats and getting their supplies off to the head of the lakes.

Prices quoted here continue as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.50	2.50	....	....
Nut	1.80	1.20	2.25	1.50	2.50	....	....
⅞ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.50	1.10	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Activity prevails despite the intervention of a holiday and the growing car shortage; these two factors tended to decrease the production. Prices well maintained at the recent circular and no cutting of consequence is reported. The tone of the market is satisfactory and the outlook bright.

The chief feature of the trade has been the demand for domestic grades. Dealers in all sections are placing larger orders and are insisting upon prompt delivery. They have been busy delivering fuel to private consumers who are laying in their winter's supply somewhat earlier than usual. Retail prices are strong and inclined to advance; their stocks are not heavy and they are trying to increase them.

Steam business is also active and the demand for all steam grades is good. Railroads are taking a good tonnage as the freight movement continues high. Manufacturing concerns engaged in the iron and steel industry are good users of steam coal and other lines also show up well. A number of the steam users are buying their supply on the open market. Contracts are being renewed at higher figures than the previous year.

Lake trade is also good and the demand from the Northwest is strong. Chartering of boats is going on actively and the indications are bright for an active lake trade right up to the close of navigation. The Toledo docks of the Hocking Valley Railway company have handled almost two million tons during the present season.

Production has been curtailed during the past week by the shut down over Labor Day and also by a lack of transportation facilities. In the Eastern Ohio district the car shortage is probably the worst and as a result the output is estimated at 65 per cent. normal. In the domestic fields of Massillon and Jackson the output was larger. In the Pomeroy Bend district car shortage cut quite a figure and the production is estimated at 70 per cent. In the Hocking Valley district the supply of cars was better and the output is estimated at 80 per cent.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75 @ 1.70	....	$1.85 @ 1.75	$1.70 @ 1.65
3-4 inch	1.60 @ 1.55	$1.30 @ 1.25	1.55 @ 1.60	1.55 @ 1.5
Nut	1.30 @ 1.20	....	1.35 @ 1.40	1.25 @ 1.20
Mine-run	1.40 @ 1.35	1.20 @ 1.15	1.30 @ 1.25	1.25 @ 1.20
Nut, pea and slack	0.80 @ 0.75	....	0.75 @ 0.70	0.75 @ 0.70
Coarse slack	0.70 @ 0.65	0.80 @ 0.75	0.65 @ 0.60	0.65 @ 0.60

HAMPTON ROADS

Movement of coal for the week only fair and mostly to the New England market. Sewalls Point makes record dumpings during month of August. Prices firm.

The movement of coal from tidewater has been fair, but it is doubtful if the dumpings will amount to anything like the quantity handled last week. The greater portion of the week's movement has been coastwise to the New England ports and has practically all been contract business. Foreign shipments were consigned to Cuban ports, Panama, and one large shipment to Italy.

Prices have been around $2.85@2.90, but it is difficult to say at exactly what figure any spot sales have been made as the suppliers seem to prefer to keep these private. There have been one or two small cargoes of high volatile coals moved to the New England market, but it is impossible to ascertain at what price it was sold.

During the month of August over one million tons of coal moved over the Hampton Roads piers, the exact tonnage amounting to 1,030,434 tons, of which Lamberts Point dumped 455,269, Sewalls Point making a record month with 283,385 tons and the C. & O. Ry. at Newport News dumped 291,780 or only about 8000 tons more than the one pier at Sewalls Point.

LOUISVILLE

Heavy shipments continue in spite of the warm weather. Strike possibility still the main uncertainty in the situation. Producers pushing the mines for all the tonnage possible.

The long continued summer weather is naturally having some effect upon the consumption of coal, but dealers are doing considerable storing in order to replenish their depleted supply, so that the movement from the mines continues heavy. This is true in both the Eastern and Western fields alike, a large part of the output in the former being used on contract shipments to points in the North and Northwest. Much of the Western Kentucky coal is going into Louisville for use both as a steam and domestic fuel. In event of the expected labor troubles in the Eastern Kentucky field coming to a head, their markets will have to be supplied from the Western district, and this at a time when the demand is the heaviest.

The higher grade fuels are still in the best demand in spite of the discrepancy of about $1.50 in price. The only uncertainty in the situation now is the possibility of a strike in the Eastern Kentucky field. Some of those best informed on the situation claim that a lockout is practically unavoidable. Most of the mines are running on full time at the present moment, there being plenty of cars with orders in excess of the capacity of the mines. From the best information available the labor trouble will not be precipi-ated until Oct. 1.

In the meantime operators are taking full advantage of the abnormally strong market, and are pushing the mines for all the possible tonnage they can produce. In spite of the fact that there is a heavy movement of the prepared grades, the high-grade screenings are particularly scarce and lifficult to buy. On the other hand, there is a surplus of the western Kentucky screenings. Domestic grades of east-rn Kentucky remain at $2 to $2.25, with the better grades of nut and slack at 85c. Second grade and western Kentucky nut and slack are quoted at 60 to 65 cents.

BIRMINGHAM, ALA.

Little change in the coal and coke market. Car shortage till prevails. Pig iron firmer, with larger sales.

This past week has brought about very little change in he situation here. The demand for both steam and domestic oal is good, especially considering that this is the dull eriod, and it is expected that a good fall business will be one, at fair prices, both for lump and steam coals. The car hortage continues evident, and will, no doubt, be felt very nuch more as the winter draws nearer.

The demand for coke, both furnace and foundry, is only air, as is also the case with smithing coal. Pig iron seems o be on a firmer basis, the large makers holding for their rice and not accepting anything offered just to book the usiness. Some large sales were made this past week, and at etter prices than have prevailed for several months. Alto-ether the iron market looks very hopeful.

INDIANAPOLIS, IND.

Market dull and quiet with mines working about half time. creenings weak. Indications point to an active business in ctober.

As the weather so far in September has been as hot as it as in August, there is only slight improvement in the ade. Retailers who cater to the country trade say farmers ill not haul coal over the dusty roads, with the thermometer howing 95 deg. in the shade. Most of the producers in the ate are running better than half time, and the cooler eather that will come this month is expected to put the ajority of the mines on full running schedule.

Screenings are cheap, according to the market, being uoted all the way from 10c. to 50c. Most operators, how-ver, hold out for 50c. to 60c. Industrial conditions are re-orted up to the average for the season, though somewhat ack in spots. There seems to be as much complaint of a ck of labor as of labor out of work. No advance in prices as made Sept. 1, and, feeling that there is sure to be one Oct. 1, domestic consumers are buying liberally and the rds will probably exceed the average September business.

CHICAGO

Conditions in the smokeless-coal market are not favorable d a decline in prices has been noted. Dealers also report a cession in anthracite. Screenings, as a rule, are selling at c., the mines.

Prices for smokeless coal have weakened slightly and hile some of this product is selling at $1.50, shrewd buyers e not encountering much trouble in obtaining smokeless ne-run at $1.40 with lump and egg at $2.25, the mines.

The car situation in the territory which produces Eastern al is less favorable and the same conditions prevail so far Western mines are concerned. There has been a recession the anthracite market and buyers are able to make pur-ases at from 25c. to 30c. a ton less than the circular price certain sizes. A large amount of central Pennsylvania al is being received in the Chicago market on the basis of 25 a ton, the mines, and is being disposed of as a substi-e for West Virginia semi-bituminous coal. Furnace and ndry coke are moving chiefly on contract. Producers of int coal report that they have comparatively little free l for all-rail shipment westward.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
nestic lump	$2.22@2.32	$2.70@2.80	$2.27	
m lump	1.92		2.07	
		2.70@2.80		$4.30
e-run	1.82	2.30	1.87	$3.45@3.55
enings	1.22@1.32	1.55@1.65	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-duct, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

DETROIT, MICH.

Stocks relatively light and market still strong. Slack in particularly good demand. Increase in prices anticipated soon.

Bituminous—The local market still continues very active; there is a good demand for all grades and the outlook is for a still further increase. Slack is coming in slowly and the demand is so heavy that the West Virginia grades are in some cases bringing as high as $1 per ton f.o.b. mines. Domestic orders are being received in good volume and dealers are busy making deliveries to their customers. Stocks on hand are relatively light and buyers are attempting to increase these as rapidly as possible to provide against the expected car shortage. Not much September business is being done, but it is expected that quotations for the month will show a slight advance before it is over. Manufacturers, who delayed closing contracts are very active buyers in the spot market. Some of these steam contracts are now being renewed at an advance over last year's figures, but producers, as a rule, are indifferent about signing up for any further tonnage, apparently preferring to keep some free coal for use in the open market.

The local market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.70	....	$1.75	....	....	$2.50	$2.40
Egg	1.70	....	1.75	....	....	2.50	2.40
Steam lump	1.25	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	1.15	$1.15	$1.15	....	....
Mine-run	1.05	1.00	1.00	1.00	1.00	1.50	....
Slack	0.95	1.00	0.75	0.70	0.80	....	....

Anthracite—Hard coal has shown some slight improvement, but not of any great importance as yet. However, it is better than at any time since the cessation in activity last winter. Indications are that the middle of the month will see the beginning of the fall demand and it is probable that it will be an exceedingly active season for the companies.

ST. LOUIS, MO.

Market stronger, although the arrival of considerable speculative coal has caused some unsteadiness. However, mining is being interrupted and the movement is not heavy.

In a general way local conditions are improving. The market has gone up in the past week on standard coals, which is something that has been needed for some time. The Carterville and Franklin County market is not as steady as it might be on account of a large amount of coal coming in that was sold on speculation.

However, country prices are firm, which is accounted for by the car shortage, lack of water and the annual chain of county fairs that always take about two or three days a week of the miners' time. This will last for at least a couple of weeks longer, and as soon as the prevailing torrid spell is over and coal in demand, prices should continue to go higher.

The Standard operators have at last decided that they must get something for their coal, and Standard lump has gone up about 15c. per ton in the last ten days. Anthracite, coke and smokeless are still dragging, with no demand.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.15
3-in. lump	....	....	$1.50	....
6-in. lump	$1.70 @ 1.85	....	1.60	1.35
Lump and egg	1.50 @ 1.60	$2.15	1.60	....
No. 1 nut	1.30 @ 1.40	....	1.05	0.87½
Screenings	0.55	....	0.40	0.85
Mine-run	1.50	....	....	....
No. 1 washed nut	1.60	....	1.60	....
No. 2 washed nut	1.35	....	1.50	....
No. 3 washed nut	1.20	....	....	....
No. 4 washed nut	1.00	....	....	....
No. 5 washed nut	0.60	....	....	....

OGDEN, UTAH

Operators able to increase number of working days by forcing the market, buying being done in limited quantities, surplus of nut and slack at the mines. Considerable coal being sold below circular.

The operators in Wyoming and Utah are making a desperate attempt to induce buyers to accept immediate shipments in order to keep the mines running full time. Orders are coming in slowly and salesmen are still working hard with the trade to induce them to get coal in transit before the car shortage becomes severe at the mines. The present condition is attributed to the money market. A large percentage of coal is bought with borrowed money, and for the past five months the dealer has been unable to procure money from his bank with which to buy. The demand for lump coal is better than during the last week in August, but this is due to the cool weather in various sections.

With the slight increase in the demand for lump and consequent increase in production at the mines, there is a surplus of nut and slack coal. This condition will probably continue through September or until the demand for lump is greater, at which time the mines will be able to move all the nut coal produced. About Sept. 20 the sugar factories will resume shipment, and this will take care of the slack.

Owing to the weak condition of the Market the operators have been unable to maintain the circular at all times, and in order to move the tonnage some shipments are being made at concessions. However, with the approaching cold weather this condition will be removed.

The car shortage has not caused the Wyoming mines to loose time, although there has been a shortage of closed equipment, and some commercial coal has been loaded in open cars. The Utah mines have not fared so well, the Rio Grande has been unable to furnish them sufficient cars, and the mines are now loosing from two to three days per week.

Present quotations are:

Lump	$2.75
Egg nut	2.50
Nut	2.25
Mine run	1.85
Slack	1.00

PORTLAND, ORE.

Wyoming and Utah mines give notice of 50c. advance to become effective Sept. 8. Local prices will probably increase accordingly.

Coal dealers here were notified this week that on Sept. 8 prices at the mines on Wyoming and Utah coals will advance 50c. per ton. At present the retail price here ranges from $9 to $10, and while no decision has been reached, it is taken as probable that retail prices will be advanced accordingly. No reason is given here for the increase.

So far no Australian coal has been imported here this summer, but if prices on Wyoming and Utah products continue to advance it is regarded as probable that some importations will be made in the fall, for which there is yet time. The freight market being easier than last year, it is the more likely that some of this business will be done this season. Last year freights were high and coal prices here lower than now.

It will be about a year before the Southern Pacific will have its line between Eugene and Coos Bay open for operation, but its completion will undoubtedly mark a change in the coal situation here and in many communities in the Willamette Valley, for the coal mines on the bay will then have found an easy outlet for their product.

NEW ORLEANS

Keen competition stimulates interest as period for new contracts approaches. Cars more plentiful than last week, but shortage still in evidence. Storing continuing on large scale.

While lacking activity in the spot market the number of contracts about to expire is stimulating interest in the local situation. Before the end of the year new agreements will have to be signed with a number of the principal steamship lines making this port and with most of the largest local consumers. Alabama interests hope to make further inroads on the old companies that rely on the river for their coal supplies. Indication of the keen competition between the Alabama, Kentucky and Pennsylvania coal companies was seen in the struggle last week for the school board contract for this year.

The car shortage is still a factor, but there has been some relief since last week, when the trouble threatened to become acute immediately. While the stocks of coal in the city are larger than ever before, there is no indication of curtailing the work of storing. The North German Lloyd Line is to make this port regularly and will add another important contract to those already pending this fall.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

Total shipments of coal over this road for July of the current year were **321,626** tons as compared with 245,087 tons for the same month last year. For the six months to July 31 of the current year, the shipments were 2,522,659 tons as compared with 1,908,004 tons for the same period the year before.

FOREIGN MARKETS

GREAT BRITAIN

Aug. 29—The coal market is quiet without any materia change. Prices are firm for immediate loading, most of the collieries being well stemmed. There is little business passing for forward loading and prices have an easier tendency

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.14@4.2
Best seconds	4.68@4.80	Seconds	4.02@4.1
Seconds	4.44@4.56	Best Cardiff smalls	2.64@2.7
Best dry coals	4.44@4.68	Seconds	2.46@2.5

The prices for Cardiff coals are f.o.b. Cardiff, Penarth o Barry, while these for Monmouthshire descriptions are f.o.b Newport; both exclusive of wharfage, and for cash in 30 days

FOREIGN TRADE OPPORTUNITIES

The United States Counsellor Service reports opportunities in foreign coal markets as follows; complete details regarding different items can be obtained on application to the Bureau of Foreign and Domestic Commerce, Washington, D. C. by giving numbers.

Europe—A large European importer, supplying railroads and a navy with coal, is desirous of establishing a permanent connection with an American exporter of coal. The inquiry refers particularly to briquettes and they must be of sufficiently high grade to compete with the foreign product. Replies should quote prices, covering insurance and freight t port of destination. **No. 11,269.**

COAL SECURITIES

The following table gives the range of various active coa securities and dividends paid during the week ending Sept. 6

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	83	83	83	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	33	31½	31½	41½	2
Colorado Fuel & Iron Pref.	....	....	155	155	15
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	10
Lehigh Valley Coal Sales	210	195	200	....	..
Island Creek Coal Com.	53½	52	53½	53½	47
Island Creek Coal Pref.	85	84¼	85	85	80
Pittsburgh Coal	20⅜	19½	19½	24⅜	1
Pittsburgh Coal Pref.	85¾	84¾	85⅜	95	7
Pond Creek	22	20	21¼	23¾	1
Reading	163¾	160⅜	160½	168⅞	15
Reading 1st Pref.	84	84	84	92½	8
Reading 2nd Pref.	....	....	88¼	95	8
Virginia Iron, Coal & Coke	39½	39½	39½	54	3

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	98	95¼	95¼	93½	99
Colo. F. & I. gen. 6s	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83¾	Sale	83⅝	83¾	77½	85
Cons. Ind. Coal Me. 1st 5s	76	78	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	85	85⅞	86½	June '13	86	87
St. L. Rky. Mt. & Pac. 1st 5s	77½	79	78½	Aug. '13	73	80
Tenn. Coal gen. 5s	98½	99	99	99	98½	103
Birm. Div. 1st consol. 6s	101⅜	102	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	103¼	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	92⅞	92	Aug. '13	92	98

No Important Dividends were announced during the week

⁂

The Colorado Fuel & Iron Co.—The Rockefeller interests are said to own one-third of the preferred stock of this company and about $20,000,000 of the total $33,000,000 of the Colorado Industrial Co. Under their management the company has shown a steady and consistent improvement, and indications are that the earnings for the current year will establish a new high record.

The Consolidation Coal Co.—During the year 1912 this company expended on improvements, betterments, extensions, enlargements and additions of a permanent nature only $329,773, as compared with $1,060,180 in 1911. However, they expended on Northern coal lands $1,261,127 last year, as compared with $146,521 in 1911. Profit and loss surplus in 1912 was $8,159,415, as compared with $7,039,192 the year before.

PRICES OF MINING SUPPLIES

MARKETS IN GENERAL

Price changes during the month have been unimportant, although the gradual advance in pig iron continued and renewed weakness has developed in finished-steel products. Metals have been very strong, with an excellent demand for copper forcing the price up to much higher levels. The severe drought in Missouri, Kansas and Oklahoma has been pretty thoroughly advertised, and while this will have a serious effect on the districts in these states, general agricultural conditions otherwise are fairly satisfactory. Returns are now available and show that the wheat crop will be a record-breaker, the corn crop about 800,000,000 bu. less than last year, but still a total crop of 2,300,000,000 bu. The cotton crop promises to be slightly less than last year.

The railroad situation is most unsatisfactory, and is having an effect on business throughout the country. Railway gross earnings are increasing rapidly, but net earnings show a decline, and it is evident that some of the important trunk lines of the country will have to reduce their dividends. This is not so important from the standpoint of the general wage earner as the fact that, with the reduction of dividends, comes the inability of railways to raise capital for new extensions and for improvements, something which gives employment to labor everywhere, and, moreover, the country has evidently caught up with its transportation facilities.

The production of pig iron during August showed a slight decline compared with July, and the advance in quotations indicates that all of this iron is rapidly being consumed. The country is now making pig iron within about 10% of its maximum capacity.

Financial conditions have steadily improved, and while it is by no means easy to secure long-time loans even when the security is desirable, still they can be secured, which was not the case three months ago. Conditions in this respect promise to improve with the season.

Unfilled orders of the U. S. Steel Corporation showed a smaller falling off than had been expected. The decrease was 175,888 tons, and the unfilled orders as of Aug. 1 aggregated 5,223,468 tons. The report of idle railway equipment was unfavorable, figuring as it did, an increase of 2881 idle care in the fortnight ending Sept. 1. In previous years, a decrease has always been recorded in the corresponding period.

LABOR

Disturbances in the ranks of labor have been less prevalent in the last four weeks than any time this year. Most disputes have been settled, and there seems to be little likelihood of any general outbreak before spring. In the meantime, the arbitration between the railway managers and the trainmen continues, and this is not likely to be settled for some time. From the West come complaints of shortage of labor in the harvest fields, and some of the railways operating in the States of New York and New Jersey had trouble in running their trains for a few days on account of the full crew law. This difficulty, however, will shortly disappear. Some improvement work on railways in the Northwest has been halted, owing to the inability to secure sufficient laborers to do the work. The strike of copper mines in the upper peninsula of Michigan continues and has been attended with much violence.

Ordinary outside labor commands $2 per day.

IRON AND STEEL PRODUCTS

The production of pig iron during August aggregated ,545,000 tons, compared with 2,560,000 tons in July. The difference in amount is practically negligible, and as prices of pig iron advanced slightly during the month, it is evident that no stocks are being accumulated. This is a negatively favorable argument, as it was generally believed that the production of pig iron would show a much larger falling off. Price changes during the month have been unimportant, but pig iron has trended toward higher levels, while finished steel products have been easier, even if no change in prices has been made. The inability of the railways to purchase equipment and make improvements, is largely responsible for the dullness in the steel market, but other consumers are buying almost as freely as they have at any time. It will not be at all surprising if legislative enactment is made some time in the near future compelling railways to substitute steel equipment in its passenger service. This, in itself, will make for tremendous activity in the car-building line.

Pig Iron—Sales of pig iron were larger in August than in July, and several sales of importance were made in the Southern market at $11 for Southern foundry No. 2. This represents an advance of $1 per ton over the recent low quotation, and indicates that the pronounced weakness, which was evident in that market in June, has disappeared; for the time being at least. It is understood that the furnaces making these sales have booked enough orders to keep their stacks running until the first of the year. The fact that the production of pig iron in August was nearly as large as in the preceding month was in itself satisfactory, and the knowledge that the furnaces going out of blast in September would be succeeded by furnaces of larger capacity going into blast, leads to the belief that the production of iron during September will be as large as in August. Another reassuring factor was that several of the large consumers of pig iron, such as manufacturers of electrical supplies, railway equipment and cast iron pipe, who seem to have the faculty of buying when the market is lowest, placed their orders for large amounts which will last them for many months to come. This was taken as an indication that the market for the time being had touched bottom. Southern foundry iron No. 2 in Cincinnati is quoted at $14 to $14.50; No. 2 Northern foundry in Chicago is $15 to $15.50; bessemer iron in Pittsburgh is $16.65 to $16.75, which price includes the 90c. freight rate from the valley to Pittsburgh.

Steel Rails—The principal railroads of the country have not placed their orders for 1914, and it is common talk in the steel trade that, if the railroads would show their confidence in the situation by placing orders, it would result in a much better feeling in the steel trade. Some improvement is evident in the export situation. All of the mills manufacturing rolling rails have enough business on their books to keep them actively engaged for the next two months.

Quotations are unchanged at $28 per ton for standard sections of bessemer rails, and $30 per ton for openhearth rails, both f.o.b. Pittsburgh. These prices represent a quotation of 1.25c. per lb. for standard sections weighing from 50 to 100 lb. per yd.; 1.21c. for 40- to 50-lb. rails; 1.30c. for 16- to 20-lb. rails. In Chicago, 16- to 20-lb. rails are 1.30c.; 12-lb. rails, 1.33c. Relaying rails in Chicago can be had at $24 per gross ton and in New York at $22.50.

Track Supplies—No inquiries of importance have appeared in the market, but it is evident that the railways will not be able to postpone the placing of orders much longer, and it is probable that the amount required will be as large as in 1913. Quotations are easier, spikes in large lots to railways being obtainable at $1.75 to $1.80 Pittsburgh, but for small lots $1.90 to $1.95 is demanded. In Chicago, spikes are quoted at $1.90 to $2; track bolts with square nuts, $2.25 to $2.40, and angle bars $1. 50.

Structural Steel—Building work in the Central West has been fairly active, and some of the leading fabricators in Pittsburgh, Chicago and the Ohio district have a fair amount of work on their books. Quite a little new work has come out for power houses in various parts of the country, and a contract for a new 18-story office building to be erected in Detroit was recently let. A new lodge building in Pittsburgh will require about 3000 tons. Railway work is especially inactive, and few bridges are being contracted for at the present time. The principal work in the East is for new subways in New York City, and a recent contract calls for the placing of 6000 tons. The steel, when bought, is being erected rapidly, and consumers have little or no complaint regarding deliveries. Fabricated work is fully as cheap as last month, and it is unusually low. Structural steel shapes are quoted at 1.45@1.50c. Pittsburgh, and 1.63@1.68c. Chicago. These prices are per lb. in large lots.

Pipe—The market for pipe is spotty. The demand for line pipe, or pipe that is used by oil and gas companies, has been unusually heavy, and some of the principal manufacturers of this kind of pipe are unable to take any more orders for delivery this year. On the other hand, the demand for smaller sizes of pipe used in steam work and for general industrial purposes, is not at all large. One of the largest inquiries in the market is for 20 miles of 8-in. pipe. There is some trouble over the puddling scale, and some of the workmen have not signed for the coming year. Quotations show no change since last month, but at that time there was a revision in discounts on ¾- to 2-in. pipe. Discounts and net prices are as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded...........	80%	71½%
2½- to 6-in. steel lap welded...........	78%	69½%
7- to 12-in. steel lap welded............	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

	Cents		Diameter	Cents	
	Black	Galvanized		Black	Galvanized
¾-in........	2.30	3.26	5-in........	30.50	45.00
1-in.........	3.40	4.83	6-in........	42.25	58.25
1¼-in.......	4.60	6.60	7-in........	59.50	85.00
1½-in.......	5.50	7.90	8-in........	62.50	89.00
2½-in.......	12.90	17.80	10-in.......	$1.03	$1.46
3-in.........	16.80	23.30	11-in.......	1.13	1.64
4-in.........	23.00	33.20	12-in.......	1.27	1.82

Sheets—New business is only fair, but some makers who were willing to accept orders on a basis of 2.15c. Pittsburgh for No. 28 black were able to secure enough tonnage to keep their mills running for some time. It is pointed out that the mills that are making this price are scarcely able to come out even, if they buy their sheet bars in the open market. The leading interest is now operating to about 70% of capacity, which is slightly better than last month One reason for the continued decline in sheets and the weakness in the market, is the fact that quite a little new capacity has sprung up in the last year, and competition is unusually keen. The following quotations are for small lots of a few bundles or more f.o.b. Pittsburgh and Chicago. The price for large lots is $1 per ton lower than last month, being quoted at $2.20 f.o.b. Pittsburgh for No. 28 black per 100 lb.

	Cents per pound			
	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24...............	2.70	3.50	2.65	3.45
Nos. 25 and 26...............	2.75	3.65	2.70	3.60
No. 27	2.80	3.90	2.75	3.85
No. 28	2.85	3.95	2.80	3.90

WIRE PRODUCTS

Wire—The cut in prices made Aug. 1, brought business and some large orders were booked at the lower quotation. It is stated that the American Steel & Wire Co. booked orders for wire and wire products during August at the rate of 7000 tons per day. This will keep mills actively engaged for the remainder of the year, providing specifications follow in due course. Quotations are unchanged as follows: Annealed fence wire in large lots, $1.50; galvanized barbed wire, $2.15; annealed barbed wire, $1.75. These quotations are per 100 lb. f.o.b. Pittsburgh. In Chicago, plain wire is $1.73; painted barbed wire, $1.93 and galvanized, $2.33. These quotations are also for large lots.

Copper Wire—Announcement that considerable work would be done by the Norfolk & Western Ry. in the electrification of a mountain line, and indications that other railways will do similar work, was partially responsible for the sharp advance in copper. The market for wire is not especially active, but considerable business has been placed on a basis of 17½c. per lb., and quotations now are nearer 18c. than this lower figure. The trade continues extremely optimistic regarding the leading feature of business.

Telegraph Wire—For lots of fair size wire, measured in Birmingham wire gage, prices in cents per pound are as follows: "Extra best" No. 6 to 9, 4⅜c.; No. 10 and 11, 4½c.; No. 12, 4⅝c.; No. 14, 5⅜c.; "best best" No. 6 to 9, 3½c.; Nos. 10 and 11, 3⅜c.; No. 12, 3½c.; No. 14, 4c. Actual freight is allowed from Trenton, N. J., where it does not exceed 25c. per 100 lb.

METALS

Copper—Buoyant advances in copper throughout the month brought the price to 16¾c. per lb. This is an advance of 1c. per lb. in the last three weeks. Largely responsible for the advance were the continued heavy takings of copper by consumers in Europe and in the United States, and furthermore, the fact that the statistics would probably show a decrease in stocks. These were fully as favorable to the producers of the metal as anticipated, as the production of the United States was smaller than the previous month, being 131,000,000 lb., and the deliveries, both domestic and foreign, 146,000,000 lb. Stocks reported at the end of August were absolutely the smallest since the Association has been compiling statistics, being 38,000,000, lb. a decrease of 53,000,000 lb. in the four weeks. This was in spite of the fact that the exports of copper in the first eight months of the year were 2000 tons less than the corresponding time last year, and the imports were larger than last year by 3000 tons. The copper trade is highly optimistic, and many believe that prices will go to still higher levels, and perhaps 20c. may be quoted for copper before the turn is reached.

Tin—The market is higher and steadier than last month, and buying has been fair. Sales have been made as high as 43.50c. per lb., and the general quotation for small lots is around that figure.

Solder—Strictly half and half solder is about 1c. per lb. dearer, being quoted at 26 to 27c. per lb.

Lead—Continued scarcity of lead, due to the strike of the lead miners in Missouri, resulted in obtaining a price of around 5c. per lb.

HARDWARE

Nails—The cut in price made Aug. 1 stimulated business, and although nails can be had on the same basis as last month, it is felt that this quotation will not continue for any length of time. Wire nails are held at $1.75 in Pittsburgh, and $2.05 New York in kegs of 100 lb. in large lots. For small lots from jobbers' stores, $1.95 is quoted in Pittsburgh and $2.15 in Chicago.

Iron and Steel—Business continues especially active, and jobbers report that some sizes are broken. Prices from warehouse stocks in Pittsburgh and other distributing centers are as follows:

Refined iron:	Per lb.
1 to 1⅞ in., round and square..........................	2.10c.
1½ to 4 in. x ⅜ to 1 in.................................	2.10c.
1½ to 4 in. x ¼ in. to $\frac{5}{16}$ in..............................	2.30c.
Norway bars	3.60c.
Soft steel:	
¾ to 3 in., round and square..........................	2.05c.
1 to 6 in. x ⅜ to 1 in...................................	2.05c.
1 to 6 in. x ¼ and $\frac{5}{16}$ in...................................	2.20c.
Rods—⅝ and $\frac{11}{16}$ in...	2.15c.
Bands—1½ to 6$\frac{3}{16}$ in. to No. 8.............................	2.35c.
Beams and channels—3 to 15 in.......................	2.15c.

MISCELLANEOUS

Portland Cement—Business is large and steady. Some reports have been current that, with the completion of the work on the Panama Canal and the barge canal in New York State, there is likelihood of lower prices being named for cement, and a large amount of unsold cement being thrown on the market. This is scarcely probable, as the combined takings of these jobs have rarely exceeded 1,000,000 bbl. in any one year, and new uses are continually being found for cement, one of the largest being for concrete roads, and, should cement be used for this in general, it will be found that a very large amount of material will go into consumption in this line. Prices show no change. In Pittsburgh, the quotation is 90c. to $1; in Chicago, $1.25; Detroit, $1.34; St. Paul and Minneapolis, $1.45. These quotations are f.o.b. but do not include the cost of package. In general, consumers have to pay about 40c. per bbl, for the package, also the freight to destination. This amounts to $1.58 in New York and Pittsburgh.

Paints—The price of linseed oil has advanced slightly and is now quoted at 53 to 54c. per gal. in 5-bbl. lots. Spirits of turpentine is also higher, and is quoted at 41c. The higher prices of pig lead resulted in a revision of the quotation of white lead in oil, which is now quoted at 8c. per lb. in 100, 200- and 500-lb. kegs.

Bars, Concrete Reinforcing—Business is more active, but somewhat lower quotations have been made whenever a desirable order was in sight. Prices for small lots from Pittsburgh warehouse are as follows:

PITTSBURGH, CENTS PER POUND

	Warehouse Stock
¾-in.	1.95@2.05
⅝-in.	2.00@2.10
½-in.	2.05@2.15
⅜-in.	2.20@2.30

Brattice Cloth—Higher prices are probable despite some favorable concessions to consumers in the new tariff bill. The demand continues large, and private advices from abroad hint at the possibility of a strike at the mills. Consumers are buying in small lots but prices are more or less stationary.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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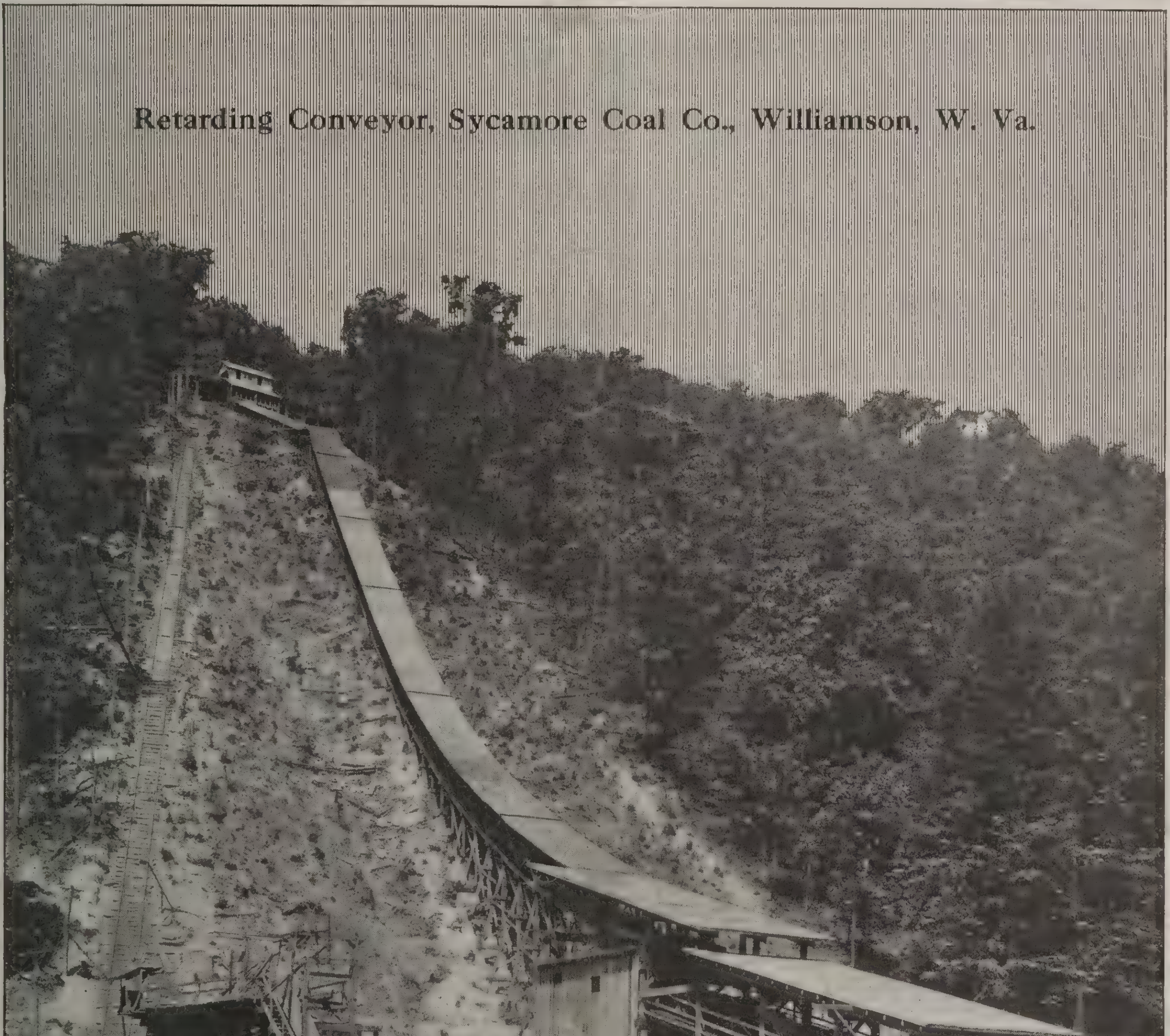
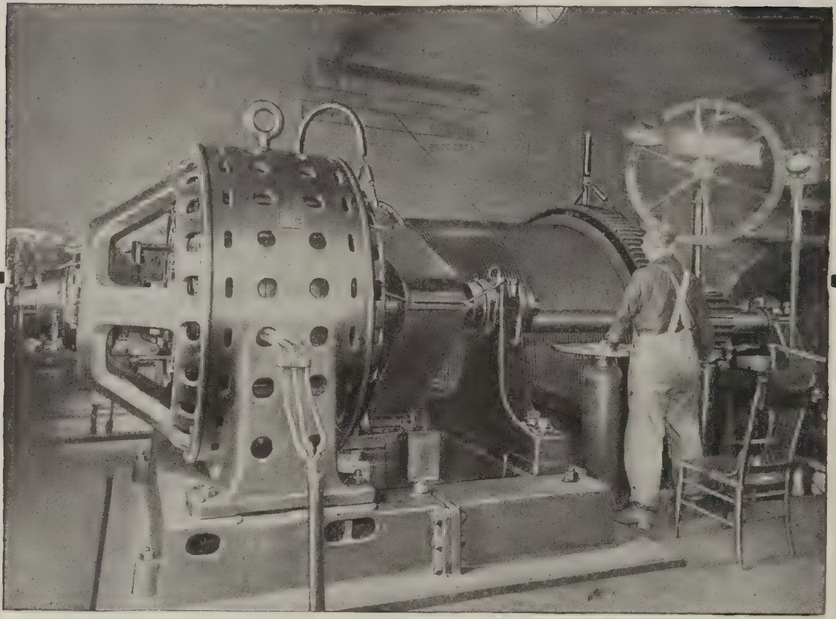
Advertising Index, Last Page

Retarding Conveyor, Sycamore Coal Co., Williamson, W. Va.





400 H. P. Westinghouse Motor for Driving Mine Hoist.

Westinghouse Motors for Mine Hoists

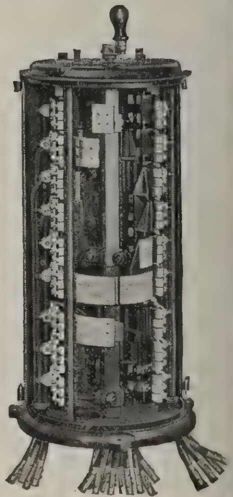
are made to withstand, without injury, the heaviest overloads encountered in normal service. They have been designed with the knowledge that any accident to the hoisting equipment will not only halt production until service is re-established but may also cause damage of the most serious nature.

Special attention has been paid to protecting these motors against the racking vibration of gears. The brackets are heavy and massive, the bearings large in area, and the shafts are extra large in diameter, and made of axle steel, the best material to withstand severe stresses.

Westinghouse Electric & Mfg. Company

East Pittsburgh, Pa.

Westinghouse Controllers for mine hoist motors can be furnished in several types to meet various requirements. Selection of the most suitable type for a given installation will be made upon request.



COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

Some Old Ads

The Weekly Ad-Talk Page

Advertising in some form or other is really as old as the institution of buying and selling.

In the days of ancient Rome and Athens merchants were wont to employ "barkers," or criers, who went about the streets shouting out the wares and alluring prices of their employers. They howled about "bargains" in those days and caused rushes of trade, we may suppose, just as the advertisements of to-day draw the throngs of shoppers.

Presently came written notices that were displayed on blank walls for the edification of the purchasing public. In the early days of London the shopkeepers had clerks who were stationed in front of the stores to shout their wares much after the fashion that used to obtain in Baxter Street, where the "barker" came into his own. These clerks were wont to preface their vocal advertisements of wares by shouting "What do ye lack? What do ye lack?"

The first genuine newspaper advertisement of which there appears to be any authentic record was printed in the "Mercurious Politicus" in London in January, 1652. It was a publishers' announcement and read thus:

" 'Irenodia Gratulatoria, an Heroick Poem,' being a congratulatory panegyrick for my Lord General's late return, summing up his successes in an exquisite manner. To be sold by John Holden, in the New Exchange, London. Printed by Tho. Newcourt, 1652."

The new method of letting the public know where it could get what it wanted was quickly snapped up, but in its early stages it furnishes some most remarkable examples of advertising. One of these quaint notices, appearing in a London publication soon after the introduction of newspaper advertising reads:

"The Publick Will Please Take Notice.—There ran away from my place on Thursday of last week an apprentice boy, called Dick Noodler, with a smutty complexion and black teeth, and he is as ugly as sin. Ten shillings reward will be paid to any person bringing him back to me."

Soon afterward this remarkable notice appeared in a Dublin newspaper, supposedly one of the first newspaper advertisements in Ireland:

"Ran Away From Patrick McDallagh.—Whereas, my wife, Mrs. McDallagh, has gone away with herself and left me with her four small children and her poor, blind mother, and nobody else to look after home and house, and I hear has taken up with Tim Gugan, the lame fiddler, the same that was put in the stocks last Easter for stealing Bardy Doody's gamecock, this is to give notice that I will not pay for bite or sup on her account to man or mortal, and that she had better never show the mark of her 10 toes near my home again. Patrick McDallagh. N. B. —Tim had better keep out of my sight."

Pat wanted to inform folks quickly and cheaply that he wouldn't stand for Mrs. Pat's shortcomings nor for her debts.

So he advertised.

He evidently knew something about the shortest distance between two things being a straight line.

COAL AGE

Vol. 4 NEW YORK, SEPTEMBER 20, 1913 No. 12

Now that the "Employees' Magazine" of the Lehigh Valley Coal Co. and the "Marvel News" of the Roden Coal Co. have blazed the way for the timid ones, we expect to see many similar papers launched in the near future. The possibilities for such educational mediums were realized and taken advantage of in other industries long ago.

Over in Charlotte, S. C., a daily paper, the "Evening Chronicle," possessing a large circulation among the cotton-mill people of that section, has carried on a little pioneering that deserves careful study by all who are interested in the results that may be attained by giving the right kind of publicity to our working classes. In a recent issue of the "Manufacturers' Record" Dorothy Mitchell of the "Chronicle" staff describes rather fully just what she has aimed at and how she has proceeded. She says:

"I have written stories about them, always searching for those things which show their advancement and laying stress upon the people who have achieved anything. Whenever a man is promoted a story is run about him, and if possible a photograph is secured and put in the paper. If a girl makes a success, or does anything worthy, it is mentioned in like manner. If a man saves his money and buys a home, this calls forth a good story, and sometimes a picture of his home is run in the paper.

"These items are published every Saturday, and are run just as the social items are run in the Sunday papers. The only difference is that I do not measure aristocracy or the getting of one's name in the paper by what the parents were, but what the person who is featured has actually done industrially. In all the work, everything is done to encourage those who have progressed, urging them on to greater things; their names and pictures are published as successful, steady and thrifty people.

"One of the worst faults the mill people have, and that which proves most detrimental to their success, is the habit of moving. In every mill community there will be found a "moving" element, and these are always the poverty-stricken ones and those who excite the sympathy of the betterment agitators. Usually they stay at a mill two or three weeks, or perhaps a month or so, and then seek other quarters for no better reason than the promise of a trifling increase in their weekly wage. Sometimes they leave because they do not like the superintendent, especially if he corrects them. In many instances there have been found cases where the people practically spend all they make outside of grocery bills to bear the expense of going from mill to mill.

"At all times I have discouraged moving and have written stories, as well as talked to them personally, about the disadvantages of it. I have encouraged the growing of gardens, flowers and trees about the premises, as well as the planting of fruit trees and fruit-yielding shrubs, and tried to get them to settle down in a place and make it a home in which to live a life worth while."

Coal corporations that seriously contemplate entering into this particular kind of uplift work, should consider the plan above outlined. The coal journals are able to cover common mining practice in its broad sense, but they cannot record local happenings of a personal nature, the publication of which by a company organ would tend to encourage and inspire the men.

IDEAS AND SUGGESTIONS

The Natural History of Coal

By L. K. Hirshberg*

Now from Cambridge University, England, comes a new treatise upon the Natural History of Coal, by Dr. E. A. Newell Arber. The peculiar value of Doctor Arber's researches are not dependent upon his historic account of coal problems of the present and the past, but on the problems now to be triumphantly surmounted in the near and immediate future. Not only does he present the great importance of more scientific knowledge of coal, but also its prospective commercial possibilities.

Thus he points out most wisely and in good time the fact that after all man is largely ignorant of the composition of coal as well as the manner in which coal was formed. Most of our so called knowledge is actually inference drawn from the rocks and minerals which lie below and above coal beds. Certainly such deductions may easily be as far-fetched as many other scientific theories turn out to be. As a general proposition, geologists have conspicuously failed to offer an entirely satisfactory and tangible explanation concerning the formation of coal. It therefore remains for paleobotanists, paleontologists, and physio-chemists to throw a bright light upon this dark matter.

New Discoveries about Coal

The most recent discoveries about coal have been made microscopically by the French savants, Doctors Bertrand and Renault. They soon ran down the clue and found that many kinds of coal minerals have been produced in open water and are for the most part made up of the remains of certain plants. Particularly is this true with those varieties of coal that are rich in hydrocarbons and combustible gases. Bituminous shales, oil shales, bogheads and many others are types.

Much less is now known about nonbituminous coals, indeed the less they approach the bituminous types, the less seems to be known about them. The reason of this may be due to the fact that the harder the coal, the less thin must its sections be when cut for microscopic purposes of investigation. To study them under the microscope it is desirable also to decolorize them. When thin slices are prepared for examination, it is usually found that these sections remain opaque, yet coal is undoubtedly homogeneous in structure.

Luckily for the newer investigators on the nature of what coal really is, most of these difficulties have at last been removed. It has now been found possible to prepare fairly thin and transparent slices by the same grinding method used by stone workers. Then by adding an appropriate dye or other coloring matter, the actual stuff present will be made apparent.

It is now generally agreed that all of the present-day theories about the origin of coal, such as the peat-antracite theory, are no longer plausible. These now discredited explanations of the formation of coal in the depths of the earth, are to be substituted by a theory based upon the newer biological and physio-chemical discoveries.

If it were possible with present analytical methods to understand the composition of coal thoroughly, a tenable hypothesis as to its origin could not be constructed unless we also knew the character of the plant fossils which go to make up the body of the coal. The subsequent effects of chemical and physical conditions cannot in any way change such a theory.

Therefore it is now up to the botanist more than to any practical coal man or other scientist, to instruct the world as to the true condition of the coal when originally laid down.

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What about Your Vacation?

Summer has passed, but the very best months of the year are with us. Have you taken your vacation? It's not yet too late. Many of you will say, "No, I'm too busy; the Big Boss wants all the coal we can get and the cost must look right, too."

Some of you will say, "What good can I get out of two or three weeks' vacation?" A number of good honest men will repeat that they have not had a vacation in years, so why take one now. A few will say the expense of a vacation doesn't justify it.

To all of these we say, "Take a vacation, you need it and the cost is the last consideration." The man who needs it most is the one who has been sticking so close to the job that he feels like it could not run without him. Most of those in this class are as honest and loyal in their work as men can be and the impulse to take even a little vacation has been smothered by their strong sense of loyalty and their belief that the boss thinks of them as of a class who are always on the job. No doubt you have been urged by the management more than once to take a rest, but you could not believe they really meant it for you.

You are perhaps one of the superintendents or foremen who know very well the job will run without you, but cannot bear giving up the reins of control for a few weeks. You feel that certain lines of work will not have the close attention you give it and that when you come back you cannot pick up things in as good shape as when you left. You know your assistant is a good man, but you do not want to leave the job entirely with him.

To every man of you we say, "Take a vacation." Here are some of the benefits that will inevitably accrue to you:

You will get out of the rut you have been running in, and you know the only difference between a rut and the grave is in length and breadth. The old saying, "A new broom sweeps clean" can only have been born of the truth that one man on taking up another's work sees the whole plan of affairs with a clearer vision. Too close contact with the daily grind of things dulls the senses. Too much time given to details does not leave time enough for the larger and more important affairs. There are still to be found plenty of you who cannot find time for safety work in its larger sense, that of accident prevention, because you are in the rut of giving all your time to getting out as much coal as possible. Have you ever thought that if your mine produces 1000 tons a day it will take from two to five days' run to compensate for every man you kill or seriously hurt? Yet the list of men killed and maimed in the coal-mining industry is appalling.

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*Baltimore, Md.

After you have been on your vacation a few days and gotten far enough away from your work to realize that the part of the world you are in does not even know of your locality save as a geographical fact, you will begin to appreciate how small your sphere of work is and what is better for you, how little is your personality in the scheme of things. The next thing you know you are wondering how all these strangers, many of whom give evidence of success beyond you, accomplish it. You will have a feeling of ambition to put forth the best effort in you when you get home. This is nothing more or less than a broadening of your mind's activities as the result of giving it rest and relaxation from its grooved routine.

Problems Will Be Solved

All through your vacation period, even though you may not see or visit a plant like your own, you will find your senses perceptibly quickened by contact with new and bigger things. Your sense of little things will grow less and your appreciation of big things larger. Even while you are resting, perhaps while fishing in some lake, your mind will unconsciously find a better way to do some things at home. Problems that will really increase the output and reduce the cost will work themselves out in your mind. Like a flash it will come to you that an expenditure of ten thousand dollars to cut some drainage ditches through the mines to convey the water to a central pumping plant will enable you to shut down several expensive steam plants for all time. You know that you can show the management as soon as you get home how this can be done, and save the expense in a year or two.

Best of all you will get home refreshed in mind and body. It may appear a little strange to you, but everything has been running smoothly; the output has really been increased during your absence; there have been no serious accidents. In fact, the plant has been doing fine. Do you know why?

The fellow next to you has had his chance and has made good. You think more of his ability and you say hereafter I'll unload more work that counts on him. Good. Your vacation is producing results and pretty soon after you return the Big Boss will say to someone, "Things are humming at the new plant since J. C. took that little spell off."

Go ahead, and see the boss this week and arrange for a vacation. Honest, it will do you good.

A Stitch in Time Saves Nine

By Pennsylvania Superintendent

I wonder if we can apply the old adage—"a stitch in ime saves nine"—around our coal mines. Take, for intance, the coke oven: How many times have you noiced an oven which had a brick out of jamb, and passed t by to fix up another oven a little farther beyond, which, perhaps, had a whole jamb or maybe an entire arch that needed repairing. You did not even stop to think that by repairing just that one brick, you might have prevented the collapse of the entire arch, which fell in because this one brick was not replaced when it started coming out.

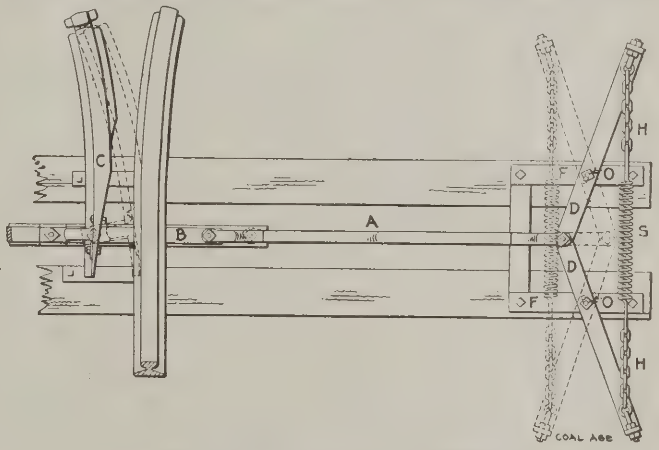
"A stitch in time saves nine," was ignored in this particular case, just as it is passed over in many other instances. This does not only apply to the coke ovens, but to the machinery around the mines and in the mines, as well as to the entry track and everything connected with the entire operation.

So if you want to be successful in whatever department you are employed, watch for "the stitch in time that will save nine"—*then do it now.*

An Automatic Spring Switch

It often happens, in mining practice, that the arrangement of the tracks leading from a slope or drift opening to the tipple is such that it is of advantage to have an automatic switch so arranged that the loaded trip coming out of the mine will set the switch ready for the return of the empties by the same track. Such a switch will often be found of advantage where different motors are hauling from particular sections of the mine, and, therefore, require to return by the same track to the district from which they came.

The accompanying diagram shows a special automatic spring switch, the suggestion of H. E. Lewis, supt., Consolidated Fuel Co., Hiawatha, Utah. This switch was intended to meet the requirements just described. The details of construction were designed or worked out by W. W. Jones, electrical engineer, Standard Coal Co., Helper, Utah.



Details of Automatic Switch

As shown in the figure, the switch rod *A* and the bar *B* serve to connect the switch point *C* with the movable arms *DD*. These arms have each a bearing or fulcrum at the fixed points *OO*, each being secured to the bed frame *F*, by a bolt at that point. A short slot cut in each arm allows the necessary movement when the switch is thrown by the passing cars. The dotted lines show the reversed positions of the switch point and the movable arm. The tension spring *S* exerts a pull of 100 lb. on the ends of the two arms, which is sufficient for the purposes intended, and holds the switch firmly in the position in which it was placed by the last trip coming from the mine.

Coal Shipping on the Great Lakes

SYNOPSIS—The third and concluding installment on the situation at the head of the lakes. A detailed description of another of the large unloading docks of the Pittsburgh Co. Not only are there facilities for handling an enormous tonnage but elaborate equipment is provided for screening the coal.

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The plant of the Pittsburgh Coal-Dock Co., a subsidiary of the Pittsburgh Coal Co., at Duluth, is said to be one of the largest in the world for the handling of bituminous coal. It is designed for unloading coal from lake boats to the storage yard and for loading on cars. An interesting feature of the plant is a mechanical screening apparatus of new design and large capacity. The plant has a storage capacity of 1,000,000 tons and an unloading capacity, as shown by recent tests, of 900 tons an hour, including the delay in cleaning up the holds of vessels unloaded. While working in free coal it is estimated that the plant will discharge 1500 tons an hour from a boat to the storage yard. The plant was designed and erected by the Brown Hoisting Machinery Co., Cleveland, Ohio.

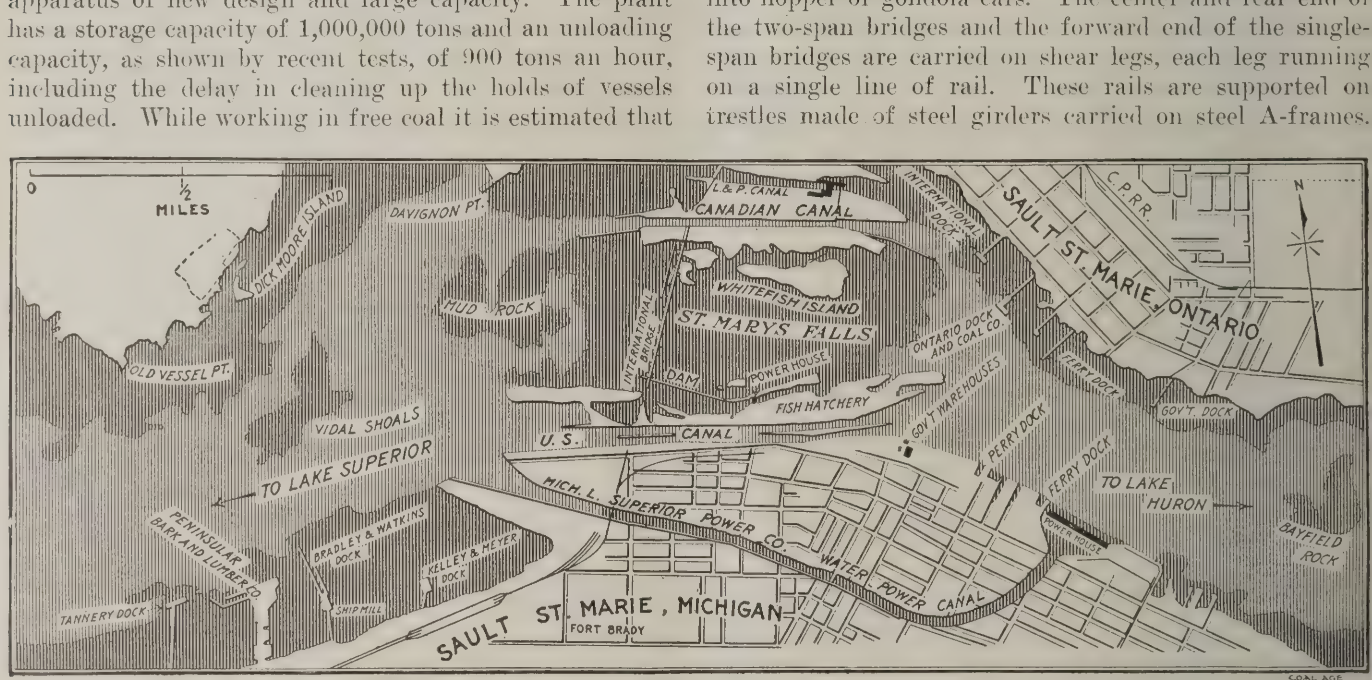
Unloading Machinery

The coal-handling equipment includes three two-span bridges, here shown, extending from the unloading dock, and two single-span bridges. Each span is of 242 ft. The yard is covered by the bridges, which are operated back and forth on a runway 1250 ft. long. Each two-span bridge and one of the single-span bridges is equipped with a man trolley, which carries a two-rope Brown grab-bucket, with a capacity of 230 cu.ft. or 5½ tons, and an operator's cab. The single-span bridges are arranged to register with any of the two-span bridges so as to make a three-span bridge or a continuous runway for a trolley over any one of the two-span bridges and one of the single spans, a total distance of 726 ft. The operating mechanism is arranged so that when a single-span bridge is connected with a two-span bridge the three spans are operated as a unit. The single spans may also be operated as independent bridges. The single span not provided with a trolley is so operated by using one of the trolleys from a two-span bridge. The two-span bridges have a cantilever extension of 78 ft. out over the dock and there is a 35-ft. cantilever extension from the rear end of the single-span bridges.

Each man trolley is designed to carry a load of 25,000 lb., to hoist the full load of the bucket at the rate of 225 ft. per minute and to travel along its runway at 1200 ft. per minute. Each bridge when carrying a loaded bucket can propel itself along its own runway at a speed of 60 ft. per minute.

The front or water end of each two-span bridge is carried on a portal pier, equipped with bins for loading coal into hopper or gondola cars. The center and rear end of the two-span bridges and the forward end of the single-span bridges are carried on shear legs, each leg running on a single line of rail. These rails are supported on trestles made of steel girders carried on steel A-frames. There is one single rail trestle or runway and one double rail trestle. The former is for the shear leg at the center of the two-span bridges and the latter is for the rear shear leg of the two-span bridges and the shear legs of the single spans. The distance from the foundations to the top of the rail on the trestles is 35 ft. 6 in. The rear ends of the single-span bridges are carried on inverted piers.

The piers for the two-span bridges are each supported on four equalizing trucks, each truck being mounted on four 24-in. double flanged cast-iron chilled-tread wheels. The wheels on each pier are connected by a train of gearing and shafting to the moving gear mechanism located on the bridge span, near the bridge support. Each inverted pier at the rear end of the single spans is carried on two sets of equalizing trucks, each truck supported on eight 24-in. single-flanged chilled-tread wheels. In addition, the rear pier that carries the screening apparatus has (for partially carrying that apparatus) one equalizing truck supported on six 24-in. wheels, each truck traveling on two lines of rails spaced 2 ft., center to center. The six-wheel truck acts as an idler only. All of the wheels in each of the eight-wheel trucks are driven, being



Detail Map of the Sault Ste. Marie Canals, the Entrance into Lake Superior

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Note—From the "Iron Age," Dec. 7, 1911.

connected by a train of gearing and shafting to the moving gear mechanism located at the top of the pier. Under the other rear pier one-half of the wheels are similarly connected to the moving gear machanism. Each shear support in the bridges is mounted on two single-rail equalizing trucks, each truck being supported by four double-flanged cast-iron chilled-tread wheels. The wheels are all connected by shafting and gearing to the moving-gear mechanism located on the bridge span.

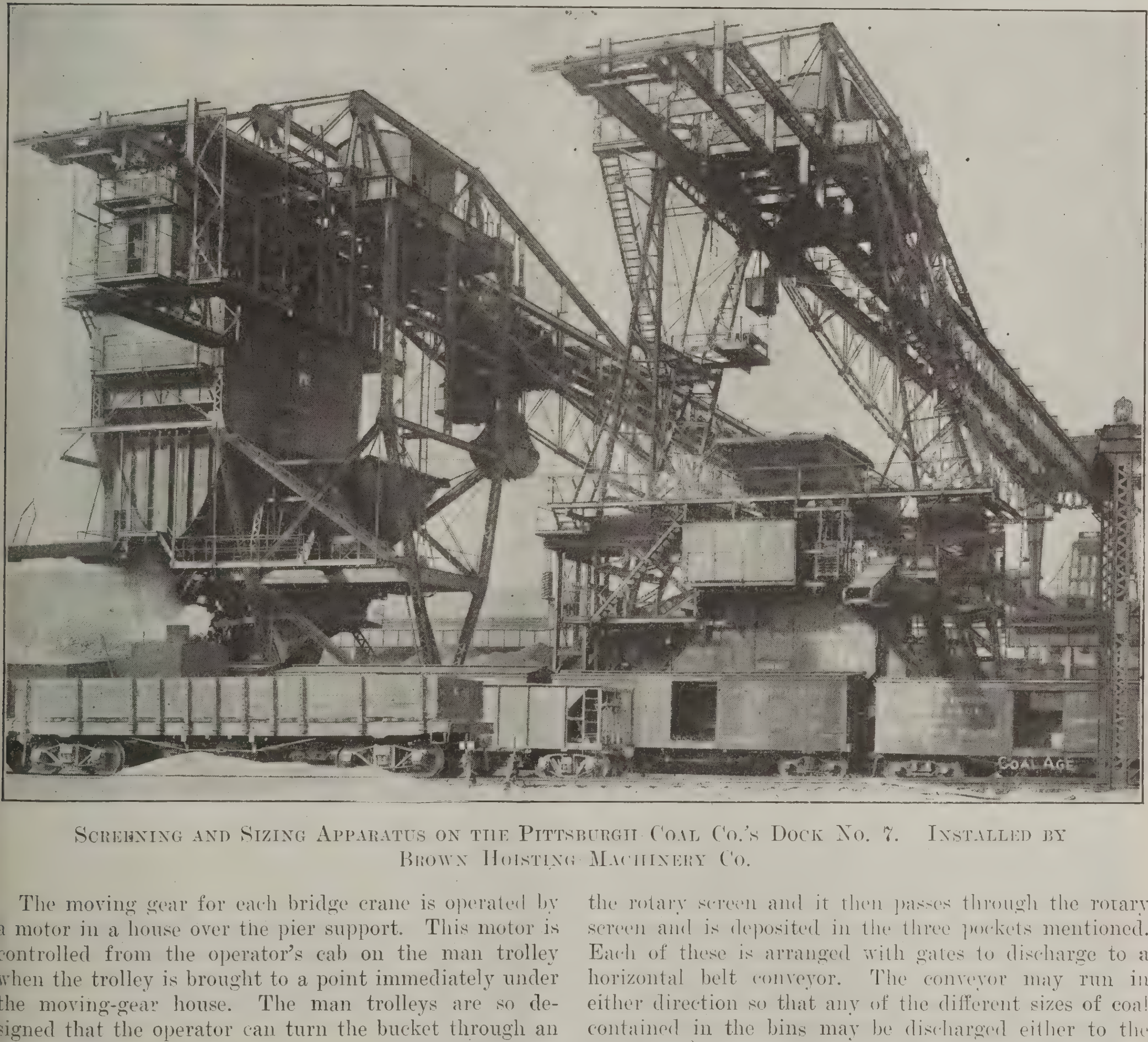
The shears support the bridge span on sliding bearings under the top chords. The cantilever extensions from the dock end of the two-span bridges are supported from the top of masts over the pier. Attached to the cantilevers are hinged aprons that can be raised and lowered. The moving gear for each bridge crane is operated by a motor in a house over the pier support. This motor is controlled from the operator's cab on the man trolley when the trolley is brought to a point immediately under the moving-gear house. The man trolleys are so designed that the operator can turn the bucket through an angle of 90 deg.

The Screening Equipment

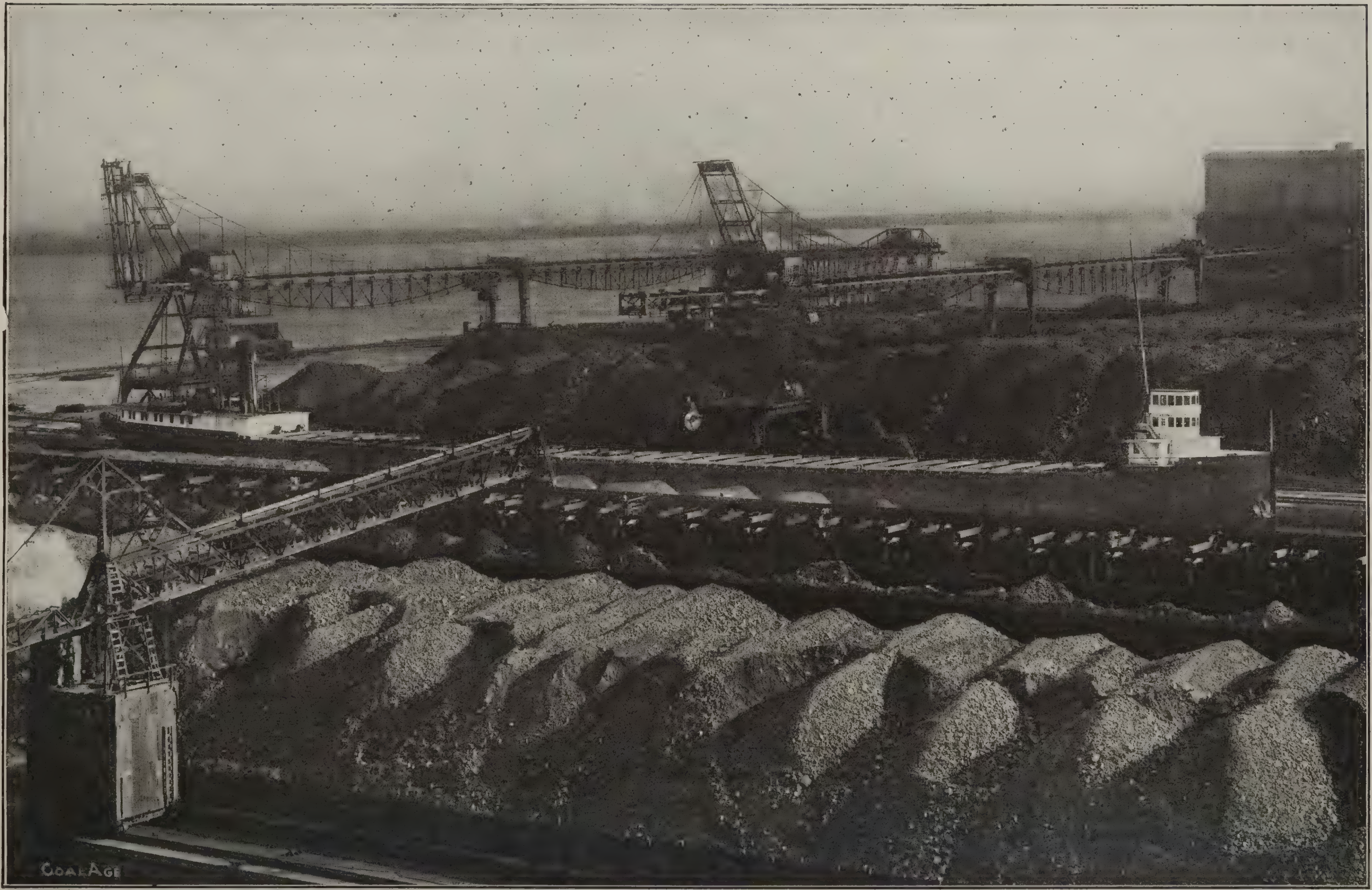
In the portion of the rear pier of the single-span bridge with which is connected the special screening equipment, is located a 30-ton receiving bin. This bin is provided for receiving the coal from the grab bucket on the bridge span and for properly controlling it as it is fed into the screening plant. At the side of the main part of the pier is another bin, which is divided into three compartments, each compartment having a capacity of 40 tons. Over this bin is arranged a rotary screen for sizing coal into the three different sizes commonly known to the trade as stove, nut and screenings, and discharging each size into separate compartments of the bin.

Beneath the 30-ton bin located in the main portion of the pier is a shaker screen. This is designed to discharge the coal passing over it into a small hopper, which in turn discharges the coal to a pivoted scraper conveyor. This conveyor carries the coal either into open gondola or hopper cars or into box cars. The coal passing through the shaker screen is discharged into a bin at the lower end of an inclined elevator. This elevator carries the coal to the rotary screen and it then passes through the rotary screen and is deposited in the three pockets mentioned. Each of these is arranged with gates to discharge to a horizontal belt conveyor. The conveyor may run in either direction so that any of the different sizes of coal contained in the bins may be discharged either to the stock pile or into open cars on a track outside of the pier.

Each bin beneath the rotary screen is also equipped with a separate chute and gate for discharging the contents into a small hopper at the foot of the shaker screen, which is arranged to discharge to the pivoted conveyor previously mentioned. By means of the scraper conveyor the various sizes of coal are loaded into box or gondola cars in the manner described for the coal passing over the shaker screen. The 30-ton receiving bin is provided with



Screening and Sizing Apparatus on the Pittsburgh Coal Co.'s Dock No. 7. Installed by Brown Hoisting Machinery Co.



General View of the Pittsburgh Coal Co.'s Dock No. 7 at Superior, Equipped with Brownhoist Machinery an auxiliary chute feeding into the lower end of the inclined elevator in order that coal taken from the screening stock pile may be sized over the revolving screen.

In general the operation of the screening apparatus is as follows: The coal is first placed in the 30-ton receiving bin. It is then passed over the shaker screen to the pivoted conveyor for delivering it into cars. The coal going through the shaker screen passes into a small bin beneath, delivering to the elevator, by which it is either conveyed to the revolving screens for preparing small sizes or directly into the screening bin for delivering it to a belt conveyor discharging on a screenings stock pile.

By this arrangement when lump coal is being loaded, a carload each of stove, nut and screenings may be taken at the same time. In case lump coal is being loaded and there are no orders for the smaller sizes, the screenings can be delivered from the elevator direct to the screening bin, which in turn will deliver the screenings to the belt conveyor for the stock pile. When taking general screenings from the stock pile for sizing and loading they are dumped by the grab bucket into the receiving bin.

The bins are of parabolic form. The 30-ton bin is equipped with a large reciprocating gate operated by power. The shaker screen is about 5 ft. wide and 15 ft. long. The reciprocating motion of this screen is accomplished by means of connecting links and eccentrics attached to a horizontal shaft belt connected to a 15-hp. motor. This motor also operates the reciprocating gate. The screens are easily removed so that different sizes can be used. The revolving screen is operated by a 20-hp. motor, which also drives the elevator. The belt conveyor is operated by a 15-hp. motor and the pivoted scraper conveyor is operated by a 10-hp. motor.

The other rear pier is equipped with a 30-ton bin, gate, and chute for unloading coal into gondola cars, a screening bin and elevator for screenings, and chutes for unloading screened coal into box cars in connection with box-car unloaders. Beneath the screening chute is a 50-ton bin for catching the screenings. In connection with this screening equipment is a bucket conveyor for raising the screenings to a point from where they are discharged by gravity to a screenings pile on the water side of the pier or carried by a belt conveyor and discharged in cars on the second track on the other side of the pier.

The electrical equipment is arranged to operate on 440-volt 3-phase 25-cycle alternating current. The motor equipment includes the following in addition to the motors mentioned in connection with the screening apparatus, all furnished by the General Electric Company: Three 112-hp. motors for moving the three two-span bridges and 112-hp. motor for operating the single-span bridge that has the extensive screening equipment; one 50-hp. motor for moving the other single-span bridge; one 225-hp. motor in each of the four trolleys for hoisting; two 112-hp. motors in each trolley for the trolley travel; one 5-hp. turntable motor in each trolley for rotating the grab buckets; one 2-hp. clutch motor in each trolley, and one 15-hp. continuous running motor for operating the screening elevator and conveyor in the pier of the single-span bridge not containing the extensive screening equipment. The travel motor on each bridge is operated by a General Electric drum-type controller. The hoist motor on each trolley is operated by a master operated magnetic controller. The trolley travel motors on each trolley are operated by a master-type controller.

During tests of the plant recently made the Steamer "J. S. Ashley," with 8983 tons of lump coal, was unloaded in 10 hr. and 15 min. and the cargo of the "J. E. Upson," 8747 tons of the same grade, was taken out in 10 hr. and 55 min. actual working time. While working in free coal each bucket averaged nearly 6 tons to the lift.

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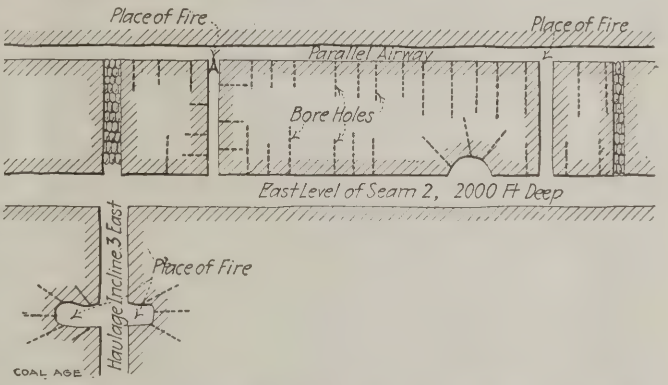
Averting a Mine Fire in Germany

The following account of the suppression of an incipient mine fire by the saturation of the ribs, is translated from the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1.

On May 16, 1912, a strong odor of fire was noticed in the east gallery of seam No. 2, in the 2000-ft. level of the gas-coal workings of the Gerhard Colliery, in the Saar district, Prussia. In the parallel entry, there was found at a point *A*, as marked in the figure, in close proximity to an old ventilating passage, already badly squeezed, a warm place in the coal, proving to the management that a mine fire was developing. It later became evident that the great pressure had heated the coal seam which was at this point 13 ft. thick. By hastily making a new crosscut, the heated coal was reached with a continuous and plentiful supply of water. Thus it was cooled off and the principal danger averted.



Spontaneous Combustion Was Checked by Water Forced into Drill Holes

Further investigation of the pillar showed the presence of still other places where the coal was in a state of incipient spontaneous combustion. As the rock between seams 2 and 3 had already been broken, it was impossible to flood the section imperilled without preventing the operation of the lower seam, consequently the Dorsfeld saturating apparatus, which had already been used in this mine was utilized for the suppression of the fire.

Along a pillar length of 300 ft., and ranged at distances of 17 to 35 ft. in the line of dip of the seam, bore holes were drilled 10 ft. deep, and into these the apparatus was introduced. This was connected with the existing water piping under a pressure of 300 lb. At the end of a few hours the water had penetrated through the pores and crevices of the partly crushed coal and was escaping into the level. After a few days the fire danger could be regarded as removed.

In the months of August and September, three other fires of similar character occurred. In these also the rib-saturating apparatus did good service. Here, at the same distances of 17 to 33 ft., as before, deep bore holes were drilled with the Crälius drilling machine, and the apparatus inserted.

Royalties as Percentages of Market Price

By William Griffith*

SYNOPSIS—The public lands should be leased for long periods or perpetually. This will promote conservation and economic efficiency in operation. Leasing will enable the prospector to earn the fruits of his discovery and he will not be disqualified from operating by a demand for the large payment necessary to purchase a fee-simple title to the land to be exploited. By making the royalty a percentage of the selling price, a perpetual contract could be made which would be equitable and advantageous to lessee and lessor alike.

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Reformers, in their recent efforts to secure for the people a greater share of the proceeds of mining enterprises on public lands, have fixed upon the leasing method as the one best adapted to secure this end, and hope to substitute it for fee-simple sales. To avoid the chance that an increased market price for the products might result eventually in the royalty becoming unduly small compared with selling prices, they would exact short-tenure leases, that the royalty might be changed from time to time as the market value of the product varied. Thus they would reserve for the people a more equitable share of the proceeds.

Short Tenure and Waste

I submit, however, that this proposed plan of short-tenure leases is unsatisfactory, and one of the most wasteful that could be conceived as has been abundantly proved during the hundred years' life of the coal industry of Pennsylvania, during which time all sorts of titles have been held. Short tenure tends toward small operating units, careless methods, extravagant waste of national resources, with excessive loss of human life, while long tenure promotes large operating units, careful and scientific methods, with the greatest possible conservation of life and property. If the public lands of this country are to be leased, the holdings should be perpetual, or for not less than 50 years, unless the mineral is sooner exhausted, and rights of renewal should be accorded to the lessee. In order that the royalty may fit the fluctuating physical and market conditions, it should be arranged on a sliding scale, automatically adjustable, a percentage, if you please, of the market value of the product; thus obviating the necessity for frequent changes of lease and royalty.

The Perpetual Lease Helps the Prospector and Operator

A perpetual or long-term lease is best for the lessee. If he is a prospector, it encourages him to explore, and develop the property, and his reward would be secured with the least outlay, for if he shows a good prospect his lease is more salable than a fee-simple title, because there is less money at stake and less hazard on the part of the purchaser.

If a lessee is an operator, such leases are best for him, because the money which he would otherwise invest in a fee-simple title may be used to prove the property, and if found good, to develop and equip it. He thus secures the coal bed on its merits, and can regulate his investment accordingly. If the developments show the property to be worth the outlay he will be warranted in installing substantial equipment, and his title affords suitable security upon which, if desired, to borrow the necessary capital. If his provings show the property to be unsatisfactory, he may forfeit his lease, and thus save what would otherwise be lost through purchase of the fee-simple title.

Financial Advantages of Long-Time Leaseholds

Next to an outright ownership, a perpetual lease is the best from the viewpoint of the financier, because it tends toward more permanent equipment, larger outputs and profits, thus affording better security for loans. It permits long-term bonds which are more attractive to investors. Short-term leases or contracts, subject to changes at renewal periods, are poor security, and cannot be easily financed.

From the viewpoint of the conservationist the perpetual lease is preferable because the lessee expects to exhaust all the coal, and, therefore, conserves the supply for the future by avoiding waste in mining, and to secure this end, can afford the expense necessary to install permanent, uptodate plants, use the latest and best mining methods, employ competent engineering advice, and install means for preserving the lives and comfort of employees.

It is to the advantage of the operator, for conservation purposes, to experiment with and investigate new methods of mining and utilizing his product in order to make a market for inferior portions of the coal which might be otherwise wasted.

The quantity of ordinary waste or refuse material from large plants is so great that its possible value becomes an item of considerable importance, and is worth the expense of searching out new methods for its utilization.

Public Welfare Demands Perpetual Leases

Perpetual leases promote public welfare because: They stimulate prospecting and the discovery of new coal or mineral areas; they hasten developments more rapidly than any other sort of title; and they will produce revenue for school and territorial purposes.

The above general principles would seem to apply with double force to the coal lands of Alaska, because the best coals of the territory are high-grade, only because of their proximity to the volcanic rocks, and are, therefore, liable to be much broken, folded or crushed through the movements or quakings common to eruptive measures.

On account of the unfavorable physical conditions, added to the high cost of labor and material, and lack of transportation facilities, the preliminary expense of proving Alaska coal lands will be unusually large. The investigation must be made, however, before the operator is warranted in making the investments necessary to equip a mine plant. How much better, therefore, it would be under these circumstances if land could be purchased on its merits, by this installment plan, instead of first hazarding the cost of a fee-simple title, which might ultimately result in a dead loss.

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*Mining engineer and geologist, Scranton, Penn.

Note—Article read before the Spokane, Wash., meeting of the American Mining Congress, entitled "Leasing of Mineral Lands."

In the Eastern United States no one favors the short-tenure lease. The coal-land owner, as the result of dire experiences, views it as the most ingenious device ever instituted for the purpose of wantonly wasting his substance, and the operator regards it as a delusion and a snare. It deludes him with the pleasant but often mistaken notion that he can pay out the investment with large profits before his short lease expires, and it becomes a snare when he gets in financially, and then finds that he can't get out.

Modernization of Conveying Plants

Special Correspondence

SYNOPSIS—A description of a telpher system that transports coke from the oven bench direct to the mouth of the blast furnace without removal from its original bucket. Breakage is thus reduced to a minimum.

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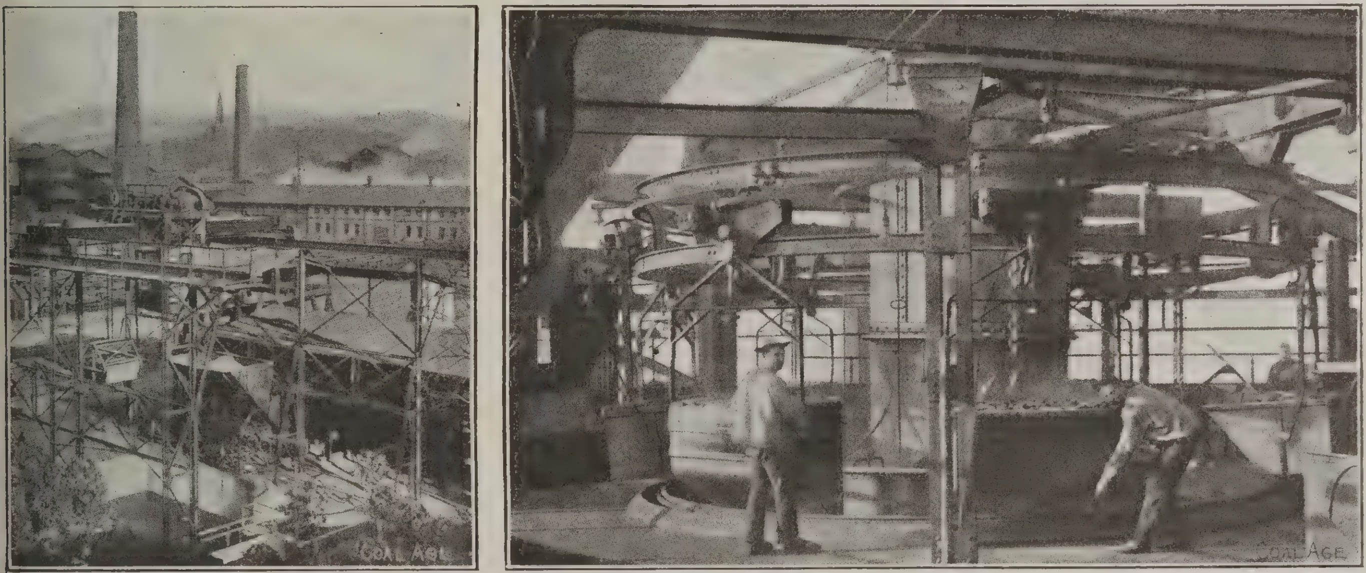
One effect of the great competition which at present exists in the production of iron and steel, as well as in allied industries, has been to render the whole process of production and smelting the subject of careful survey in order to detect any points of economy which could be adopted in the handling processes involved. It is nowadays realized that in many instances success or failure depends largely on a decimal point in the works production costs. Anything, therefore, which tends toward the elimination of useless labor and time has its definite value.



Two Views of the Suspended Telpher System

Old Plants Modernized

For this reason works which have been established for considerable periods have been modernized and revolutionized. Newer works have, of course, availed themselves of the most modern advantages in methods of handling material. Considered from a technical standpoint, it is perhaps most interesting to note the way in which the older plants have been thus brought up to date by the application of modern devices, one of the conspicuous examples of which is the Austrian plant situated at Trzynietz, belonging to the Austrian Mining & Ironworks Co.

One of the most difficult problems in the reconstruction of the conveying apparatus at this works was the conveyance of the coke from the ovens to the blast-furnace mouth. This was rather a difficult undertaking, as the coke-oven bench was separated from the blast furnaces not only by a number of buildings such as boiler houses and a smithy, but also by a storage ground for ore. It was important also to avoid rehandling, and to prevent any considerable fall into the furnace mouth.

The method adopted by Messrs. Adolf, Bleichert & Co., of Leipzig and London, who undertook this modernizing of the transport system, was the use of a telpher line combined with an inclined section having a rope drive leading to the charging platform. The coke is shoveled direct into the telpher cars from the quenching stage. At this point the workman in attendance starts the loaded cars by engaging a switch. The next empty bucket thus moves up and stops at the proper point for loading. The loaded car runs automatically without supervision on a suspended track around various curves between the buildings to the sorting line, where it passes over a weighing machine before taking up a position behind the preceding bucket at the regulation distance fixed by a block system.

When a coke charge is required, a signal is given from above and the man supervising the traffic below engages a switch, whereupon the carriers automatically start one after another. On arrival at the inclined section they couple automatically to the traction rope and uncouple again on reaching the top, proceeding to the mouth of one or the other of the two furnaces according to the position of the switches. Here they discharge by tipping. The drop is small and the coke suffers no damage. The buckets then return to the coke ovens.

The traffic is continuous and has a loop system, so that there is no change in the direction of travel. It will be seen that the transport of small quantities effected by this means offers special advantages when various classes of ores have to be smelted because it is simple and easy to make the necessary mixtures accurately.

An Accounting System for Coal Companies

By J. C. McNeil*

SYNOPSIS—A brief description of a simple system of bookkeeping applicable to any coal company, in which reliance is placed upon vouchers and loose-leaf forms, so that the amount of work to be done is reduced to a minimum.

⁂

The coal industry, is one of wasting assets and hence the accounts of the coal companies should be kept in such a manner as to exhibit at all times the true status of its affairs.

The revenues of a coal company are derived principally from four sources, viz.: Sales of coal and merchandise, tenement rentals and revenues from miscellaneous sources.

Coal Sales

Invoices should be rendered to each customer for all coal sales, showing such details as are needed for the business. They should be numbered consecutively, beginning on the first day of each month, or the first of each fiscal year, as may be deemed necessary, and should be entered in an invoice register ruled to give all the information shown on the invoice. One general ledger account should be kept for the debit "Invoices Rendered." The credit account should be "Coal Revenue," or if it is desired to exhibit the revenues from each grade of coal, proper credit accounts with the different grades should be set up. A side ledger should be opened for the purpose of opening accounts with the various customers, making the account Invoices Rendered, the controlling account for this ledger.

Merchandise Sales

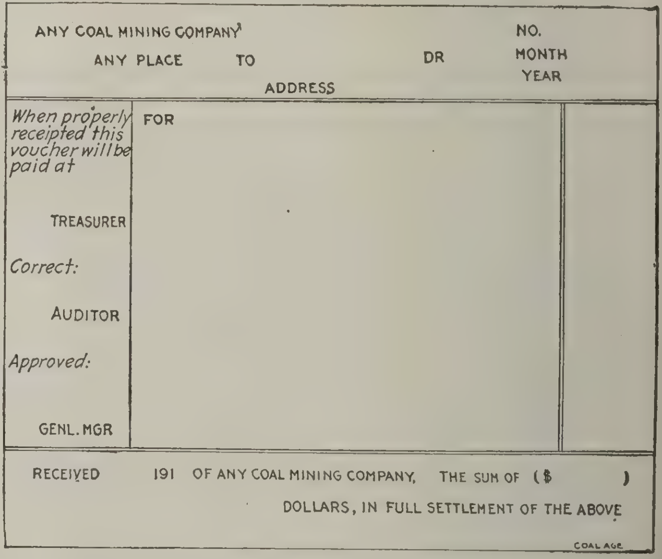
While it is the custom of some companies to treat the merchandise scrip issued plus the cash sales as the merchandise sales for the month, this method is not accurate. A daily report of sales, divided as between cash and scrip, should be obtained from the manager of the stores and the total of these reports at the end of each month should be debited to the store manager and credited to merchandise sales. The office cash account should be debited with the cash received and the scrip issues account debited with scrip turned in and the total of these two debits passed to the credit of the store manager's account, which automatically clears that record. In this manner, the actual amount of the merchandise sales can be accurately determined and the credit balance standing in the scrip issues account will always show the amount of merchandise orders in the hands of employees and not redeemed.

Tenement Rentals

The usual method of handling these rentals is through the payrolls, the debits being made against the employees occupying the houses and the total of the column rent being passed to the credit of tenement-rent revenues. It would also be a good plan to make up a statement each month showing the numbers of the houses, which would have to be numbered for this purpose, the name of the occupant, the amount of rental and the payroll sheet and line numbers on which the deductions are made. In this way, a permanent record of the occupancy of the tenement houses would be on file.

Miscellaneous Revenues

Revenues are always received through the sale of some materials, purchased for other uses, from freight claims, and various items arising in the usual course of business, for which regular invoices should be prepared for proper record. It would not be wise to take these items through the invoices-rendered account, as it is desired that this account should represent the sales of coal. It would, therefore, be better to have a separate register for these miscellaneous bills, which should be numbered in a series separate and apart from the coal invoices, and also provide a side ledger for them. The controlling debit account for these items should be known as sundry accounts and the credit account would, of course, be the various accounts affected by each bill or invoice. The charges to this account would come from the bills, which should show the credit account for a corresponding amount, or from the vouchers for payments made for various accounts. As the corresponding credits for these charges are made from vouchers, they would come through the vouchers register and the bills would be issued for record and collection only. They should, therefore, only be entered in the record column of the sundry-accounts register.



ANY COAL MINING COMPANY
ANY PLACE TO
ADDRESS
DR
NO.
MONTH
YEAR

When properly receipted this voucher will be paid at
TREASURER
FOR
Correct:
AUDITOR
Approved:
GENL. MGR

RECEIVED 191 OF ANY COAL MINING COMPANY, THE SUM OF ($)
DOLLARS, IN FULL SETTLEMENT OF THE ABOVE

Fig. 1. Voucher for Making Payments

Clearing Revenue Accounts

While it is customary to charge the revenue accounts and credit profit and loss direct, it would be better to carry an income account, the net balance of which should be charged to profit and loss at the end of each fiscal year. In this manner, the various revenue accounts would be debited and the total amount credited to income account, while the expenses would be handled as debits to income account and the various expense accounts credited. The balance would then be passed to the debit or credit of profit and loss and the contraentry made to income account. In this manner, the profit and loss account would show at a glance the net profits or losses of the business for the period represented.

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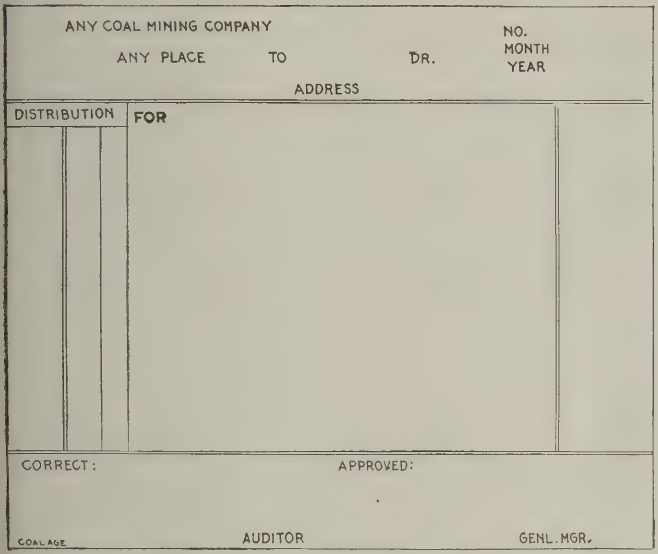
*Artemus, Ky.

Expenses

The expenses of a coal-mining company would come under four general heads: Maintenance expenses, production expenses, sales expenses and general expenses. These accounts would, of course, be the general ledger-expense accounts and could be subdivided into various detailed accounts for statistical purposes in a manner which I shall later explain. These accounts, however, cover in the main all the expenses of a coal-mining company.

Maintenance expenses represent all the expenses made by the coal company for maintenance of its properties, such as mines, machinery, tenement houses. Maintenance of these properties would mean repairs; depreciation of the properties; ordinary renewals of machinery, mine cars, and other properties about the plants.



ANY COAL MINING COMPANY

ANY PLACE TO DR.

NO.
MONTH
YEAR

ADDRESS

DISTRIBUTION	FOR

CORRECT: APPROVED:

AUDITOR GENL. MGR.

Fig. 2. Voucher for Filling

Production expenses should represent the total cost of producing the coal at the mines, including only the actual costs of production. Into this account should be charged the monthly amounts set aside for depletion of coal lands, etc.

Sales expenses should represent the entire cost of marketing the output. This account should be charged with the amounts expended for conducting branch sales offices, advertising, salaries and expenses of agents and officials engaged solely in the sales end of the business.

General expenses should represent the general expenses of conducting the business, which are not properly chargeable to the other expense accounts. To it should be charged insurance, taxes, legal expenses and salaries and expenses of the general officers not devoted entirely to one department.

Expenditures made for additions and betterments to the properties which do not represent renewals of existing structures or machinery should be charged to an additions and betterments account. The total of this account should be cleared at the end of each fiscal year by charging the amount to capital accounts. In this manner, the capital accounts would represent all the expenditures made for the properties when acquired and also all the improvements put thereon. The depreciation and the depletion of the properties will be taken care of in appropriate reserve accounts which I will explain hereafter.

Detail Expenses

Under maintenances, there should be entered in details expenses made for: Maintenance of tipples and outside structures, maintenance of power plants, motors and machines, tracks, ventilation, timbering, removal of slate, depreciation of the various classes of machinery, and such other primary accounts as may be necessary.

Under production expenses, there should be entered the details of expenses made for: Mining, hauling, ventilation (operation), lubricants for machines, barn expenses, removal of water, operation of power plants, and such other items as properly belong to the actual expenses of producing the coal.

Under sales expenses, the charges made for salaries of sales agents, expenses of sales offices, proportion of general office expense, expenses of yards, freight on coal sold delivered at destination, advertising and other actual sales expenses should be entered in the details of these expenses.

Under general expenses, there should be charged taxes, insurance, royalties, salaries and expenses of officers, depletion of coal measures, interest and discount, and such other expenses not included in maintenance, production or sales expenses.

Under additions and betterments, there should be charged all expenditures made for additions to the properties which are not renewals of existing structures.

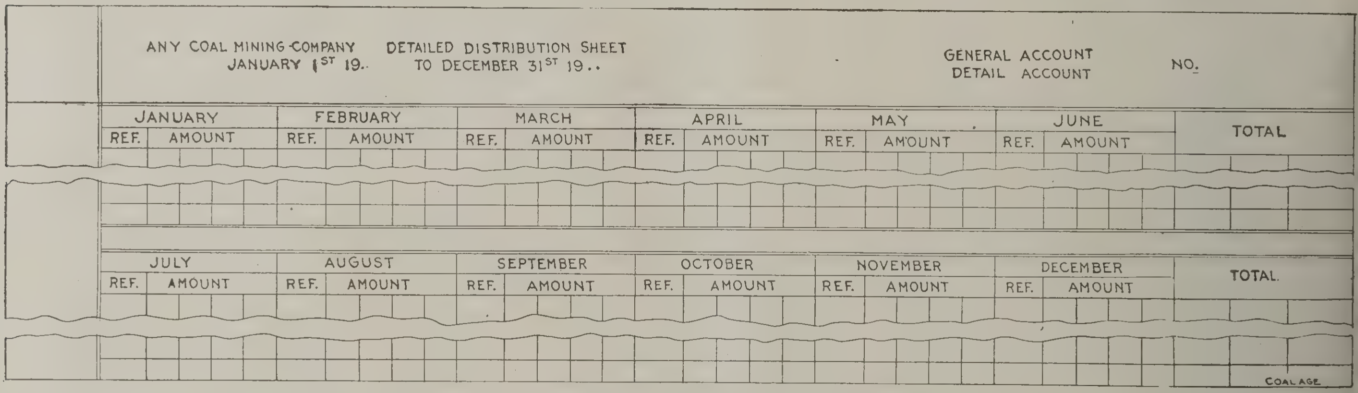
Method of Handling

It is intended under this system of accounts that all payments are to be made on vouchers which are properly approved by the proper officer authorized to do so. As shown by Figs. 1 and 2, the vouchers should consist of two parts, the pay part and the file part. Vouchers should be made each month in favor of each party rendering services of furnishing material, showing the dates and amounts of the invoices with a brief description of each, the totals of the invoices entered and written in words in the receipt portion of the voucher. All supporting papers should be fastened to the file part of the voucher and passed to the auditor, who should enter thereon the month and audit number. By using the number of the month for which vouchers are made, with three additional numbers, provision is made for the issue of 999 vouchers in any one month.

Vouchers should be arranged alphabetically, as nearly as possible, before numbering. They should then be entered in the voucher register, the first columns of which should show the numbers, parties in whose favor drawn, purpose (briefly) for which drawn, and the amount. The debit columns of the voucher register should be headed for each of the general accounts and such other accounts as would be affected by the issue of vouchers and for which an accumulative total would be desired for book entries; also a special column should be provided for such accounts as might come up and for which no special columns had been provided. The credit side of the voucher register should show the net credit to be posted to the voucher liability account, a special discount column and such other credit columns as the nature of the business would require. Under this system it is proposed to dispense with numerous journal entries by handling accounts through vouchers, as well as payments. Only the totals of the general accounts would be entered in the columns for these accounts. A voucher-distribution form, Fig. 3, should be provided for the entries of the detail accounts, using one sheet each year for each detail account. This form, as will be observed, provides for 12 months' entries and shows the reference which should be the number of the voucher from which taken and the amount. Credits to the detail accounts should be entered in red ink and proper deduction made in totaling the same. If all details are properly entered, the totals of the detail accounts under each general account must agree with the register total of the general account; if not, the work has not been entered correctly. Under this system a voucher (for record only) should be drawn covering the payrolls, the liability account being payrolls, and all rolls handled through the voucher register in the same manner as any other payments. On this voucher, the various expense accounts would be charged, the corresponding credit being passed to payrolls, and then payrolls should be debited and a corresponding amount passed to the credit accounts affected.

Journalizing

Under this system, it would be better to make all the journal entries at one time, say, the last day of the month in which the accounts are handled and the journal entry should contain only the totals of the accounts affected. This would reduce the number of journal entries required to a minimum. A form like Fig. 4 should be used for journal entries, which should state "the debit account" the credit account and follow with the explanation of why the entry is made. The total of the debits and credits should be shown on each entry and its correctness should be certified or approved by the head of the accounting department before being entered; or, it could be certified to as being correct by the auditor, or chief accountant, and approved by the general manager of the business before being entered. In this way, the head of the business would have knowledge of every entry affecting the books before being entered thereon. Entry into the journal then becomes a matter of straight copying, and all papers supporting the entry can also be attached to the loose entry form, making a nice file for it.



ANY COAL MINING COMPANY
JANUARY 1ST 19..
DETAILED DISTRIBUTION SHEET
TO DECEMBER 31ST 19..
GENERAL ACCOUNT
DETAIL ACCOUNT
NO.

JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		TOTAL
REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	

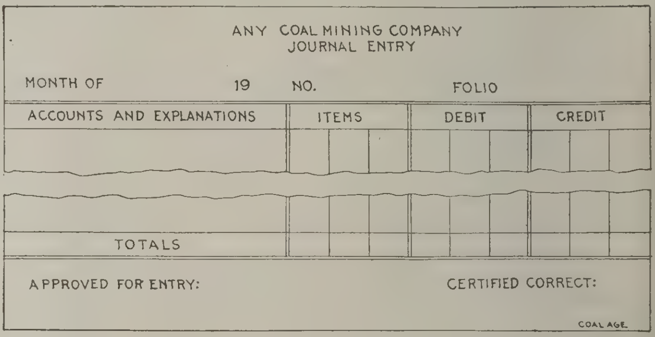
JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		TOTAL
REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	REF.	AMOUNT	

COAL AGE

Fig. 3. Detailed Distribution Sheet

Miscellaneous Expenses

Payments which are made annually; such as taxes, insurance, etc., would, if charged direct to expenses in month the payments were made, burden the accounts for that month unnecessarily and cause the expense to be all out of proportion. The taxes should be accrued each month and charged to expenses direct or through an account that could be cleared into the income account, monthly on a basis of one-twelfth of the previous year's tax payments. Differences between the book amount and the actual amount due could be adjusted in the month of payment. Prepaid insurance premiums should be charged to an appropriate asset account and one-twelfth of this amount charged out monthly to the appropriate expense accounts. By this manner of handling, it will be seen that the credit side of the balance sheet will show the liability for taxes up to and including the month for which they are made, and will likewise show correctly as an asset the unexpired insurance premiums. Accounts of a similar nature should be handled in a like manner.



ANY COAL MINING COMPANY
JOURNAL ENTRY
MONTH OF 19 NO. FOLIO

ACCOUNTS AND EXPLANATIONS	ITEMS	DEBIT	CREDIT
TOTALS			

APPROVED FOR ENTRY: CERTIFIED CORRECT:

COAL AGE

Fig. 4. Example of Journal Page

Depreciation and Reserve Funds

A fixed amount per ton of coal mined should be charged into the expense accounts each month and credited to an appropriate reserve fund to cover depletion of coal measures. All equipment should be depreciated each month on a basis of a fixed percentage of the value of the equipment, or on the purchase price, the monthly charge being one-twelfth of the annual percentage, which should be sufficient to recover the full amount of the value of the machinery or investment at the expiration of the depreciation period. This amount should likewise be credited to an appropriate reserve account. It would be well to charge to expenses and credit to an appropriate reserve account one-half of 1 per cent. monthly of the total investment, or the initial investment in the property. This should be done because, if money of others were employed in the business, legal interest would have to be paid thereon and if a business will not justify a night; at all mines employing less than one hundred (100) men underground, the fan shall be run at its usual speed for six (6) hours before men go into the mine to work. A recording pressure gauge shall be maintained in connection with each fan at all times: *Provided,* nothing in this clause shall apply to mines employing ten men or less.

§ 15. REFUGE PLACES—POWER HAULAGE ROADS. (*a*) On all single-track haulage roads, where hauling is done by machinery, which roads the persons employed in the mine must use while performing their work or travel on foot to and from their work, there shall be places of refuge on one side not less than 3 feet in depth from the side of the car, and not less than 4 feet long and 5 feet in height and not more than 60 feet apart. On rope-haulage roads, means of signalling shall be established between the haulage engineer and all points on the road.

ial shall be stored nor allowed to accumulate therein. They shall also be whitewashed not less than once in six months.

GOB ON HAULAGE ROADS. (*e*) One side of all haulage roads shall be kept clear of refuse or materials, except timbering, unless the rib or timbering on such side shall be 2½ feet or more from the rail. But in such case materials or refuse shall not be permitted within 2½ feet of the rail.

§ 16. CARS. (*a*) When there is an open hook coupling on either end of the car, the hook and links must be attached so that when hanging down, the coupling will be clear of the ties and rails.

Mine cars in use when this Act shall become in force and effect shall be made to comply with this provision within one year thereafter.

passage

charge of legal interest on the investment therein, it is not profitable to have the money so invested. The funds thus set up should be in terms of cash, not book values, and it would be well to invest the amounts in bonds or other securities, so that when the mine has been exhausted the stockholders can be returned their investment and the dividends paid them will truly represent the profits. Additional lands purchased should be charged to the depletion reserve account and not the property account. A charge to property account for additional lands purchased from funds secured from the profits of the business would swell the property account out of proportion. It must be remembered that in coal mining, every ton of coal removed from a property reduces its value to that extent.

The balance sheet of a coal company should show first the property assets, such as lands, equipment, etc.; second, bills and accounts receivable; and, last, liquid assets. The liability sheet should show the capital liabilities, funded liabilities, notes or bills payable, current liabilities for labor and materials, reserve-fund liabilities and last the profit and loss, which, of course, in an efficiently managed coal business should appear on the credit side.

A system of this kind can be applied to a concern operating any number of mines, is very flexible, and at the same time very effective. Its purpose would be to accurately record the history of a coal business.

⁂

Mining Show and Annual Convention of the American Mining Congress

That the manufacturers of mining machinery and appliances and the makers of safety and rescue devices have been awaiting just such an opportunity as will be presented in Philadelphia, Oct. 17-25, when the American Mining Congress will hold its first national Mining Show or Exposition, became pleasingly apparent to the officers of the congress a few days after the project was launched. There has already been such a response from manufacturers that it is feared there will not be space for all who may apply.

It is already regretted by the congress that Horticultural Hall, in which the exposition is to be held, is not larger, and, while it may prove inadequate to the demands to be made upon it, nevertheless, it is large enough to stage a great industrial show.

There is already some talk among the officers of the congress of cutting down the amount of space being asked for by the larger corporations in order that there may be a greater diversity of exhibits. Provisional contracts are being made to meet this contingency.

"The manufacturers have been quick to appreciate that this will not merely be an industrial show to satisfy the curiosity of the public," said Richard L. Humphrey, the director of the exposition. "They realize that the convention of the American Mining Congress, which is to be held during the week of the exposition, will bring to Philadelphia a great gathering of practical mining men who are directly interested in the exhibits and men who will either be purchasers then and there, or who will make their purchases after returning home and weighing the efficiency and need of the devices.

"The exposition will be the first general national clearing house between the men who make mining machinery and the men who use such machinery. Mining men, in need of new equipment, understand fully what a tremendous task they have on hand when they start out to find the machinery that is best adapted to the conditions of their mines. They see their opportunity in the mining exposition. The indications are that the American Mining Congress will have the greatest and most representative convention in its history.

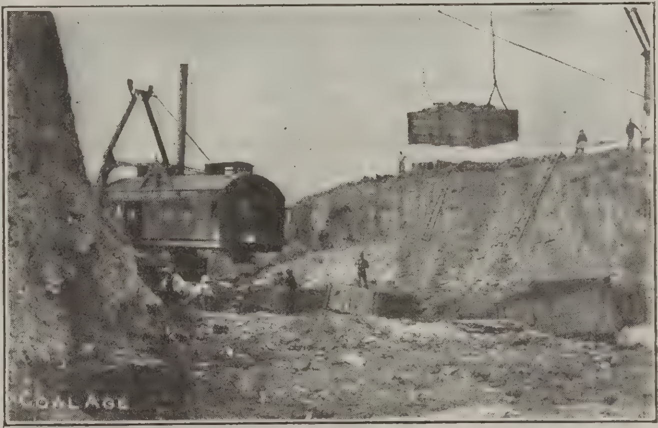
"It is proposed to bring together at the exposition a variety of exhibits affording instructive object lessons of greatest value to the future of the mining industry. The American Mining Congress and the first mining exposition will afford an unusual opportunity for the interchange of views, and is by far the most comprehensive attempt that has been made in the history of the mining industry to demonstrate its needs and the efficient utilization of the mineral resources of the country."

⁂

A Trackless Mine

A muleless, trackless, motorless coal mine is one of the latest and most novel improvements in open-cut or strip-pit mining in the Pittsburg, Kansas, coal field. The style of mining itself, where steam shovels are used, is comparatively new.

In two or three of the 25 strip pits in this country lifting cranes on the banks of the cuts are used to elevate 5-ton skips of coal to the surface, there depositing them on the running-gear of a tram. These cars, filled with coal, are hauled by a dinky engine to a derrick which picks the skips up and dumps them in railway cars. It is claimed that nowhere else in the country is such a method used in coal mining.



An Open Trackless Mine

The lifting crane travels by its own power and keeps on the bank of the cut abreast of the coal diggers in the bottom of the pit, which usually is from 24 to 30 ft. deep. Ladders are used by the workmen in entering and leaving the workings.

Other pits have been employing tracks and trams in the bottom of the huge trenches, as is done in underground mines, and most of them use mules for motive power. In such pits the coal is hauled to the surface on inclines.

The coal vein is about three feet thick and is uncovered by steam shovels, some of which are the largest ever constructed. The yield is somewhat over 5000 tons per acre

POWER DEPARTMENT

Does Bituminous Mining Pay?

By A. E. Rickards*

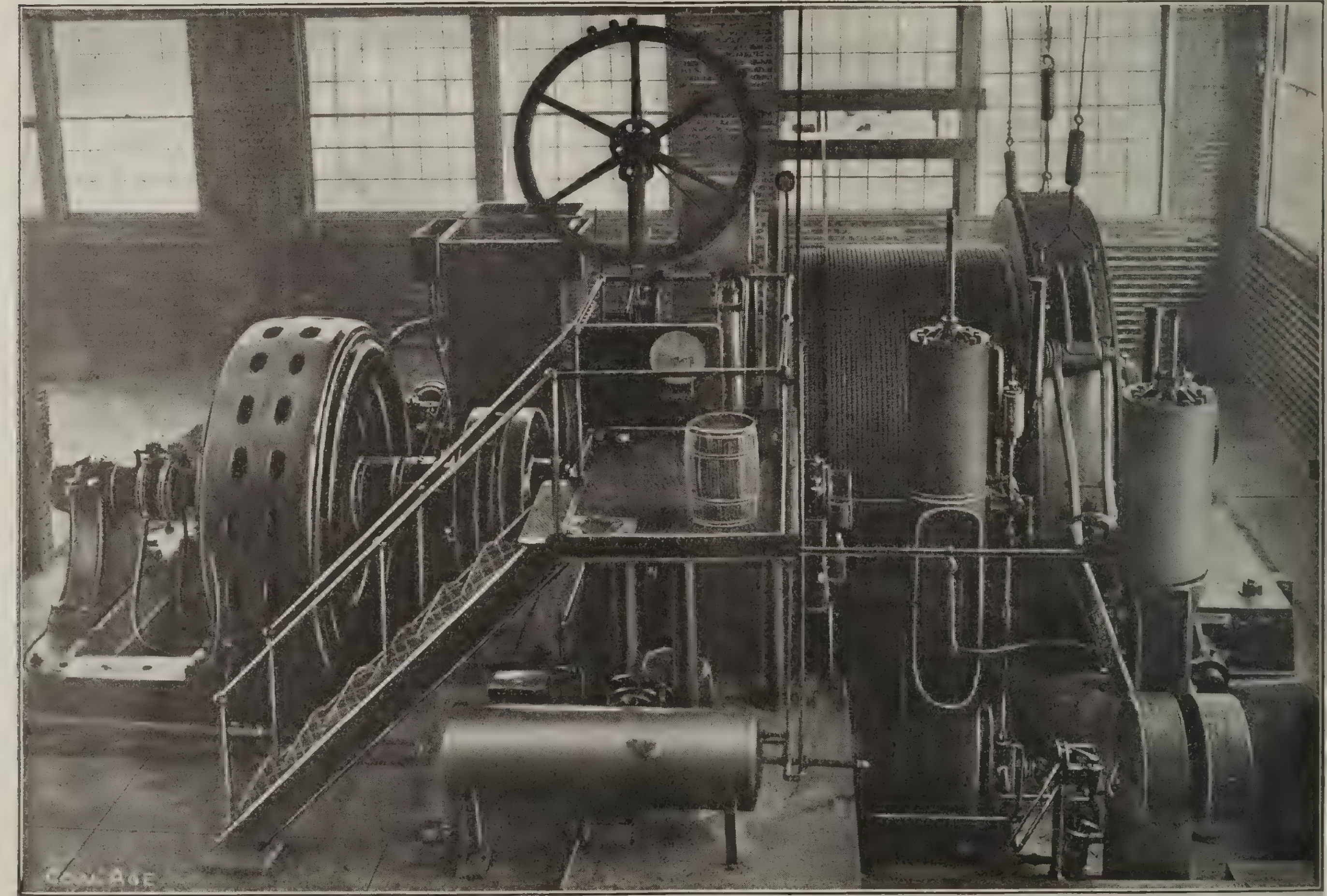
SYNOPSIS—Some interesting facts and figures are here presented, covering the coal production of the country during the past, and showing the steadily increasing amount mined per capita of population and its rising cost per ton. The principal opportunity for economy in mining cost is then discussed.

⁂

In the year 1920, there will be 835,000,000 tons of bituminous coal mined in the United States. This amount is over twice the quantity produced in 1909. With this great increase in the demand for bituminous coal, at first glance, one would consider its production a very profitable business. However, to earn a legitimate profit becomes a more difficult problem each year. These statements can be verified by referring to the United States census reports and those of the Geological Survey.

The data given in this paper are compiled from these reports and indicate that the operators have a big problem before them. The first table is most interesting—it shows that this country is changing rapidly from an agricultural to a manufacturing one. It also shows that there are two other factors which have a material bearing upon this great increase in the demand for coal. These factors are the rapid growth in population and the remarkable increase in the demand for fuel per capita.

For the past 50 years the population increased at an average rate of 23.5% per decade. The demand for coal per capita has increased from 0.26 tons in 1860 to 4.54 tons in 1910. Or, in other words, in 1910 there was 4.54 tons of coal mined for every man, woman and child living in United States at that time. During the past two decades the coal mined has increased at an average rate of 62% per capita per decade.



A 750-Hp. Alternating-Current Motor Driving a Mine Hoist

If these averages hold true until 1920 the coal mined per capita will be 7.36 tons. If the population increases at the same rate as during the past 50 years, there will be 113,475,000 inhabitants in the United States in the year 1920. On this basis the coal mined in that year will amount to 835,176,000 tons. This is an increase of 100% over that mined in 1910. By comparing this increase with the per cent. increase in the quantity of coal mined during the past 50 years, the amount predicted for 1920 seems entirely probable.

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*General manager, Industrial Engineering Co., Pittsburgh, Penn.

TABLE No. 1. COMPARATIVE ANALYSIS OF BITUMINOUS COAL MINED IN PROPORTION TO THE POPULATION.

	Population		Quantity of Coal Mined		Per Capita	
Year	In Numbers	Percent Increase in 10 yrs.	Tons per year	Per cent. Increase in 10 yrs.	Quantity Mined in Tons	Per cent. Increase in 10 yrs.
1860	31,443,000	....	6,494,000	....	0.262	....
1870	38,558,000	22	17,371,000	167	0.45	73
1880	50,155,000	29	42,831,000	147	0.855	89
1890	62,947,000	25	111,302,000	159	1.77	108
1900	75,994,000	20	212,316,000	91	2.8	64
1910	91,972,000	21	417,111,000	96	4.54	60

Coal was first discovered in this country in the year 1670 by Father Hennepin, a French missionary. It was found close to the Illinois River near the site of the present city of Ottawa. The first actual mining of coal was about 1744 in the Richmond Basin, Virginia. The first records of production were in 1822, which shows that about 54,000 tons were mined.

Remarkable Progress Has Been Made

In 1890, this country was the second coal-producing nation of the world. At that time Great Britain's production exceeded ours by about 30%. However, by 1900, the United States had overtaken Great Britain and has since maintained the advantage with an increasing lead each year. In 1911, the coal production of this country exceeded that of Great Britain by 60%. Today the United States is by far the greatest coal-producing country in the world.

Chart 1 shows graphically the quantity of bituminous coal mined each year from 1890 to 1912.

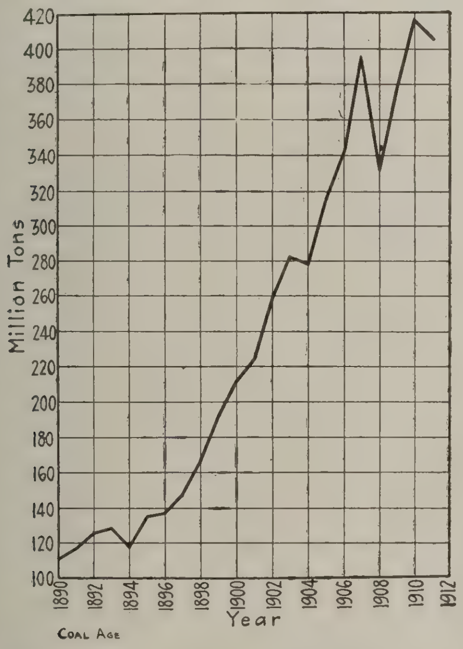


Chart 1. Amount of Coal Mined Yearly

In almost any other industry such a growth in the demand for its product would have caused a considerable increase in the price of its commodity. However, this did not take place in the case of coal production. In fact, at times the selling price was so low that it was a difficult task for the operators to earn a legitimate profit. This condition of affairs is caused by a constantly increasing competition. As the demand increases, new workings are continually opening up.

This makes a capacity in excess of the demand. This condition has existed for the past 25 years. The owners of coal lands are always looking for an opportunity to develop them. The railroads also encourage competition by continually extending their lines into new fields. This gives them additional tonnage and at the same time secures a low-priced fuel for their own consumption.

Chart No. 2 shows the effect of keen competition upon the selling price of coal. This chart shows the average selling price per ton per year at the mines.

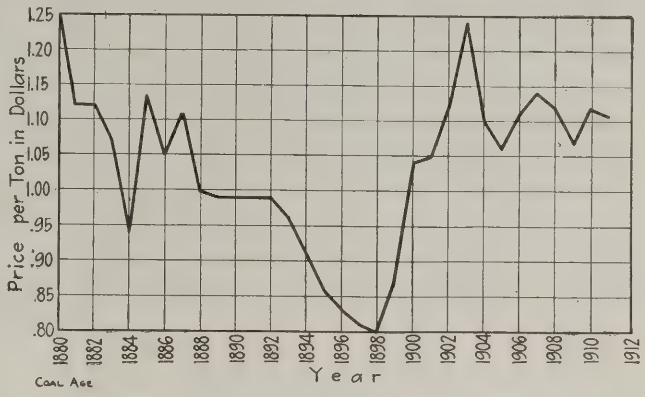


Chart 2. Selling Price of Coal per Ton at the Mines

To make a profit with the low selling price and the continual increase in the cost of production, is indeed a problem. One way to solve this is to increase the output. Mr. Edward W. Parker states "that the present bituminous mines in the United States are capable of producing 600,000,000 to 700,000,000 tons per year." He claims that this is possible without opening up another new working. To do this, of course, requires ample transportation facilities and plentiful labor supply.

The Present Status of the Industry

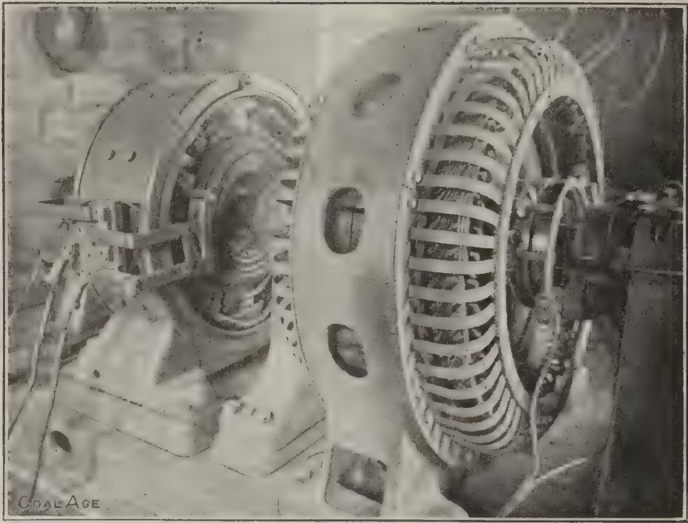
Table 2 shows the condition of the bituminous industry in 1909. Per cents. shown in the last column would apply to the conditions of today. These figures indicate the increase in seven years dating from 1902 to 1909.

TABLE No. 2. CENSUS ANALYSIS OF THE BITUMINOUS COAL INDUSTRY—ALL COAL COMPANIES

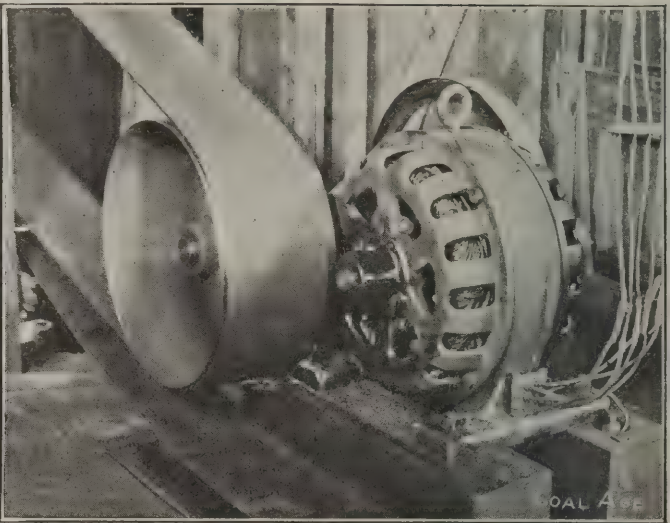
No.	Item	1902	1909	Per cent. Increase in 7 years
1	Number of companies..........	4,409	3,503	—20.3
2	Number of mines..............	5,652	6,013	6.4
3	Total capital................	$440,800,000	$1,062,197,083	141.
4	Primary horsepower...........	521,165	1,227,401	135
5	Number of wage earners.......	280,638	569,789	103
6	Wages........................	$181,482,288	$294,196,488	62
7	Number salaried employees....	19,871	22,800	14.7
8	Salaries.....................	$14,511,924	$21,800,895	50
*9	Miscellaneous expenses.......	$16,774,459	$29,691,324	77
10	Cost of supplies.............	$24,798,922	$48,000,000	94
11	Contract work................	$1,244,114	$2,207,672	77
12	Quantity coal mined (tons).....	260,216,844	379,744,257	45
13	Value of product.............	$290,858,483	$405,486,777	39

* Note—Includes royalties and rent of mines, taxes, office rent and sundry expenses.

Table 2 shows that the number of companies (item 1) decreased 20.3%. This does not mean that competition decreased. The next item (2) shows that the number of mines increased 6.4%. These figures indicate that the companies become larger and stronger. This is borne out by the next item (3) which shows that the total capital increased 141%. Some readers may consider that a large portion of the increased capitalization was water. However, the next item (4), Primary Horsepower, shows that this is not the case. For instance, the primary horsepower increased 135%. This means that the capacity of the power plants had to be increased this



100-Kw. Synchronous Motor-Generator Set



A 15-Hp. Alternating-Current Motor Driving a Fan

amount, due to the installation of new and heavier equipment in and around the mine. The new machinery must have required the expenditure of a considerable portion of the new capital. All the remaining items in this table show a material increase.

Table 3 shows more clearly how the cost to mine coal has increased. It is an analysis of the preceding one and contains the same items worked out upon a per ton basis.

TABLE No. 3. ANALYSIS SHOWING AVERAGES UPON PER TON BASIS

No.	Item	1902	1909	Per cent. Increase in 7 Years
1	Number of tons coal mined....	260,216,844	379,744,257	45
2	Capital....................	$1.695	$2.80	65.3
3	Contract work..............	$0.00478	$0.00583	21.9
4	Number of wage earners.......	0.00107	0.0015	40.3
5	Number of salaried employees.	0.0000764	0.0000602	—21.2
6	Primary horsepower...........	0.002	0.00324	62
7	Wages......................	$0.697	$0.775	11.2
8	Salaries....................	$0.0558	$0.0575	3.4
9	Cost of supplies...............	$0.095	$0.126	32.6
10	Miscellaneous Expenses*.......	$0.0643	$0.0785	22
11	Value of Product.............	$1.115	$1.07	—3.9

* Item No. 10 includes royalties, rent of mines, taxes, office rent and sundry expenses.

Table No. 3 shows most conclusively that the cost per ton of coal mined has increased and that the profits have decreased. For instance, in 1902, the average selling price per ton was $1.115 and the average operating cost to mine coal was $0.912, leaving a profit of 20.3c. In 1909, the average selling price was $1.07 and the average cost $1.037, leaving a profit of only 3.3c. per ton.

These operating costs do not include all the fixed charges. They include only the cost of wages, salaries, supplies and miscellaneous expenses. The item, miscellaneous expenses, includes royalties, rent of mines, taxes, office rent and sundry expenses.

Contract Work (item 3) is given to show the amount of new development work done.

The increase in capital (item 2) per ton of coal mined is interesting. This shows an increase of 65.3% in seven years. It shows that the mine operators are continually spending money for equipment and improvements which they anticipate will reduce the cost of mining. In 1902, there was $1.695 capital invested for every ton of coal mined per year. In 1909, this had increased to a sum of $2.80 for every ton of coal mined per year. If the economies anticipated by the operators, had worked out, the other items of expense in the column under 1909, would have been reduced, instead, each item of expense shows an increase.

From the foregoing it is seen that the capital account has reached such proportions, that the future profits must be obtained through greater output and greater economies in the operation of the workings, and the investment must be kept down to a minimum.

A Rapid Evolution Is in Progress

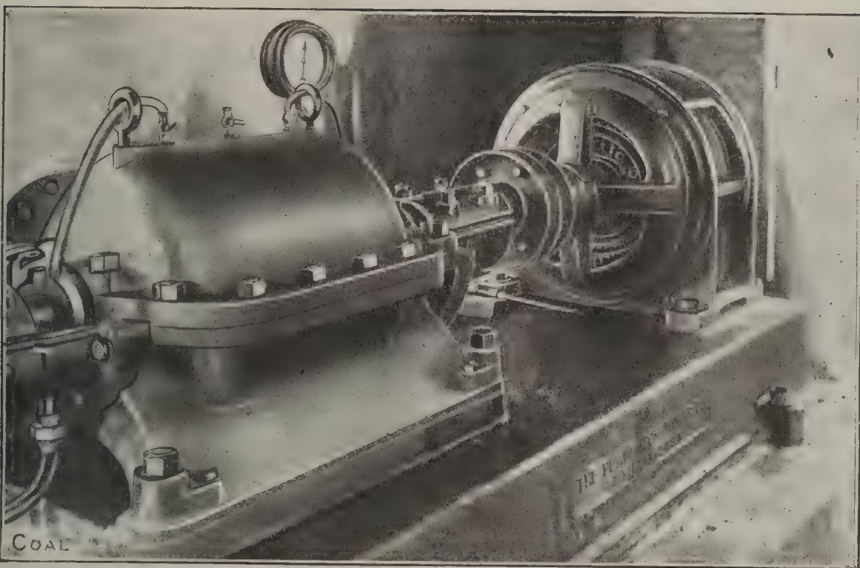
The coal-mining industry is undergoing a rapid evolution. It was only a few years ago when mining coal was strictly a mining proposition. Coal was dug entirely by manual labor and hauled by mules. Today almost 50% of the entire production is mined by machinery and hauled by locomotives. The industry is now becoming a combination of both a mining and a power proposition.

After the mine operators had gone to the expense for mining machinery, etc., the cost to produce coal should have been reduced. However, the new order of things brought about conditions of its own, which, in most cases, increased the cost of production.

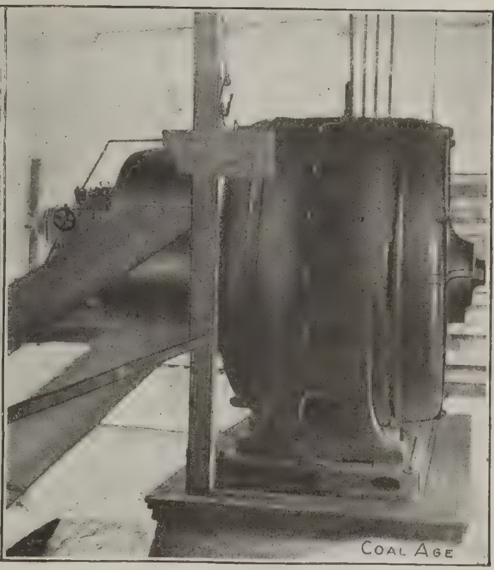
The profits in the future depend in a great measure upon the solution of these new problems. They offer the greatest of opportunities to effect economies. These opportunities exist in almost every working. This does not indicate that the man in charge is negligent. A mine superintendent is essentially a miner. He has been selected by the management because of his practical knowledge on mining coal. Power is entirely out of his line. The production of power, its proper distribution and its use in a mine, requires the work of those who have made the subject a special study, in other words, specialists.

In the past, the operators have made it a general practice to install isolated power plants and generate their own current. However, today a large number of these plants have since been abandoned and the operators are now buying electricity from the nearest power company. Many of the new workings opened up during the past few years are operating entirely from purchased power.

It seems somewhat inconsistent to think that a central station can afford to buy coal, pay freight and then sell the current produced back to the coal mine. Nevertheless, this is the case; furthermore, the operators are in



A 35-Hp. Motor Driving a 330-Gal. Centrifugal Pump



A 200-Hp. Motor Driving a Mine Fan

many cases finding it cheaper than producing their own power.

One of the principal advantages of central-station service is that it allows extensions to be made and more mining machinery to be added without making expensive additions to a power plant.

This can best be explained by citing the case of a certain coal company. This experience will most undoubtedly be similar to that gone through by many readers. These men opened up their workings eight years ago and invested $18,000 in a power plant. They anticipated that this installation would meet their requirements for years to come. They increased their tonnage to such an amount that three years ago they found it necessary to increase the capacity of the power house. This required an additional investment of $14,000. They then had a total of $32,000 invested in the power plant and believed that this equipment would be ample for their needs for years.

They extended their workings such distances that it soon became a problem to deliver electricity at proper voltages. At times the quantity of coal mined was considerably less than it should have been, due to this one difficulty. Early this spring they decided to make further additions to the power plant to take care of the new conditions before them. The changes contemplated would cost $18,000—this would make a total of $50,000 invested in power-generating equipment.

After studying the matter thoroughly these men decided to purchase their power from the local central station. The necessary investment would be much less than that required for power-plant extentions; also since making the change they find it considerably cheaper than their former power costs.

How Conditions May Be Met

To meet the conditions arising due to an increase in the power requirements, is oftimes a most perplexing problem. The solution may lie in any one of the following three plans:

1. By increasing the capacity of the present installation.
2. By building an entirely new, modern power plant,
3. By purchasing central-station current.

To decide which plan to adopt requires considerable study. The operator should first determine the following details with the present plant.

1. The maximum demand for power per ton of coal mined.
2. The quantity of power required per ton of coal mined.
3. The cost for power per ton of coal mined.

There are always certain parts of the load that remain fairly constant irrespective of the quantity of coal produced, such as that required for ventilation, pumping, lighting, etc. The information on the first two details should be obtained separately so as to show the demand and the quantity of power required by this part of the load, and that required for mining, haulage, etc.

With this information as a working basis, the plan to adopt can be decided upon by determining which alternative offers the most economical operation with a minimum investment and at the same time allows for future growth.

Purchased Power Is Usually Cheaper

When an analysis is made, such as outlined in the foregoing, it will, in almost every instance, result in favor of purchased power. This, of course, is assuming that the rates are such as usually quoted by the power companies. Table 4 is given to support this statement. The information in this table was obtained from actual tests in 40 mines located in Pennsylvania, West Virginia and Ohio. Each case, excepting mines Nos. 24, 36, 37 and 40, shows that purchased power is cheaper.

The table is divided into groups according to the size of units and contains data on both steam and gas engines. The groups are arranged as follows:

Group (A) Steam Engines—50 hp. and under.
" (B) " " from 51 to 100 hp.
" (C) " " " 101 to 200 hp.
" (D) Gas " " 101 to 200 hp.
" (E) Steam " " 201 to 500 hp.
" (F) Gas " " 201 to 500 hp.
" (G) Steam " " 501 to 1000 hp.
" (H) Gas " " 1001 hp. and over
" (I) Steam " " 1001 hp. and over

Columns 8, 9 and 10 show the cost per horsepower-hour and the savings effected if power were purchased at a given rate. The savings are shown in cents and also upon a percentage basis. The rate used for central-station power is figured at $15 per kilowatt per year for the maximum demand and 1c. per kilowatt-hour for the current consumed. On a horsepower basis this rate would be $11.20 per horsepower maximum demand plus 0.746c. per horsepower-hour. All the details in the table are worked out upon a horsepower-hour basis.

An Electrically Driven Fan, Showing Size of Fan House

Substituting Electricity for Steam. Note Idle Exhaust Pipe

TABLE No. 4. COMPARATIVE COST OF POWER, ISOLATED PLANT *VS.* PURCHASED POWER. IN BITUMINOUS COAL MINES

	Isolated Plant Power						Purchased Power		
1	2	3	4	5	6	7	8	9	10
							Rate $11.20 per Hp. + 0.746c. Hp.-hr.	Saving per Hp.-hr.,	
No. of Mine	Price of Fuel	Hp. of Engine	Max. Demand	Per Cent. Load Factor	Hp.-hr. Consumed per Year	Cost per Hp.-hr., Cents	Cost per Hp.-hr., Cents	Cents	Per Cent.
	Group A. Steam Engines to 50 Hp.								
1	$0.75-c	50	60	22	96,500	2.7	1.41	1.29	47.8
	Group B. Steam Engines from 51 to 100 Hp.								
2	$0.75-c	75	70	25.7	169,000	2.6	1.20	1.40	53.8
	Group C. Steam Engines from 101 to 200 Hp.								
3	$0.75-c	180	200	50	79,000	1.40	1.02	0.38	27.1
4	0.75-c	180	160	19	300,000	2.40	1.34	1.06	44.2
5	0.75-c	200	285	24	421,000	2.20	1.50	0.70	31.4
	Average cost					2.00	1.28	0.72	36
	Group D. Gas Engines from 101 to 200 Hp.								
6	$0.04-g	130	150	20	228,000	2.50	1.48	1.02	40.7
7	0.04-g	130	150	22	251,000	2.40	1.41	0.99	41.2
8	0.04-g	150	90	22	289,000	2.00	1.09	0.91	45.5
	Average cost					2.30	1.32	0.98	42.6
	Group E. Steam Engines from 201 to 500 Hp.								
9	$0.75-c	225	300	30	593,000	1.50	1.31	0.19	12.6
10	0.75-c	250	175	15	328,000	2.00	1.34	0.66	33.0
11	0.75-c	260	280	19	434,000	3.00	1.47	1.53	51.0
12	0.75-c	300	150	17	445,000	2.30	1.12	1.18	51.3
13	0.75-c	300	320	31	815,000	1.90	1.18	0.72	37.9
14	0.75-c	300	300	50	1,312,000	1.40	1.00	0.40	28.6
15	0.75-c	300	375	50	1,318,000	1.30	1.06	0.24	18.4
16	0.70-c	300	300	39	1,024,000	1.30	1.07	0.23	17.7
17	0.75-c	300	160	13	342,000	2.00	1.26	0.74	37.0
18	0.75-c	300	325	24	632,000	1.90	1.32	0.58	30.5
19	0.75-c	325	300	45	1,283,000	1.40	1.01	0.39	27.8
20	0.75-c	340	375	41	1,224,000	1.20	1.09	0.11	9.1
21	0.75-c	350	400	31	950,000	1.50	1.21	0.29	19.3
22	0.75-c	350	400	31	951,000	1.40	1.21	0.19	13.5
23	1.50-c	350	350	17	522,000	2.90	1.49	1.41	48.7
24	0.75-c	400	450	18	632,000	1.00	1.54	0.54	*54.0
25	0.75-c	400	180	16	562,000	2.20	1.10	1.10	50.0
26	0.75-c	400	425	12	422,000	2.80	1.86	0.94	33.5
27	0.75-c	450	400	21	830,000	1.90	1.28	0.62	32.6
28	0.75-c	480	375	19	800,000	1.30	1.27	0.03	2.3
29	0.75-c	500	350	16	700,000	1.60	1.30	0.30	18.7
30	0.75-c	500	450	39	1,710,000	1.30	1.04	0.26	20
31	0.75-c	500	500	18	790,000	1.60	1.45	0.15	9.3
	Average cost					1.77	1.26	0.50	28.8
	Group F. Gas Engines from 201 to 500 Hp.								
32	$0.04-g	300	250	17	447,000	2.00	1.37	0.63	31.5
	Group G. Steam Engines from 501 to 1000 Hp.								
33	$0.75-c	575	650	31	1,562,000	1.50	1.20	0.30	20
34	0.55-c	600	625	12	631,000	2.50	1.85	0.65	25
35	0.75-c	700	700	26	1,595,000	1.30	1.24	0.06	4.6
36	0.75-c	950	900	65	5,420,000	0.90	0.932	0.032	*3.5
	Average cost					1.55	1.30	0.25	16.1
	Group H. Gas Engines over 1000 Hp.								
37	$0.05-g	1500	1500	24	3,160,000	1.10	1.27	0.17	*15
38	0.05-g	1500	1500	24	3,160,000	1.40	1.27	0.13	9.2
39	0.05-g	1700	1500	24	3,680,000	1.40	1.20	0.20	14.3
	Average cost					1.30	1.24	0.06	4.6
	Group I. Steam Engines over 1000 Hp.								
40	$0.75-c	1800	2000	18	2,840,000	1.20	1.53	0.33	*27.5
	Average for all mines					2.13	1.32	0.81	38

*Note—These quantities are negative and show an increase of cost by the purchase of power.

Column 2 shows the price the operators charged themselves for fuel; 75-c. indicates the price charged was 75c. per ton for coal; 4-g. indicates that the company used natural gas at 4c. per 1000 cu.ft.

It seems to be common practice among many operators to charge themselves at the rate of 75c. per ton for the coal used for power purposes. As a matter of fact it costs them whatever price it would bring in the market. Again, many operators insist that they use slack and refuse from the mine, fuel which for the most part, is unsalable. A visit to many of the boiler rooms shows that by far the greater number of them are using run of mine.

Four Per Cent. of Output Is Burned

Very few operators appreciate the quantity of coal they consume for power purposes in proportion to their total output. Table 5 gives these details. The last column shows the percentage of coal used for this purpose in proportion to the total production. It also shows that this is steadily increasing. For instance, in 1911 the operators used 3.9% of their total output to generate power. Can an operator afford to consume practically 4% of his total production for power purposes?

TABLE No. 5. COAL CONSUMED AT THE MINES FOR POWER PURPOSES.

			Quantity Consumed at Mine for Power	
Item	Year	Total Quantity Mined	No. Tons	Per cent. of Total Quantity
1	1890	111,302,322	3,580,214	3.2
2	1895	135,118,193	4,673,577	3.46
3	1900	212,316,112	7,260,899	3.42
4	1905	315,062,785	11,275,864	3.56
5	1910	417,111,142	15,362,518	3.66
6	1911	405,757,101	15,935,564	3.90

It will be but a matter of a few years when the greater number of coal mines will be operated from central stations. To illustrate the trend of the times—the Virginia Power Co., a $10,000,000 incorporation in the New River District was developed because of the opportunities existing there in the coal field.

The West Penn Electric Co. connected the first coal mine on their lines in 1896—a load of 120 hp. Today it has contracts with the mine operators aggregating over 20,000 hp., and anticipates that this will exceed 30,000 hp. before the closing of the year.

Another point worth mentioning is that the total capital of all the power companies exceeds $2,500,000,000. This amount is 2.35 times greater than the total capital of all coal companies. Again, the central station companies' income from the sale of electricity for power purposes increased 746% during the last 10 years. This shows how power users are adopting purchased current.

EDITORIALS

Power for Coal Mining

We print, upon another page, an article by A. E. Rickards, entitled, "Does Bituminous Mining Pay?" Aside from the facts, figures and comparisons brought out in this paper, all of which are well worthy of careful consideration by mining men, there are others which are perhaps equally potent, although less lucidly revealed.

In speaking of the increased amount of power employed to secure coal, the author says in part:

> The industry is now becoming a combination of both a mining and a power proposition. . . . The profits in the future depend in a great measure upon the solution of these new problems. They offer the greatest of opportunities to effect economies. These opportunities exist at almost every working. This does not indicate that the man in charge is negligent. A mine superintendent is essentially a miner. He has been selected by the management because of his practical knowledge on mining coal. Power is entirely out of his line. The production of power, its proper distribution and its use in a mine requires the work of those who have made the subject a special study, in other words, specialists. . . . It seems inconsistent to think that a central station can afford to buy coal, pay freight, and then sell the current produced back to the coal mine.

This is an age of economic production. So far as power is concerned, this involves large units, carefully planned power plants and scientific operation.

Few, indeed, are the men who thoroughly master two professions. As pointed out by Mr. Rickards, in most cases the successful mine superintendent is a "practical" man. He has probably grown up in the mines and knows from alpha to omega the ins and outs to be observed in the removal of coal from the earth. In short, he is a thorough specialist in his line.

It is nearly as rare to find a man who can economically produce coal and at the same time efficiently produce power therefrom as it is to meet a farmer who can successfully raise large crops of grain and cheaply and safely navigate the vessel that transports them over sea. Yet it is no more of a discredit to the practical mining man that he does not understand the theory of combustion, or the thermodynamics of heat engines, than it is to the farmer that he may not be versed in spherical trigonometry, or the science of navigation.

There are mining companies, and not a few of them, who are today generating energy in their own plants cheaper than any power company can supply current to them. Immediately beside these mines, however, may be located others that find it decidedly to their advantage to purchase current from an outside source. Whence, then, comes this difference in economic policy under identical conditions of mining?

As has been stated above, economic production of power requires large units, advantageously placed and carefully handled. This not only means a demand for a heavy power output but requires the services of one or more specialists, either mechanical or electrical or both. The small user of power cannot, in the nature of things, produce current as cheaply as either the large consumer or the central power company.

Other things being equal, the one place on earth where power may be developed from coal with the least possible expense is at the mine's mouth. The only reason why the central station, making its current from the consumption of fuel, can furnish power cheaper than the mining company is able to do, is that the former makes economies in power generation which the latter either cannot or does not attempt.

As pointed out by Mr. Rickards, coal mining today is a dual business, requiring not only the production of fuel but the scientific generation, distribution and utilization of power. At the present time there is not only an opportunity but a positive need—not necessarily a demand—in the coal field for mechanical and electrical engineers who are as truly specialists in their line as a superintendent is in his. In many cases, such men, if given a free hand, would be able to effect vast economies in the power expense of coal production, even though they might be woefully ignorant or the minutiae of mining and be guilty of that cardinal sin, in the eyes of many a so called "practical" mining man, of never having hurled imprecations upon the head of a mine mule.

◆

An Interesting Question for Discussion

There is probably no element that lends itself more effectively to the development of safe and economic mining than that of the discussion of mining subjects. The experiences of intelligent mine workers, briefly narrated, not only make interesting reading, but are of untold value to readers who are themselves working in the same or other districts. The experiences of men working in gaseous mines and localities is often a revelation to those employed in districts where gas is not known.

We have received this week an important inquiry from a mine worker in the Northwest in reference to starting the fan after an explosion. This question presents a broad field for discussion; it considers the conflict and doubt that exist in the minds of those in charge, immediately after a great explosion, when all is uncertainty, and sentiment and duty run riot in the mind.

In this connection, we recall the words of Sir Thomas Holland, commenting on the tragic death of Mine Inspector W. H. Pickering and quoted in COAL AGE, Aug. 9, p. 203: "The deeds of men are worth more than lives; through their death the spirit of the race lives." The occasion was the explosion in the Cadeby Main colliery, July 9, 1912, in the report of which Chief Mine Inspector Redmayne described the conditions immediately after the explosion as "A race with death."

We hope this discussion will be treated in the broad spirit that it deserves by men who have experienced such moments of doubt and uncertainty when the lives of fellow mine workers were at stake, and all depended on the action of those left in charge. Let the best advice available be given to guide and control those who may be called to similar experiences in the future.

Star-Chamber Methods

The medical profession has been exposed from the earliest days to the criticism of a public unable as a whole to do justice to those whom it would judge. This is true also of other professions, but it must be conceded that the "medicos" have resented such outside criticism more fiercely that any other people, and we think with no greater reason.

This attitude, strange to say, is most obvious in the more competent medical men; the more marked their talents, the more anxious they seem to disguise what they do not know and the more they scheme to screen themselves from the protests of the laymen.

In some recent first-aid meets, the judges have published no demerit list, have announced no percentage markings, have made absolutely no criticisms. They have limited themselves solely to declaring the names of the winners of first and second places.

By this method they have in a way safeguarded their honor at the expense of their usefulness. But the credit of themselves and their order is nothing to the world at large. Their first duty is to care for human life and health and when self-sacrifice is required, to their credit be it said, they recognize the paramount call of humanity. A first-aid man recently stated to us that the doctors were neglecting their duty in not criticizing first-aid work at public meets, for the men who make mistakes in the field will repeat them in the mine. It may not be necessary for purposes of *examination* to reveal the mistakes of the examined, but it is essential to call attention to them if those men are going to perpetrate the same follies in a mine heading or room which they have committed on the drill field.

Let it not be thought that laying themselves open to criticism by an expression of opinion, will degrade the physicians in the eyes of the public. It is true that they will sometimes err, and sometimes criticism will be fierce and unjust, but on the whole, they will gain by coming into the open.

We could leave two blank pages, week by week, to represent the profundities of editorial thought. Many slips, erring judgments, half-lights, snap decisions would doubtless be saved to the public and many a time we should be spared the foolish attacks of people who had given less consideration to the matters at issue than we had expended ourselves. But every week we deliver our judgments, expose ourselves to the line of fire and accept the criticisms openly made or secretly uttered by our readers, and are not either provoked or injured thereby.

We were glad to see that at Gibson, N. M., where in true Western way, men are men and professional dignity is an unknown quality, the judges declared what mistakes were made, laid themselves open to charges of lax judgment and false conclusion and accordingly really did good work.

At other meets we have seen men unrebuked who tried to resuscitate a victim by forcing his arms into the sod, his friends apparently hoping to revive him not by reducing and dilating his chest cavity but by forcing in the insensate ribs of Mother Earth.

The first-aid men are learning fast; they will not patiently accept all that is taught them and discussion will be helpful to teacher and scholar. We believe that first-aid will make more rapid strides here than it has made in England or on the European continent, because the teaching of physiology in the public schools and the discussion of medical subjects in even nontechnical papers has prepared the American people for an intelligent consideration of first aid.

We have unlearned the false modesty of Europe and if our school training has been at times conducted in an incompetent manner and has become hazy with the passing years, there yet remains a nucleus from which great results may spring. The study of physiology in public schools in this country which already is 25 years old, has given the first-aid men of the United States a considerable advantage over the students of the St. John and St. Andrew Ambulance Associations of Great Britain, the illustrious prototypes of American first-aid organizations.

⁂

A Home-Made Expansion Joint

On long steam or air-pipe lines, especially if the work is of a temporary nature, the question of adequate expansion joints is sometimes puzzling. This is especially true where the line is continuous and has no bends or changes of grade.

If no provision is made in a pipe line for expansion and contraction, it is almost certain to do damage, either from breaking its connections, or, as is sometimes the case, actually moving or displacing the machinery to which it is attached.

A makeshift expansion joint can be easily made from three short nipples, two long nipples and six screwed elbows. As ordinarily constructed this puts an offset in the pipe equal to the length of the three short nipples and the six elbows.

Another similar contrivance can be made with two short nipples, one long nipple and four elbows. This, however, necessitates an offset in the pipe equal to the length of the long nipple plus two elbows.

Of course, such an arrangement as has been described is not to be compared with such an expansion joint as a double offset U-bend, but, on the other hand, it can be made easily and is much cheaper. It is also fairly satisfactory, even when considerable expansion must be accommodated.

⁂

Collapsible Stoppings

The question of the efficacy of collapsible stoppings has recently been brought forward, in a paper by Dr. J. J. Rutledge, mining engineer of the Bureau of Mines, now located in Oklahoma. It is argued that the building of light stoppings in entries will prove effective in localizing an explosion of gas or dust, by permitting the free expansion of the gases of the initial explosion, owing to the destruction of these light stoppings by the blast.

The question is a broad one in its bearing on mining practice and is open to argument, on both sides. We would like to ask, however: "Has the Bureau of Mines made sufficient experimentation along this line, and have the results of such experiments been sufficiently satisfactory to warrant advocating the practical application of this theory in coal mining. The question is a good one for discussion, as it admits of arguments on both sides; and we hope that mining men will give their experience and recommendation in regard to such practice.

LEGAL DEPARTMENT

When is Delivery to the Carrier, a Delivery to the Buyer?

By A. L. H. Street*

In instances when a contract to sell coal or other commodity, to be shipped to the buyer, does not fix a place for delivery, the law ordinarily regards delivery to a railway company, or other carrier, for transportation to the purchaser, as a delivery to him, especially if he has designated a particular carrier. The question as to when title passes to the buyer usually arises when the freight is lost or injured in transit, in determining to whom the carrier is liable, and whether the seller is entitled to recover the contract price, notwithstanding the loss or injury. Application of the legal principle above stated, with its important qualifications, is illustrated by the following summary of appellate court decisions, including holdings in cases which arose in the coal trade.

The general rule is that coal is "shipped" when it is put on board the car or vessel in which it is to be carried, and that an agreement to deliver coal f.o.b. is satisfied, and title passes to the purchaser, and the coal is at his risk, when fuel of the quality and quantity called for by the contract is loaded for shipment. (*Massachusetts Supreme Judicial Court, 84 Northeastern Reporter 1020*; *80 Northeastern Reporter 236.*) An important exception to this rule is that title to a shipment does not pass to the buyer until the price is paid, on delivery to the carrier designated by the buyer, where the contract calls for payment on delivery. (*70 Pacific Reporter 1080.*)

The ordinary effect of a purchase of coal "f.o.b. mines" is declared by the United States Circuit Court of Appeals to pass title on delivery of the coal to the carrier. (*172 Federal Reporter 113.*) In the last cited case, it was further held that the fact that sellers shipped coal in their own name did not necessarily show an intent to retain title after delivery to the carrier. Under a contract by a mining company to sell coal to a customer to be delivered on cars at the mines each month, carload lots, which the company loaded and directed a railway company to carry to the purchaser, must be regarded as having been delivered to the customer, as between him and the mining company, though the railway company refused to transport the coal, appropriating it to its own use (*United States Circuit Court of Appeals, 141 Federal Reporter 617*); the buyer's remedy being against the railway company.

It is not necessary that the bill of lading be sent the buyer, in order that delivery to the carrier be constructive delivery to him. (*96 Southwestern Reporter 188.*)

The Seller Is Not Liable for Delay in Delivery

The seller is not liable, of course, for any delay in actual delivery by the carrier to the buyer, in a case where delivery to the carrier is constructive delivery to the buyer. (Case last cited.) Though, in such cases, a theory of agency of the carrier for the buyer arises, there is no such agency as makes the buyer liable to the seller for a misdelivery made by the carrier. (*43 Southeastern Reporter 715.*)

When coal was sold for delivery on board a vessel provided by the buyer, it was held that the seller's right to recover the price was not affected by a proceeding brought by the master of the vessel for demurrage. (*Maryland Court of Appeals, 24 Atlantic Reporter 420.*)

Fuel was sold for delivery at Burlington, N. J., and was carried there in a barge selected by the seller. The shipment arrived at the buyer's wharf too late in the day for unloading, and, during the following night, the barge sank. On these facts, the New Jersey Supreme Court of Errors and Appeals held that, unless the loss was caused by a defective condition of the wharf, it must fall on the seller, who was responsible for the condition of the barge and the manner in which it was handled, until the buyer had reasonable time in which to inspect and remove the coal. (*23 Atlantic Reporter 686.*)

Under a contract to ship coal from Belleville, Ill., mines via a certain railroad, the parties knowing that St. Louis was the nearest point to which that line extended, delivery to the only carrier to which delivery could be made was held by the Kansas City Court of Appeals to constitute delivery to the buyer. (*120 Southwestern Reporter 658.*)

When a buyer agreed to furnish vessels to carry coal to be delivered thereon by the seller in monthly installments of 2500 tons each, it was decided that there was no delivery of any part of an installment until the whole was loaded; and, in another case, it was held that under a contract to sell a full boatload of coal slack, title to the fuel did not pass to the buyer as fast as the slack was put in the boat in the course of filling it. (*33 Federal Reporter 552.*)

When Shipment Is Consigned in Name of Seller

If the seller consigns the shipment in his own name, he is presumed to have intended to retain title in himself, and, on loss of the freight in transit, will not be heard to say that delivery to the carrier was delivery to the buyer; and, according to a decision of the Nebraska Supreme Court, prepayment of freight charges warrants an inference that the seller intended to reserve title pending transportation, though it was also held, in the same case, that the mere fact that the seller agreed to see the shipment f.o.b. at the buyer's place of business did not retain title in the seller after delivery to the carrier; that agreement being treated only as a promise to pay the freight charges to the destination. (*74 Northwestern Reporter 670.*)

Under shipments to the shipper's order, delivery to the carrier is not delivery to the buyer, unless the bill of lading is delivered to the latter. (*39 Southern Reporter 722.*)

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*Counselor at law, St. Paul, Minn.

SOCIOLOGICAL DEPARTMENT

Lehigh Valley Coal Co. Meet

Special Correspondence

The second annual first-aid contest among the champion teams of the six divisions of the Lehigh Valley Coal Co. was held at Hazle Park, Hazleton, on Saturday, Sept. 13. Over five hundred employees of the company were in attendance. The principal prize was a large, handsome gold-lined loving cup, which was awarded to the Packer No. 5 Inside Corps last year. This cup is to be awarded year by year until some corps has won it three times, when it will become the permanent property of that team. In addition to this prize, the company will send the winning team and the two men who made the best scores in the one-man event, to the American Mining Congress, in Philadelphia, in October, the men to be the guests of the company and to represent it in the contests.

The divisions were represented by the following teams, all of which had demonstrated their fitness for the honor in a series of preliminary contests: Lackawanna division, Westmoreland colliery; Wyoming division, Franklin colliery; Lehigh & Coxe division, Deringer No. 1 slope; Mahanoy & Shamokin division, Packer No. 5 colliery; Delano division, Primrose colliery; Pottsville division, Blackwood tunnel. Doctor Lathrop, of the Hazleton State Hospital, and Doctor Shafer, of Kingston, were judges, with Atherton Bowen, of Wilkes-Barre, as field chief.

Captains of First-Aid Teams

Doctors Judging Franklin Team

The events were as follows:

Two-man contest. Compound fracture of right arm midway between shoulder and elbow; severe laceration of back of left hand and fingers.

Three-man contest. Simple fracture of nose, punctured wound of left eye, and simple fracture of left collarbone.

Four-man contest. Severe burns of face, neck and shoulders: patient suffering from shock; left hand and forearm slightly burned. Full-team event. After a fall of rock, the patient is found with the following injuries: Simple fracture of right forearm, both bones; severe cut in palm of right hand, bleeding in jets; simple fracture of left thigh just below the hips.

One-man event. Patient is found with a severe cut on the right temple, unconscious in bad air. The air 50 ft. away is good. Use contents of first-aid package only.

The Deringer team won the cup and the trip, with a percentage of 97½, but the closeness of the competition can be judged from the scores made by the other teams; Franklin, 97⅜; Packer No. 5, 97⅛; Westmoreland, 96⅞; Primrose, 96¾; Blackwood tunnel, 96½. The one-man event was won also by the captain of the Deringer team, Simon Fellin, with a score of 99. Captains Morris, of Westmoreland, and O'Neill, of Franklin, tied for second in this contest with a score of 98. Since the captain of the winning team was also the winner in the one-man event, and the two other men were tied for second place, Mr. Bowen, in behalf of General Manager Chase, of the Lehigh Valley Coal Co., announced that Messrs. Morris and O'Neill would both accompany the Deringer team to the Philadelphia meeting.

First-Aid Team from Deringer No. 1 Slope. Winners of the Contest

After the second contest, an excellent dinner was served by J. J. Becker, of Wilkes-Barre. Among the prominent men present at the meet were General Manager F. M. Chase, mining superintendent Thomas Thomas, general manager A. B. Jessup, of the Markle Coal Co., division superintendents W. D. Owens, J. H. Haertter, W. H. Davies, Thomas R. Jones and G. P. Troutman.

The competing corps were composed of the following men: Westmoreland, James H. Morris, captain, Edward Reap, Thomas Ridgely, Walter Jacoby, Joseph Johnson, Fred Halpin, subject.

Franklin, John O'Neill, captain, Edgar Boston, William Morgan, Harry Thomas, Hugh Owens.

Deringer No. 1 Slope, Simon Fellin, captain, Joseph Fellin, Henry Poncari, Isaac Morgan, Leon Poncari, Thomas Gibson, subject.

Primrose, Anthony Gluding, captain, Henry O'Donnell, Joseph Maher, Daniel Lewis, Joseph Blum, Daniel Jenkins, subject.

Blackwood Tunnel, Williams Adams, captain, Ray Clemens, Ralph Parr, Henry Krise, John Rhoads, John Lipsback, subject.

Packer No. 5 Shaft, John McLain, captain, Charles Calvert, Joseph Kerwin, Henry Carey, John Sheridan, Thomas Brown, subject.

The penalties enforced in the contest were those recommended by the American Mine Safety Association at its first meeting with an additional count entailing 5 demerits for improper bandaging.

The penalties enforced in the contest were those recommended by the American Mine Safety Association at its first meeting, with an additional count entailing 5 demerits for improper bandaging.

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Gibson First-Aid Contest

By Tracy Garrett*

Only three points separated, the four teams in the second annual first-aid contest of the Victor-American Fuel Co.'s New Mexico division. The meet was held Aug. 17, and was probably one of the most successful ever held in New Mexico. The amphitheater of the company's athletic park, where the contest was held, was crowded, not only with the employees of the company and their families, but with the Atchinson, Topeka & Sante Fé Ry. Co.'s men, brought by Agent Purdy, of Gallup, to witness the events.

Weaver Mine Team Which Received Cup
(Team lifting injured man over props representing a fall. Ropes mark roof of entry.)

The judges were C. S. Stevenson and A. A. Flynn, from the U. S. Bureau of Mines mine-safety car, which happened to be at Gibson at the time. State Mine Inspector Beddow served as time keeper. The government men were enthusiastic in praise of the work done by al of the competing teams and, in making the award of a handsome silver loving cup, presented by the Victor American Fuel Co., Mr. Stevenson called attention to th closeness of the score and to the difficulty in making th decision.

Four teams competed, representing the Weaver, Hea ton, Navajo and Bartlett mines. The final standing o the teams was: Weaver, 93; Navajo and Heaton tie with 92, and Bartlett 91. Each of the mines was repre sented by a team captain and four men. An interesting feature was the Navajo team, composed entirely of Jap anese miners, with the mine boss as captain. Severa

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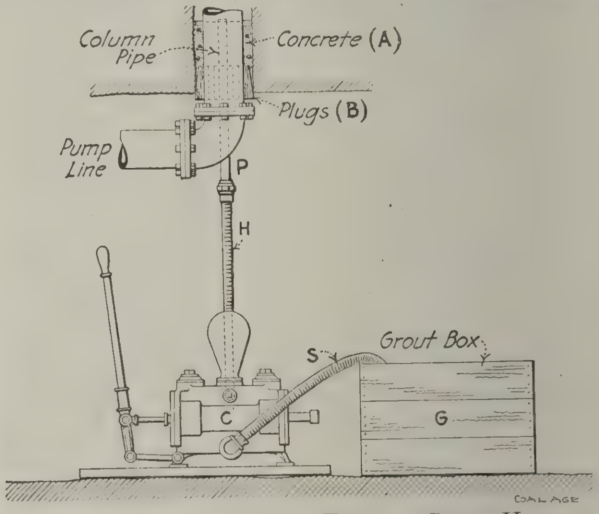
*Gibson, New Mexico.

Y READERS

to pour cement grouting into the space surrounding the pipe, from the surface above. This method has generally proved unsatisfactory, owing to the air entrapped in the hole preventing the grouting from filling the space.

I want to suggest a method that I believe is simple and effective, for grouting the lower end of the pipe. By its use, a practically air-tight joint can be secured between the casing and the strata. Referring to the accompanying figure, the space around the casing, at the



Grouting the Lower End of Bore Hole

bottom of the hole, is plugged with wooden plugs, i the usual manner. The grouting is made by mixing several sacks of good hydraulic cement with sufficient water so that it will flow readily through the handpump show in the figure. The grouting is mixed in the box (*G*) which is also shown, at the bottom of the drill hole. short pipe (*P*), 1 or 1½ in. in diameter, connected t the discharge of the pump cylinder (*C*) by a flexibl hose (*H*), is run up through the plugs (*B*) surroundin the casing. This pipe is extended from 18 in. to 2 f above the top of the plugs. Another short section o wire-wound suction hose (*S*) leads from the box to th pump and forms the avenue by which the grouting i drawn into the pump.

By this arrangement, the grouting is readily pumpe from the box into the annular space (*A*), above th plugs and surrounding the pipe. When sufficient grouting has been pumped into this space, and while the pum is still in operation, the pipe is gradually withdraw from the hole and a wooden plug quickly inserted in it place to prevent the grout from flowing out of the hol before it has set. After giving the grouting sufficien time to set, the borehole should be thoroughly groute from the surface. If the best portland cement is use in preparing the grouting, there will be no trouble experienced by reason of leaky joints. I have seen severa holes grouted, in a manner similar to that describe and none of these holes have given any trouble.

Pennsylvania Engineer.

Stockdale, Penn.

Cleaning the Coal

I was interested in reading the article on "Cleaning Coal," by Josiah Keely, COAL AGE, Aug. 30, p. 296. In some districts, when the mines are running at full capacity, neither the operators nor customers are as particular about having the coal thoroughly cleaned by the miners, as when orders are scarce and the work is slack.

Since miners as well as operators are always anxious for steady work and like to have the mines run regularly, it seems to me it would be of advantage for the miner, sometimes, to see and to know the complaints that are made to the company by their customers. This might induce the miner to take more pains to clean his coal properly when loading his cars. If miners could see some of the letters that are received from customers, complaining of dirty coal, they might not be so anxious or ready to "slip one over" on the company, by the many practices known to them, such as breaking up and wetting the bone coal. In some mines this has been quite a common practice among a certain class of miners who do not seem to know or realize that, by so doing, they injure themselves and the company who employs them.

I have never seen such letters of complaint posted, but think the suggestion would be worth trying.

GEORGE N. LANTZ.

New Straitsville, Ohio.

Save the Timbers

I have noticed numerous references to the drawing of mine timbers, as the working faces advance; and was much interested in the letter by Charles Waine, on "Shooting Mine Timber," COAL AGE, Aug. 2, p. 171. The practice of shooting mine timber is a bad one, and should never be used where it is possible to draw the timbers and use them again.

My experience in buying the timber supply for mines has taught me how much can be saved by using the old timbers, many of which can be used two or three times, with proper care. The amount of timber ordinarily used in a mine employing, say 150 or 200 men, is very large. Now, if two-thirds of the timber used in such a mine can be used a second time and another portion a third time, it is easy to see that an immense saving can be effected. In some mines the timber bill is a large item, and if this can be reduced one-third or one-half by using the mine posts two or more times, it means a large reduction in the operating expense of the mine.

Every miner should be as much interested in saving the timber, which the company brings to his place free of charge and which enables him to protect himself while at work, as though its loss was his own.

JOHN SUTTON.

Terre Haute, Ind.

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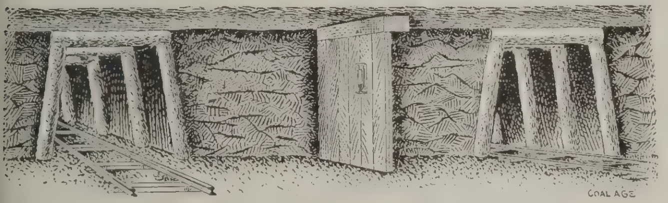
Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

The Water Gage in the Mine—As used in the mine, the reading of the water gage shows the difference of pressure between the intake and return airways, at the point where the reading is taken. The intake pressure is always greater than the return pressure and this excess or difference of pressure is what moves the air or creates the current.

The use of the instrument is clearly shown in the accompanying figure, which shows two parallel airways going into the mine, one of these being the intake and the other the return airway of that section of the mine. It makes no difference on which side of the brattice the instrument is placed; the water will always be depressed in that arm of the gage which is open to the intake, because the pressure on the intake is always greater than that on the return airway.



SHOWING POSITION OF WATER GAGE BETWEEN INTAKE AND RETURN AIRWAYS

What the Water Gage Shows—The water-gage reading indicates the ventilating pressure required to circulate the air, and is therefore equal to the resistance of the airways between the two points on the intake and the return; or, in other words, the resistance inby from the point of observation. The nearer this reading is taken to the head of a pair of entries, the closer it will approach zero, while at the next to the last crosscut it would be practically zero.

The use of the water gage in mining practice is of great importance. In connection with the observed velocity of the air, it shows the "power on the air" or the power producing the circulation. What is required in the practical ventilation of a mine is the production of the necessary velocity and volume of air, with the smallest expenditure of power. The most economical circulation is obtained when the required air volume is circulated by the least power, which means a comparatively low water gage.

The circulation of a comparatively large quantity of air under a low gage indicates ideal economic conditions, as far as the circulation is concerned. On the other hand, a small air volume and a comparatively high water gage shows a needless waste of power. In practice, an unusual reduction of the quantity of air passing in a mine or entry, accompanied by a similarly uncommon rise of gage pressure would indicate an obstruction of the airways.

The Coal Age Pocket Book

VELOCITY

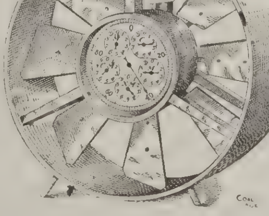
The velocity of the air current is one of the most important factors in the practice of mine ventilation. If the velocity of the air current is too low the ventilation of the mine is inefficient, as the air will not sweep away the accumulating gases from their lurking places in the mine. On the other hand, if the air moves with too great a velocity, not only do the workmen suffer inconvenience; but the high velocity of the current is often dangerous.

Danger of High Velocity—A rapid air current carries a great quantity of dust, and, by supplying large quantities of oxygen, maintains an unnecessarily active condition of the mine atmosphere that favors the ignition of the gas and dust. The high wind creates a draft that greatly intensifies the flame of lamps or of a blast of powder and increases the possibility of ignition.

How Velocity is Estimated—In mine ventilation the velocity of the ventilating current is commonly estimated in feet per minute, or feet per second.

How Velocity is Measured—A simple method of ascertaining, with more or less accuracy, the average velocity of the air current passing in an airway is to measure off a distance of, say 300 ft. along a straight portion of the airway; and note the exact time between the observed flash of powder at one end and the smell of smoke at the other end of this distance. The distance (300 ft.) divided by the time will give the velocity of the air in the center of the entry. The average velocity of the current may then be taken as $^4/_5$ of this observed velocity. For example, if the observed time is 30 sec., the center velocity is $300 \div 30 = 10$ ft. per sec.; and the average velocity $^4/_5 \times 10 = 8$ ft per sec. or $8 \times 60 = 480$ ft. per min.

The Anemometer—The common method of measuring the velocity of the air in airways is by the use of the anemometer, which is shown in the accompanying figure. The dial hands record the number of revolutions of the vane. The instrument is so calibrated that each revolution of the vane corresponds to 1 ft. of air travel. The reading of the dial, therefore, shows the distance the air traveled during the time that the instrument was exposed to the current. Hence, this reading divided by the time of exposure, in minutes, will give the velocity of the current in feet per minute. A single revolution of the large hand corresponds to 100 revolutions of the vane. The small dials register the total reading.



THE ANEMOMETER

INQUIRIES OF GENERAL INTEREST

Starting Fan after Explosion

Assume that an explosion occurs in a mine generating large quantities of methane. The coal is highly inflammable and the mine dry and dusty. From the dry condition of the timber and the inflammability of the coal, it is highly probable that numerous small fires have been started by the explosion, in different parts of the mine. Suppose, moreover, that the ventilating fan is so badly damaged by the force of the blast, that it is necessary to make extensive repairs before it can be again started.

Under ordinary circumstances, dangerous quantities of gas will accumulate in different parts of the mine, during the time the fan is idle. There is, besides, now, the probability that carbon monoxide has been produced by the explosion. The amount of damage done in the mine and the condition of the stoppings, brattices, etc., are unknown and can only be surmised.

Under these conditions, would it be advisable to start the fan, after making the necessary repairs, without first ascertaining, as far as it may be possible, the condition of affairs underground? Would not the starting of the fan, without making a preliminary examination of the mine, incur the risk of a second and more disastrous explosion?

RALPH W. MAYER.

Roslyn, Wash.

While the question proposed by correspondent is practical, it assumes the worst condition that could possibly exist. No one familiar with the assumed conditions in this mine will deny for a moment that a second and more disastrous explosion is liable to occur, whether the fan is or is not started. It may be admitted, however, that the danger will be somewhat greater when the fan is first started. The question calls for the exercise of the best judgment by those in charge. If men are in the mine, the hope and possibility of rescue demand that a reasonable risk be assumed. On the other hand, the uncertainty of rescue as compared with the strong probability of further disaster may make any attempt to enter the mine at once, a foolhardy sacrifice of life. On such occasions, sentiment is strong, but good judgment aided by experience should rule.

In answer to the question asked, we would say if rescue work is to be attempted at once, it would be safer not to start the fan, but to organize a rescue party of experienced men equipped for entering a gaseous atmosphere. This would require the use of breathing apparatus and safety lamps. If it is found on investigation that further attempts at rescue are impracticable, all should withdraw from the mine and the fan should then be started, very slowly at first, so that the result can be closely watched. It would not probably be advisable, in that case, to make any attempt to enter the mine for several hours after starting the fan; but this can only be determined by the observed results. In any case, we would not advise a strong circulation of air. It must be remembered that the air current, for the most part, is probably only traversing the entries, and the volume of the air should be gaged accordingly. The upcast current should be watched closely for any indication of fire below.

This question presents many phases worthy of discussion; and we hope to hear further from a large number of practical mining men who have had experience in rescue work and in the later investigation of mine explosions. Anyone of any heart realizes that it is a difficult matter to lay aside sentiment and to turn a deaf ear to the pleadings and demands of those whose only hope for the rescue of dear ones lies in the efforts of brave heroic souls who are willing to sacrifice even their own lives in a possibly forlorn hope of saving others. Let this question be thoroughly discussed.

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Fire on Intake

Some time ago a fire broke out in one of the old rooms, in the mine where I am employed. It was decided to seal off this fire and, to do this, it was necessary to build air-tight stoppings in the necks or mouths of five rooms.

When this work had progressed a few days, the company wanted coal for local trade and were desirous to have the miners go in and load this coal. In the meantime, the fire boss had reported fires on the third southeast entry as "giving off fumes;" but signed the book "O.K." The miners went into the mine, but had to come out again in less than an hour, because of the gas from the fire. Some of the men were sick and went to the doctor at once.

The mine committee, with the mine manager, mine examiner and superintendent then went into the mine to examine the firewalls that were built to seal off the fire and confine the gases. The committee were composed of old, practical miners, one of them an experienced gas man. They found stoppings that were built of concrete leaking badly at the top. The first of these showed a crack 2 in. wide and 8 ft. long, while the second showed a crack 1 in. wide and 10 ft. long. Smoke and gases were coming from both of these cracks.

The examiner's report showed a current of 2400 cu.ft. in the intake of this section, and 3000 cu.ft. in the return, an increase of 600 cu.ft. They still tried to get the miners to go in to work, claiming that the mine was safe and the gas given off would not hurt anyone. Normally, this mine registers about 30,000 cu.ft. of air at the foot of the downcast; but the air courses were, in places in such shape that the miners had to crawl on their hands and knees to get through them. It was estimated by those working on the stoppings, that the top coal, 18 in. thick, was burning over a space 20 ft. wide and 20 ft. long.

Kindly state if this mine was operated in compliance with the mine law.

A MINER.

Farmersville, Ill.

The Illinois state mining law would not allow the operation of a mine under the conditions named above.

N QUESTIONS

[redacted]

Ques.—In mines where undercutting is done, would you adopt the same method of blasting the tight side of rooms and entries, in all thicknesses of coal seams? Explain fully.

Ans.—In mining a thick seam where the coal is undercut, it is common practice to put in what is called a "rib shot," to cut the tight side. The thickness of the seam gives such a shot greater opportunity to work and break the coal. In the mining of a thin seam, it is safer practice to blow down the center coal first, as a rib shot, in this case, would probably prove a very tight shot and might cause trouble by blowing the tamping. In any case, much will depend on the shooting quality of the coal.

Ques.—How should props be placed if the top is soft and the bottom hard?

Ans.—With a soft top and a hard bottom, a systematic method of timbering should be adopted, the props being stood in rows and long cap pieces used against the roof. The distance between the rows and the distance of the posts apart will be determined by the character of the roof.

Ques.—In what position should a prop be stood in a flat seam in order to best resist the roof pressure?

Ans.—Post timbers, in a flat seam, should be set perpendicular to the roof and floor, unless some slip or other peculiarity of the roof formation makes it advisable to give the post a slight inclination to enable it better to support the tendency of the roof to slide or creep.

Ques.—How should a post be set in a moderately inclined seam?

Ans.—The post should be "upset" or given a slight inclination up the pitch, the amount the post is thus inclined to depend on the degree of the pitch of the seam. In this position, the tendency of the roof to slip downhill will act to tighten the post.

Ques.—How many gallons of water will a pump discharge that has a 14-in. cylinder, a 4-ft. stroke, and makes 200 strokes per minute? Find the discharge in gallons per minute.

Ans.—The sectional area of the pump cylinder is $0.7854 \times 14^2 = 153.96$, say, 154 sq.in. The piston travel is $200 \times 4 = 800$ ft. per min. The cylinder displacement, in this case, is $154 \times 800 \div 144 = 855+$ cu.ft. per min. In practice, the water end of a pump is commonly assumed to have an efficiency of 85 per cent., making the actual discharge 85 per cent. of the cylinder displacement, or, in this case, $0.85 \times 855 \times 7.48 = 5436$ gal. per min.*

Ques.—How many mine cars would be required to operate a mine having an output of 1500 tons of mine-run coal, per day of eight hours; the cars having a capacity of 2 tons mine-run coal per car; and allowing a period of 2 hours' time for each car to be loaded, hauled to the tipple, emptied and returned to the working face?

Ans.—Allowing 2 hr. as the time required for a car to be hauled to the tipple, emptied and returned to the face, assumes that each car in the mine can make four trips daily, provided the coal is loaded promptly. This would then represent a tonnage of $1500 \div 4 = 375$ tons, carried to the tipple by the cars in 2 hr., each car making a single trip. The capacity of the mine cars being 2 tons each of mine-run coal, the number of cars required would be $375 \div 2 = 187.5$. Since there are always a certain number of cars laid up for repairs and otherwise idle, there should not be less than 200 cars provided for the operation of this mine.

Ques.—Name the different conditions under which you would advise the single-, in preference to the double-entry, system.

Ans.—The single-entry system should never be used, in the development of a mine of any size or importance. In case of a fall of roof in the rooms, which is liable to occur at any time, the circulation of air would be entirely blocked, in the use of the single-entry system.

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*Note—The speed given for this pump is from six to eight times its normal speed. A pump of this size would ordinarily make from 30 to 40 strokes per minute, and probably discharge from 800 to 1000 gal. per min.

COAL AND

Washington, D. C.

In amending the House draft of the tariff bill the Senate sitting in committee of the whole has inserted in that measure an important provision relating to coal. The provision consists of language including coal under certain conditions in the list of articles upon which the President is authorized to impose special duties for the purpose of retaliating against any country which may not accord to the products of the United States the equal and reciprocal treatment to which he believes they are entitled. A part of the general language preceding the coal paragraph and applicable to it which is now included in the draft of the bill is as follows:

That whenever the President shall ascertain as a fact that any country, dependency, colony, province, or other political subdivision of government imposes any restrictions, either in the way of tariff rates or provisions, trade or other regulations, charges or exactions, or in any other manner, directly or indirectly, upon the importations into or sale in such foreign country of any agricultural, manufactured, or other product of the United States, which unduly or unfairly discriminates against the United States or the products thereof; or whenever he shall ascertain as a fact that any such country, dependency, colony, province, or other political subdivision of government imposes any restriction or prohibition upon the exportation of any article to the United States which unduly or unfairly discriminates against the United States; or whenever he shall ascertain as a fact that any such country, dependency, colony, province, or other political subdivision of government does not accord to the products of the United Statse reciprocal and equal or equivalent treatment, he shall have the power and it shall be his duty to suspend by proclamation the operation of the provisions of this Act relative to the rates of duty to be assessed upon the importation of the following specified articles, or such of them as he may deem just and applicable, and to substitute therefor the rates of duty hereinafter prescribed upon such articles when imported directly or indirectly from such country, dependency, colony, province, or other political subdivision of government.

Following this comes the list of articles with reference to which retaliatory powers are given to the President. Coal is provided for in the following terms:

On coal, bituminous and shale, 45c. per ton of 28 bushels, 80 lb. to the bushel; coal slack or culm, such as will pass through a half-inch screen, and briquets of which coal and coal dust is the component part of chief value, 15c. per ton of 28 bushels, 80 lb. to the bushel.

And the President may provide for drawbacks for the refunding of the duty paid upon any such coal, culm or slack imported for the purpose of being used for fuel upon vessels propelled by steam and engaged in trade with foreign countries or between Atlantic and Pacific ports of the United States and which vessels are registered under the laws of the United States.

That whenever the President shall ascertain as a fact that such restriction or prohibition or lack of accord of reciprocal and equivalent treatment has ceased, he shall have the power and it shall be his duty to revoke such proclamation, whereupon the articles covered thereby, when imported from the place mentioned therein, shall pay the rates of duty otherwise provided by law. But this provision shall not be applicable beyond the period of three years after the date of the passage of this Act unless Congress shall otherwise prescribe.

West Virginia Hearings Are Concluded

The hearings have been concluded before the senate committee investigating the West Virginia coal strike situation at Paint Creek, but without developing much real additional information. The hearings held some time ago in the West Virginia district itself appear to have developed about all that the committee was able to bring out, and the recent testimony has been chiefly concerned with sustaining or rebutting the statements which were brought forward at that time.

It would seem that the materials in the hands of the committee three weeks ago have been but little added to, although there have been some interesting exhibits filed which may shortly be published. It is believed that a report on the situation may before long be made public, and this, it is supposed, will sharply take sides in regard to the matter. The exact content, of course, is not yet even tentatively known, but the prediction is strongly made in well informed quarters that there will be a sharp drift toward the side of the miners owing to the fact that several members of the committee have already indicated a strong bias in that direction.

That there will be any disposition in the Senate to take action of a definite kind based upon the findings of the committee is not generally believed, it being the view of most

companies is upheld by the courts.

At the meeting to be held shortly at Shenandoah the ques tion of docking and the "check-off" will be thrashed out wit President White. All those affected by the docking bill ar standing behind the efforts of the union officials.

The Question of Railroad Passes

The Public Service Commission of Pennsylvania has de cided that, for the present it will not require public-servic companies to file tariffs or schedules with the commissio but will be satisfied with the posting of them in their of ficies and stations in the form required by the Interstat Commerce Commission. Companies not subject to the Inte state Commerce Commission will adopt similar forms of ta iffs and schedules and publish and post them in their office All companies are required to keep a copy of each tariff schedule in their principal office.

With respect to the applications now pending for the a proval of contracts, the Public Service Commission will ho hearings in all cases on Oct. 8, of which due notice will given by publication in the localities affected. General rul and regulations governing the making of applications, t publication of the time and place of hearing and the di position of the applications are being promulgated by t commission.

The commission will not before Jan. 1, pass upon t question as to the right of railroad companies granting fr passes to their employees. The act creating the commission does not become effective until that time, and prior to the new year the commission has authority only to dispose of the unfinished business of the old Railroad Commission and to determine questions relating to contracts between utilities and municipalities.

The question of railroad passes has caused a stir throughout the state since the passage of the new Public Service law, as many who have studied the act are of the opinion that under its provisions railroad employees cannot be granted the courtesies which are now extended to them. This is of importance to the coal industry especially since many of the officials of the larger coal companies now receive railroad passes.

PENNSYLVANIA

Anthracite

Scranton—Subsidence of the surface, due to mining operations under the city still continues to be evident and in at least one instance, concrete piling has been resorted to, to prevent damage to buildings.

Mt. Carmel—Philip Hughes and Felix Crusinsky, assistant fire bosses at the Pennsylvania Colliery, were badly if not fatally burned Sept. 10 by an explosion of gas in a tunnel they were examining. The men were alone in the mine at the time. Hughes managed to find his way to the surface and summoned a rescuing party.

Pittston—At a recent fire drill at the Pennsylvania No. 6 Colliery, at Pittston, the 187 men and boys employed about the breaker and washery were out of the buildings and in the yard in one minute and ten seconds after the sounding of the alarm, and in two minutes and four seconds there were five lines of hose in active play, with a pressure of 140 lb. per sq.in. This was more than sufficient to carry the streams from the lower yard to the top of the breaker.

Shamokin—During the past week the Susquehanna Coal Co. opened the bath houses in the Shamokin district for the first time and the miners on coming out of the mines went under the showers and proceeded home looking like bank clerks.

Plymouth—The proposed proceedings of the Borough of plymouth against the Plymouth Coal Co. to restrain the mining of coal was postponed by agreement, pending an investigation by mine inspectors, and 60 days was allowed for a thorough inspection of mining conditions in the borough.

Bituminous

Uniontown—Through a deal just completed, L. B. Hawkins, of New Castle, has sold to J. V. Thompson 100 acres of land in Greene County which is underlaid with coal. The land was sold at $600 per acre. For several years past efforts have been made by the coal people to purchase the land, but it was not until this week that the deal was finally completed and the land disposed of.

Cresson—A number of coal operators have approached state authorities in an effort to purchase valuable coal holdings that underlie the new Tuberculosis Hospital at Cresson. The coal was formerly owned by Andrew Carnegie who deeded it to the state when he gave the large tract of land to the State of Pennsylvania for the erection of the new sanatarium.

Beaverdale—More than 200 miners employed by the Pennsylvania Coal and Coke Corporation struck recently because they allege the mine foreman discharged several men that he might employ others to do contract work. President Watkins is expected from New York to confer on the matter.

Boswell—A new mine opening said to be one of the largest shaft openings ever planned in the western part of the state is about to be started near here by the Consolidation Coal Mining Co.

Latrobe—Phillip Stump aged 65 years, night fire boss at the Atlantic mine of the Atlantic Crushed Coke Co. was found dead in the mine. The man was resting on a bench when death, due to heart failure, overtook him.

WEST VIRGINIA

Charleston—Alleging that the Paint Creek Colliery Co. had failed in its promise to dismiss a company physician employed during the recent labor trouble, 500 miners employed in and around Mucklow struck Sept. 12.

A unique and valuable feature of the first Fayette County fair, which will be held at Oak Hill, West Virginia, during the week of Oct. 6 to 11, will be one of the United States Government mine rescue cars equipped with all modern life-saving and rescuing apparatus for use in coal mines.

The differences between the miners and their employees at the works of the Seng Creek Coal Co. in the Coal River field were settled Sept. 10 by a conference between a committee of miners and the president of the company. By this settlement, the price for mining coal in the low veins is advanced from 26c. to 30c.

Bluefield—It is estimated that there are jobs for 2500 men in the Pocahontas region. It is impossible to get miners to perform the work necessary in filling the increased demand. Throughout this region, able-bodied men can earn from $90 to $125 a month or even more.

TENNESSEE

Isoline—The Clear Creek Coal & Lumber Co., of Isoline, Cumberland County, Tenn., recently filed a voluntary petition in bankruptcy, scheduling liabilities of $70,000, with assets of the alleged value of $212,000. The principal creditor is L. A. Pugh, who is trustee under a bond issue of $50,000, secured by property listed at $200,000. The company controls 6500 acres of coal and timber land in Cumberland County, encumbered by the trust deed referred to, as well as other property.

KENTUCKY

Jenkins—A survey of the Baltimore & Ohio is nearing completion from the Elkhorn Fuel Co.'s workings on Beaver creek to Jenkins, Ky., a distance of 35 miles, and it is said that a contract is to be let at once for the construction of the line. This road will be one of the heaviest pieces of railroad work in Eastern Kentucky.

Somerset—A recent fire at Somerset, Ky., did considerable damage to the town, the total loss amounting to $20,000. The office of the Crain Coal Co. was among the business houses destroyed.

Hindman—The interests known as the Litts Syndicate are said to have bought up recently several thousand acres of rich coal and timber land lying along Carr's Fork, in Knott county, immediately beyond the Letcher county line, completing a tract of about 10,000 acres in that section under control of these interests. It is said that a branch of the Lexington & Eastern will be built up Carr's Fork a distance of 15 miles in order to reach the tract.

Middlesboro—The long-continued drouth in Bell County and southeastern Kentucky generally is reported to have forced a number of mines to cut down their operations to half-time, on account of their inability to secure sufficient water for their boilers. At one mine in the county it requires two days of pumping to secure sufficient water for half a day's operation. Recent rains have helped somewhat, and the season has now arrived when ample precipitation to relieve this condition may be expected.

OHIO

Columbus—Judge E. B. Kinkade, of the Court of Common Pleas in a decision handed down recently declined to interfere with the rates established by the Ohio Utilities Commission a year ago on Hocking Valley coal between Nelsonville and Toledo. The rate was cut by the Utilities Commission and the Hocking Valley R.R. Co. tried to have it rescinded. The railroad company contended that the rates established by the commission were unreasonable and unlawful as they did not allow the railroad company a fair profit.

The commission named by Governor Cox, of Ohio, to investigate conditions surrounding payment for coal mined, took a vacation during the past week. All of the members attended to their private affairs and have arranged to take up the work again next week. The commission spent a week investigating conditions in the Springfield district of Illinois and also met with a number of operators in Chicago. A day was spent at the docks of Milwaukee to see the condition of the coal as it comes off the freighters.

INDIANA

Terre Haute—Miners here have an understanding among themselves that if the train that takes them home each evening across the Wabash River is more than 20 minutes late they will not go to work next day. One day recently the crew was late. The railroad officials made satisfactory explanation to the miners, however, and they agreed to go back to work. Next morning 900 men filled the cars. The switching crew did not know of the arrangement and being delayed did not take the trouble to couple on to the waiting cars, believing that they were empty, and proceeded to the mines with a couple of cars the locomotive already had in tow. It will take the railroad commission to settle the trouble caused by the misunderstanding.

Seelyville—The Rosebud Mine of the Vandalia Coal Co. closed Sept. 10, throwing more than 250 men out of employment. Although all of the coal has not been removed, there is considerable danger in mining it.

ILLINOIS

Chicago—With only a few days remaining before they were expected to face trial on rebating charges, the O'Gara Coal Co., the Harrisburg Big Muddy Coal Co., and the Harrisburg Saline Collieries Co., filed a petition of insolvency and asked for receivers on Sept. 13. Judge Carpenter, to whom the application for a receiver was made, appointed Thos. J. O'Gara, president of the O'Gara Co., and Fred A. Busse, former mayor of Chicago, to take charge of the properties of the three companies.

Virden—Two miners were seriously burned and another less severely in a gas explosion Sept. 8, in the mine of the Glenridge Coal Co. Some time ago a fire broke out in one of the entries, which was subsequently walled up to smother the flames. An attempt was made to open up the entry and get out a mining machine which had been walled in and the explosion followed.

O'Fallon—The record for hoisting coal in the St. Clair County field the past year is held by the St. Louis & O'Fallon Coal Co.'s No. 2 mine, where 4056 tons were hoisted in 6¾ hours, which is at the rate of 601 tons an hour. Failure to complete the eight-hour run was on account of no cars. During the past year the Suburban Railway handled the greatest amount of St. Clair County coal into East St. Louis, and St. Louis, the account being 854,983 tons, the product of four mines. The St. Louis & O'Fallon R.R. hauled 848,704 tons from its two mines.

Taylorville—The miners employed in the No. 6 mine of the Springfield Coal Mining Co. went on strike Sept. 13, because of a dispute over the weighing of coal. The limit of 3500 lb. on each car was removed recently, since which time there has been more or less trouble over the weights. The difficulty is not regarded as serious, and it is expected that the men will soon return to work.

Springfield—At the present time the mines in this district are doing better than they have since early spring. Some of the coal companies are, however, advertising for more miners.

TEXAS

Bridgeport—The coal mines in this vicinity are now operating full time after two months of light running.

Slaton—A coal mine yielding lignite which was worked 33 years ago near Slaton, is to be opened up on a commercial scale, it is hoped, at an early date, by Colonel A. B. Robertson, owner of the famous "V" ranch, on whose land the mine is located.

COLORADO

Trinidad—John R. Loft has stated that the rumors of an immediate call for a strike in the southern Colorado coal fields were unfounded. He says the leaders of the union are optimistic and hope that the operators will meet the miners, and that a satisfactory agreement may be reached.

OREGON

Eugene—A bed of coal has been found in the hills three miles south of Eugene by H. A. Mitchell and E. G. Wilfert, who own a small tract of land there. Samples of the coal have been brought to Eugene and indicate a good quality. If investigations prove satisfactory, mining operations will follow.

Squaw Creek—Representatives of the U. S. Geological Survey have been in this field for the past six weeks, making an extensive examination of the coal in this section. This appears to be a promising coal field and awaits only transportation to make the fuel available. The field, which lies in the mountains 40 miles west of Grant Pass, is inaccessible at present, although a railroad has been surveyed through it. It is presumed that the promoters of the survey are the people who filed on the coal lands, as 9000 acres had been filed on before the lands were thrown into the national forest by former President Taft.

FOREIGN NEWS

Sydney, N. S.—The output of the Dominion Coal Co. for August amounted to 425,635 tons, as compared with 409,125 tons in the same period of 1912. The highest previous output was in October last, when 422,343 tons were mined. The output for the seven months previous to Sept. 1, 1913, was 2,720,765 tons, as compared with 2,533,283 tons last year, or an increase of 187,482 tons.

PERSONALS

Henry D. Jackson, consulting engineer, at 88 Broad St., Boston, sails Sept. 20 for Bermuda on a three months' trip for rest and recreation.

John Lynn has leased the Sherrill coal mine at Blanco Okla., and will engage in the coal business in a small way. He expects to work eight or ten men.

Morgan O. Morgans of Nesquehoning, for 12 years superintendent for the Lehigh Coal and Navigation Co. has resigned and accepted the superintendency of the Kaska William colliery at New Philadelphia.

Frank I. Pierce state mine inspector, of Indiana is delaying the completion of his investigation of the explosion in the mine of the Jackson Hill Coal Co. at Hymera where several men were injured, three of them since dying, until the survivors are able to testify.

Wayne Collier, manager of the Pan-American Coal Co., at Zanesville, Ohio, claims to be one of the luckiest men that ever lived. Recently he started out with two sacks containing $2800 each on his motorcycle to pay the men at the mines and when he arrived at his destination he found both sacks gone. Stanley Kern, a pumper at the tube works, found the sacks and returned them to him.

CONSTRUCTION NEWS

Elkins, W. Va.—The Davis Colliery Co. is making a number of improvements in its already modern mining and coking plant at Coalton.

Erie, Penn.—The Bury Compressor Co. is just starting the erection of an addition to its plant, extending the main building 100 ft. This is necessary on account of increase in its business.

Fredericktown, Penn.—The finishing touches are being put on the new temporary tipple being constructed by the Fredericktown Coal & Coke Co., and within a short time the plant will be running coal.

Sturgis, Ky.—Among the new buildings to be erected and used by the West Kentucky Coal Co., at Sturgis, is a complete department store, which will be used as the company's commissary. Other buildings to take the place of those destroyed in a recent fire are well under way, and all will be completed before cold weather.

Salt Lake City, Utah—Development of the newly established coalfield in Southern Utah is being pushed with great rapidity by the American Fuel Co., of Salt Lake City, and hundreds of thousands of dollars are going into the work. The above mentioned company has developed its property at Neslen quietly but thoroughly, and this mine will soon become one of the big shippers of the state.

Bluefield, W. Va.—The Norfolk & Western R.R. is planning a branch line into Wyoming County to open up some valuable coal lands, which have already been leased. Several lines have been surveyed into Wyoming County, by the Norfolk & Western, the Chesapeake & Ohio and the Virginian, but it is expected the first mentioned will build a branch line leaving the main track at Davy, which will extend for about 20 miles or more into a comparative wilderness, thus giving access to a large area of coal and timber land.

Cabin Creek, W. Va.—The two-million-dollar power plant of the New River Development Co., now under construction upon Cabin Creek, is approximately two-thirds completed, and it is believed it will be finished within a month or two. While no transmission wires have yet been strung, the steel towers to which they will be attached are being erected, and this phase of the work is well under way. It is also contemplated to build a dam near Hinton and develop power from the waters of New River.

Harlan, Ky.—Mine operators and business men of Harlan, Ky., are said to be preparing to organize an independent telephone company, with a direct line connecting Middlesboro, Harlan and Pineville, unless the Cumberland Telephone & Telegraph Co. will extend its lines to the town shortly, as there is some prospect of its doing. The growth of the business interests of Harlan make adequate telephone service imperative, and a line will be built, either by the company or by the business men of the town.

Hazard, Ky.—The new Kentucky Block Coal Co. proposes to lease the property of the Henry Coal & Coke Co., about two miles from Hazard, and to begin operations there at once. A 1000-ton plant will be built. J. B. Allen will have the active management of the operation, having resigned recently as chief engineer of the Slemp Coal Co. He expects to have coal moving shortly after the first of the year, with houses for the miners and other buildings completed. A sawmill will start work on the property at once, getting out lumber for various purposes in connection with the mine.

Sandusky, Ohio—Dock improvements are to be made at Sandusky, O., and the work is announced to begin shortly. The Lower Lakes Dock Co., is planning an expenditure of $1,000,000, which will include additional railroad sidings and an additional coal loading plant. The announcement of the improvements were made following the visit of Otto Schroll, Supt. of the Toledo division of the Pennsylvania R.R. Co., to Sandusky. The proposed improvements are designed to give the Pennsylvania better facilities for handling coal shipped from southern Ohio and West Virginia mines. The contract for the improvement has been awarded to the Great Lakes Dredge & Dock Co.

Panther, W. Va.—The Lathrop Coal Co. has let a contract to the Pittsburgh Coal Washer Co. for a large coal washer, the work of erection to be started at once. This washer will be used to remove all foreign substance from the slack. A contract has also been closed with John W. Doss, of Welch, to build 10 new houses for the miners, all to be thoroughly uptodate; also to operate new sawmills for cutting timber upon the lease.

The Panther Coal Co., a new corporation that will be managed by the same officers as the Lathrop Coal Co., has applied for a charter and will operate a lease one-half mile east of the Panther Station. This company will be in operation in a short time, producing the same quality of coal as that mined by the Lathrop company. Work will be commenced at once on 50 houses, all of which will be thoroughly uptodate.

NEW INCORPORATIONS

Idamay, Ky.—The Congleton Coal Co. has been incorporated with a capital of $1500, and the incorporators are Lee, Hill and Tryce Congleton.

Hazard, Ky.—The Kentucky Bullock Coal Co., has been organized with a capital stock of $30,000. The incorporators are J. B. Allen, M. M. Bullock and J. A. Roan.

Morgantown, Ky.—The Independent Coal Co., has been organized with a capital of $1500. The incorporators are C. M. Sullivan, James W. Cook, and James F. Hope.

Coalton, Okla.—The Herron Coal Mining Co., has been organized at Coalton with a capital stock of $20,000. The incorporators are W. F. Herron, W. P. Russell and George Arbaugh, all of Coalton.

Greencastle, Ind.—The Silver Ash Block Coal Co., has been organized to buy, sell and mine coal. The capital stock is $25,000 and the incorporators are George W. Hanna, James E. Houck and John W. Stoner.

Nashville, Tenn.—The Royal-Ten Coal Co., of Knox County has been organized with a capital stock of $25,000. The incorporators are H. M. Johnson, H. S. Pless, Ben. A. Morton, Ralph W. Brew and Joseph P. Grant.

Peru, Ind.—The Island Creek Lumber Co., of Island Creek, W. Va., has filed articles of incorporation here naming as directors J. O. Cole, Chas. C. Crane and E. C. Bears. The company has $10,000 capital stock, and will open coal mines on land owned by Mr. Cole.

Philadelphia, Penn.—The L. P. S. Extraction Co. has been organized with a capital stock of $120,000 to acquire, own and lease mines and mining rights of all kinds. The incorporators are George A. Perry, of Philadelphia, Penn. W. M. Hope, of Dover, Del., and others.

Des Moines, Ia.—Articles incorporating the McKay Coal Co. were filed Sept. 5 with the county recorder. The company is incorporated for $4000 and will engage in a general fuel business in Des Moines. The incorporators are A. G. McKay, E. M. Gray, and Earnest C. Pond.

Elkins, W. Va.—The Limestone Railroad Co. is to mine and transport coal, limestone and other mineral. Capital stock $15,000. Incorporators are R. B. Cody, E. M. Cody and E. A. Cody, of Buckhannon, W. Va., J. A. Isherwood, of Elkins, W. Va. and Robert Connell, of Washington, D. C.

Charleston, W. Va.—The Economy Splint Coal Co., of Charleston, W. Va., has been organized with a capital stock of $15,000 to produce coal. The incorporators are N. R. Hoge, of Sanderson, W. Va., T. G. Bush, of Quick, W. Va., Joseph Moore, J. M. Harris and Fred Burdett, of Charleston, W. Va.

INDUSTRIAL NEWS

Charleroi, Penn.—Improvements being made at Lock No. 4 on the Monongahela River are not interfering with the coal trade. During the month of August 16,807,000 bushels of coal were locked through. This is somewhat above the average.

Scranton, Penn.—The total shipments of anthracite coal from Pennsylvania in the month of August were 1,206,691 tons less than for the corresponding month in 1912. Last month, these shipments amounted to 5,369,900 tons as against 6,576,591 tons for the corresponding month of last year.

Peoria, Ill.—The Peoria Coal Club has signed a contract with the Illinois Merchants' & Manufacturers' Protective Association to do all its investigating for the coming year. Short weight, the credit of customers, etc., will be the work of the detective agency and two men have been appointed for this purpose.

Charleston, W. Va.—Over a million and a half tons of coal were shipped on the Chesapeake & Ohio R.R. from the Kanawha, New River and Kentucky districts during the month of August. The tonnages are as follows for the three districts:

Kanawha district coal 892,540 tons, coke 1980 tons. New River district coal, 537,490 tons, coke, 12,810 tons. Kentucky district coal, 195,300 tons, coke, 11,940 tons. This makes a total shipment of coal and coke of 1,652,062 tons.

Washington, D. C.—That the coal operators of Pennsylvania and Ohio took a hand in fomenting trouble and promoting the big strike in West Virginia in 1912 in order to more advantageously compete with West Virginia operators, was the sworn testimony before the Senate Investigating Committee on Sept. 9. A former Burns detective who went into West Virginia during the strike to investigate testified he received this information from a prominent man identified with Pennsylvania mining interests. He steadfastly refused to give the name of his informant.

Monongahela, Penn.—Representatives of a Uniontown syndicate headed by J. V. Thompson, are rapidly buying up all the virgin coal land that lies along Ten Mile Creek and in the vicinity of Hackney in Greene and Washington Counties. Agents of the syndicate have been at work for several months acquiring the property which is said to aggregate over 7000 acres, the prevailing price being approximately $600 an acre. The same interests are also purchasing coal lands at Conger and Dunn Station. The farmers at these points, however, are holding out for higher prices and the likelihood is that they will get them.

Granite City, Ill.—A big increase in the output of coal in Madison County will be shown by the report of the county mine examiner to the board of supervisors. This will be the fourteenth annual report and each has shown a substantial gain over previous years. Twenty-seven mines are in operation and the output for the year was approximately four million tons. Practically all the coal was consumed by the industries of the county or sold to railroads for locomotives. Thirteen persons were killed in the mines during the year and approximately $85,000 was paid by the miners for powder to blast the coal.

St. Louis, Mo.—One of the most important coal and railroad transactions made in this vicinity in a long time came to light a few days ago when it became known that the Manufacturers Ry. had bought the St. Louis & O'Fallon Ry., and had secured trackage rights over the Alton & Southern lines.

This came in the face of the fact that the Manufacturers Ry. was at this time supposed to be completing a deal with the various roads entering St. Louis, and working as the St. Louis Terminal lines to allow the Manufacturers road a working basis for the freight moved over its rails. With the announcement of the O'Fallon purchase came a letter withdrawing the proposed arrangement with the Terminal Ry.

It is understood that the Manufacturers Ry. will have a close working arrangement with the road now building by the Aluminum of America, which has under way work for the approaches to ferry slips on the east side of the river. The railroad owns property on the west side and in this way the Manufacturers Ry. has broke the Terminal control of the river crossing facilities, and threatens to become an important coal carrier to at least the local market.

COAL TRADE REVIEWS

GENERAL REVIEW

Bituminous operators again out of the market and tonnage difficult to obtain. Occasional congestion reported but the season is now sufficiently advanced to look for a hard situation at any time. Wholesale anthracite continues dull and mining still restricted.

The retail anthracite trade received a slight impetus during the week, due to the first appearance of colder weather. Greater activity is noticeable among dealers and consumers, but the movement is not of sufficient proportion to effect the wholesale situation. Mines continue working under curtailed production, and some of the smaller sizes are still going into storage. The most interesting development during the week was the recent announcement of a proposed increase in the water freights out of New York Harbor. The companies claim that this business has been done at a loss in the past and they are determined to eliminate all such unprofitable features of the trade.

Bituminous operators who were in the market a few weeks ago, have again withdrawn and the situation is notably stiffer. The short car supply is having a steadying influence while the spot market is stronger and the outlook even more perplexing. There is a particular scarcity of West Virginia grades and quotations are showing a strong tendency to increase on what little prompt coal is offered. The season has advanced to a point where a firm situation may develop very rapidly.

On the other hand, an occasional congestion is being reported, notably at Boston where there is more coal on vessels than can be unloaded and some of this will probably be on demurrage shortly. Again, prompt loading cannot be obtained on short notice at Hampton Roads, as was recently demonstrated when an attempt was made to divert vessels there from Baltimore; apparently shipments to tide are well sold in advance of their arrival. A record production is being made in the Pittsburgh region. The demand continues close up to the supply and prices are firm with prompt tonnages difficult to negotiate. Dealers are beginning to buy in preparation for the fall trade. Cars continue in fair supply, the greatest difficulty at the moment being the shortage of labor.

The effect of the heavy movement in Ohio is noticeable on the car supply although the situation is by no means serious as yet. The September circular is well maintained, domestic grades being particularly strong and the lake movement limited only by the supply of cars; the latter business is also being somewhat delayed by the difficulty in obtaining return cargoes at the upper-lake ports. The railroad yards at Hampton Roads are practically cleaned up due to a heavy dumping, principally for shipment into the New England trade; spot tonnage is difficult to obtain. The car supply is the principal feature in the Southern market, many mines being forced to reduce operations to one-third or one-half capacity; both steam coal and lump are improving.

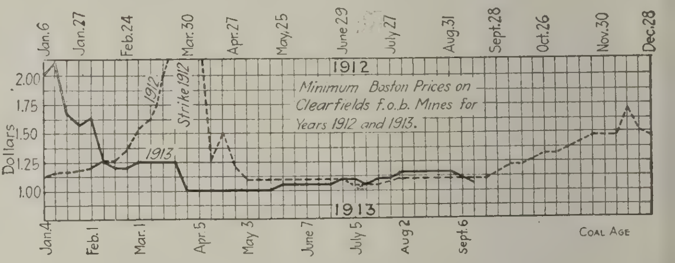
The cooler weather has caused a tightening in the car situation in the Middle West and free coal is generally difficult to obtain. Some activity has developed in the retail trade and there is a disposition among coal men to speculate heavily on the prospects of a rising market this winter. Industrial conditions are improving and prices are some stiffer.

BOSTON, MASS.

Hampton Roads coals firmer, and the outlook more perplexing; receipts still heavy. Georges Creek in short supply. Signs of increasing demand for Pennsylvania grades. Barge rates on anthracite from New York to advance Oct. 1.

Bituminous—There is no material change in Pocahontas and New River, except that the spot market is even stronger than a week ago and the outlook for the next 60 days is, if anything, more perplexing. Orders are still plentiful and it is at least worth noting that steamers it was sought to divert from Baltimore were finally obliged to await their turn at that port because no agency at Hampton Roads could undertake prompt loading on short notice. In other words, coal is still being sold well in advance of its arrival at tide and it may be that this condition will prevail into the cold weather. Shippers who were putting coal on the market here a fortnight ago now find themselves obliged to decline business that is offered, and as high as $2.95 f.o.b has been realized for the small orders that have lately come in.

Meanwhile Boston has more bituminous waiting discharging berths than has been the case for months and it is reported that some heavy demurrage will accrue before the harbor is clear of boats that have been held in the stream for two and three weeks. It is possible there will be a decided lull when these cargoes are added to the stocks already on hand but we cannot be so confident now that the market will ease off later. The season is at hand when a firm situation can develop very fast.



The shippers of the better grades from Pennsylvania have no difficulty keeping orders ahead of output. Prices fluctuate from day to day but there is a strong undertone. There are signs of an increasing demand for these coals, now that Pocahontas and New River seem so firmly established on a high-price level. For bunkering, in particular, the distributors here find a wider opening for reputable Pennsylvania coals on account of the demand from steamship owners for lower prices than can be made on coals from Hampton Roads. There is a better regard here for Pennsylvania coals of known origin than was formerly the case.

Water Freights are easy. Most of the coal moving this way is in steamers or in other tonnage that is under contract, so the current demand is rather light and at what are now considered minimum rates; 75c. is about the average from Norfolk on large vessels, with 10c. less to Providence.

Anthracite—It has been informally announced that effective, Oct. 1, certain anthracite carrying companies will advance barge freights, New York to Boston, from 50 and 55c. to 65 and 70c., making the circular price $5.90 alongside for stove and egg. In March, 1912, the price was $5.50 alongside, making a total advance of 40c. in less than two years, not counting the Pennsylvania state tax which some shippers are charging and others are not. Dealers are nevertheless taking supplies as fast as their storage will permit and the hard-coal trade is in excellent shape.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*................	$1.10@1.50	$1.35@1.65	$1.67@1.77	
Philadelphia*..........	2.35@2.75	2.60@2.90	2.92@3.02	
New York*............	2.65@3.00	2.90@3.20	3.22@3.32	
Baltimore*............	....	....	2.85@2.95	
Hampton Roads*........	....	....	....	$2.85@2.95
Boston†............	....	....	....	3.78@3.88
Providence†............	....	....	....	3.93@4.10

NEW YORK

Bituminous market steady and well supported in spite of the rumored withdrawal of the railroad buyers. Anthracite continues dull and production restricted. Retail trade somewhat stimulated by a fall in temperature.

Bituminous—The withdrawal of a number of Eastern railroads from the market as reported last week, has failed to have any effect on the situation which continues firm in every respect. It is clear that whatever results were anticipated from this action on the part of the roads, the effect of their withdrawal from the market has been entirely discounted and coal continues to move as freely as at any time during the prevailing activity. It is anticipated that they will again be buying by Oct. 1; a great deal of difficulty was experienced last year in obtaining sufficient railroad fuel and it is probable that the roads will endeavor to better prepare themselves this winter.

One of the best features in the market is the obvious care which operators are taking to keep the production down within the limits of the demand. Indications point to a consistently strong market throughout the winter, with the producers so thoroughly in control of the situation, that they will be able to eliminate the possibility of a runaway market. Such a condition is very desirable since any abnormal infallation is invariably followed by a subsequent depression, more harmful in its effects than any temporary period of high prices. Conjectures are already being heard as to what effect the closing of the lake trade will have upon the market; this of course, always results in a temporary embarrassment in certain districts specializing on this business but it seems to remote at the present time to be considered. The bituminous market continues firm at former quotations as follows:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The appearance of some moderately cool weather has had a slightly stimulating effect upon the retail demand for hard coal, but without changing the wholesale situation. There are no reports as yet of any increase in the production in the mining regions, and the collieries are still working on part time. The companies are also stocking as liberally as before, notably pea and buckwheat grades. Stove continues in strongest demand. However, the change in weather has caused renewed interest in the market on the part of both dealers and consumers; inquiries are more numerous and a continuance of the low temperatures will see the winter trade under way somewhat earlier than is usually the case.

There is a noticeable tendency on the part of local agencies to confine their business entirely to old customers and in some instances to even withdraw from some of the outlying local markets. An example of this is found in an advance in local water freights particularly to Boston which, it is rumored, will be put into effect by a number of companies either Oct. 1, or Nov. 1. This increase will be from 50@55c. up to 60@65c., the latter figure having been put into effect in the early part of this year by one of the big local shippers. It is claimed that the water movement of hard coal by the large companies, has long been carried on at a loss. There are also other instances where unprofitable business is being dropped.

The local market has recorded some further advances during the week, and is now quotable on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	....
Egg	5.25	$5.15@5.25	5.20	$5.10@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.50@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.35@2.70
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.75	1.70	1.40@1.70

PHILADELPHIA, PENN.

Anthracite trade is slowly becoming more active. Curtailed operations still continue but there are indications that full mining is likely to be resumed shortly. Bituminous market continues strong with demand good, and prices on about a parity with the week previous.

The first real cool snap of the season made its appearance early this week, and anxious eyes were turned toward the coal bin. The change, while temporary, at the same time it is likely to be the opening wedge for the fall business. It is rumored that most of the dealers, are not carrying such very heavy stocks of coal. Then again, it is not believed that the householders have much coal, carried over from last winter. It will be recalled that the winter of 1912 and 1913 was, comparatively speaking, a very mild one; and it is safe to assume that few consumers were compelled to renew their supplies, the early winter purchases carrying them over until spring. This is an unusual condition, as there is generally more or less coal carried over. This bears out the assertion made by many, that when the demand actually starts up, it will come with rush. Curtailed mining still continues although operators declare that full operations are likely to commence at any time. Dealers state that they are receiving numerous orders for deferred shipment, and when deliveries start, there will be more activity with the wholesalers.

In bituminous one hears of occasional orders being turned down, more on account of lack of ability to deliver, rather than because the prices were not acceptable. Some coals are even selling at slightly higher prices than was the case a week or two ago, but that again resolves itself into a question of how bad the customer is pressed for tonnage. Tidewater deliveries are fairly heavy at the present time, with good prices prevailing. Quotations vary from $1.25 to $1.60 and better, at the mines.

PITTSBURGH, PENN.

Production at full capacity and prompt coal still difficult to obtain. Dealers buying more freely in preparation for the fall demand. Odd tonnages of coke being offered at concessions but the market generally firm.

Bituminous—More is heard of shortage of men than formerly, particularly from West Virginia fields, while car supply in the Pittsburgh district is fairly satisfactory, though short on a few divisions. Production and shipments are practically up to record rate. The approaching end of the lake shipping season has not produced any weakness in the market, regular prices being firmly maintained, while free coal is somewhat hard to find, although the demand is quite limited except from retail dealers. Many of the dealers failed to make contracts and are now increasing their purchases in the open market, providing for the fall demand from consumers. We continue to quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The market has been very inactive since there were fair sized sales of furnace coke for September delivery. These sales were at $2.50 with two or three possible exceptions. In the past week small lots of spot coke have been offered at concessions, down to $2.35 or $2.25, but there is question about the quality, and in any event no ordinary tonnages are offered below $2.50, which the leading operators regard as the market. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $2.90@3; contract foundry, $2.90@3. per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 6 at 369,459 tons, a decrease of 33,571 tons, and shipments at 371,270 tons, a decrease of 33,845 tons. The decrease was due probably to the holiday, and the previous week's figures had been correspondingly high, presumably in anticipation of same.

BALTIMORE, MD.

Growing car scarcity is tightening up the market again, although some low-grade coals are still comparatively cheap. Not a few mines are out of market, however, because they cannot get through more than enough to meet contracts.

The bituminous coal market is being again strengthened by a growing car scarcity. While the situation in Pennsylvania is not so bad, there have been days in West Virginia recently when the shortage has been acute. Some operating interests have reached a point where they refuse to sell any coal and are obliged to hustle to meet their contract obligations.

Where there was coal to offer in West Virginia, prices were as a rule a little better than the week previous. Unless the car situation improves rapidly the upward movement should continue. During the week run-of-mine was quotable in small lots at from 90 to 95c., and three-quarter sold around $1.05 to $1.10. Slack showed remarkable strength early in the week, because of the reduced screening and sold up to 95c.

There has been somewhat of an easing up in the movement to tide, although New England is still taking a fair quantity of coal. In the export business there should soon be a resumption of activity, as several important charters were announced for the week. Anthracite dealers are doing a fairly satisfactory business. There is no rush of fuel yet, as the yards are pretty well stocked. Many of the Pennsylvania coal cars that are ordinarily used in the anthracite trade are now in use in the soft coal districts.

Increased activity in shipping circles here recently is interesting the bunker supply trade. The port of Baltimore has shown a tremendous increase in its export and import business so far this year and many of the tramps that now come here are in the market for coal supply.

BUFFALO, N. Y.

Bituminous continues steady, but not quite so active. Car shortage becoming more and more noticeable. Demand close up to supply.

Bituminous—The most important change of front in the bituminous trade is in the car situation. It is not only agreed that they are growing scarcer, but the railroad officials state that the end is not very near. It is denied that the locomotive supply is short. At present the Pennsylvania, according to official statement, is delivering only about 75 per cent. of the required supply, though the Allegheny Valley mines appear to be faring somewhat better.

The fear that the closing of the lakes will develop a large amount of unsold coal is not so great as it was. The shipments in that trade are slowing down somewhat, but not on account of any natural falling off in demand or in any estimate that cuts down the apparent amount needed by the upper-lake consumers. Just as soon as the present cool weather becomes definitely established the former heavy shipments are expected to be resumed.

The fact is that the demand is so close up to the supply that there is no reason for predicting any great change in the situation. Not in the entire history of the bituminous trade has the summer demand been anything like what it has been this year, so that it is not to be expected that any decline will occur now just as the natural increase in consumption is at hand.

There is a steady growth in manufacturing in this vicinity, quite as much as has been the case at any former time and the domestic season is also now at hand. The iron consumption is good and business refuses to be disturbed by anything done or proposed by Congress.

Prices are therefore strong at $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack, with Allegheny Valley about 20c. lower.

Coke—While high-grade coke is a little firmer there is a decided weakness in the lower grades of furnace, which are selling in place of stock. Quotations are $4.85 for best Connellsville foundry and $3.85 for high-sulphur furnace.

Anthracite—The weather now favors a return of the demand for anthracite and there is some call for the purely domestic sizes, but it is hard to sell egg in any quantity and shippers will not consider the fall trade definitely opened till all sizes will sell. Pea and buckwheat are not active. It will be a hardship to take out all the available chestnut and stove sizes before anything will sell at all steadily. Lake shipments are heavy, though not quite as large as they were last month. More storage room in the only requirement. The weekly shipment by lake was 148,000 tons.

TOLEDO, OHIO

Car situation showing effects of the large movement. Lake trade heavy but vessels delayed at the upper lakes waiting cargoes. Cooler weather stimulating the demand.

No car shortage of consequence has as yet been noted on this market although shipments are not as prompt as they were earlier in the season. Some of the railroads are sending out warnings of an impending shortage and are making an appeal to shippers to use every precaution to prevent a congestion of cars. Hocking operators are refusing many orders and other roads coming into Toledo are demanding that customers accept a certain proportion of hopper cars.

Lake business continues active and is being pushed as rapidly as possible. The ore shipments are not as rapid as was the case earlier in the season and vessels which have been waiting around for ore loaders have been offered to grain shippers. It is stated that ships have been waiting at the head of the lakes for ore from two days to a week.

The demand for coal is a little brisker than it was because of the cooler weather. Steam grades are fairly active and the domestic trade is beginning to pick up. A little more cold weather will bring about considerable activity in the market generally. Prices are very firm here and there are no indications of a weakening anywhere along the line. Fine coal continues scarce and high in price.

Prices as quoted at Toledo are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.75	$2.50	$2.00	$2.50	$1.35	$1.35
Egg	2.50	1.35	2.50	1.50	2.50	....	....
Nut	2.00	1.25	2.25	1.75	2.50	....	....
¾ lump	....	1.65	....	....	....	1.25	1.25
Mine-run	1.60	1.35	....	....	....	1.12	1.15
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

The principal feature is the car situation which is curtailing production. In Eastern Ohio and Pomeroy Bend the shortage is marked and trouble being experienced in other fields. Prices are stiff and the demand strong for all sizes. Lake trade is still active.

The question of car supply is the principal factor in the coal trade in Ohio. Inability to furnish sufficient equipment has caused a lessening in production in many of the fields. The demand for all grades is good and the circular at the new level of Sept. 1 is well maintained. The tone of the market is satisfactory in every way.

The domestic demand is one of the best features of the trade. Retailers in all sections are placing orders and asking for prompt delivery if possible. Dealers stocks are not large and they are endeavoring to increase them to guard against a famine when the rush comes. Larger householders have placed orders and retailers are busy making deliveries. Retail quotations are firm and inclined to advance. Pocahontas prices have increased because of a scarcity of labor in the mining district.

Lake trade is also active and the volume of fuel going to the Northwest is only limited by the car supply. The dock situation at the upper lake ports is satisfactory and little congestion is reported. Chartering of bottoms is still going on and the lake movement will be active to the close of navigation. The Toledo docks of the Hocking Valley have loaded 2,000,000 tons since the season started.

Eastern Ohio operators are probably the worst sufferers as a result of the shortage of cars. It is estimated that the output in that district is but 60 per cent. normal. In the Hocking Valley the production is estimated at 85%, in the domestic fields about 75% and in the Pomeroy Bend field, about 65% of the average.

Steam business is holding up well under the circumstances and is expected to continue active during the fall at least; manufacturing establishments are taking quite a good tonnage while railroad fuel is also in fair demand. Only a few steam contracts are expiring at this time and they are being renewed at higher figures generally.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75 @ 1.70	....	$1.85 @ 1.75	$1.70 @ 1.65
3-4 inch	1.60 @ 1.55	$1.30 @ 1.25	1.55 @ 1.60	1.55 @ 1.50
Nut	1.30 @ 1.20	....	1.40 @ 1.25	1.25 @ 1.20
Mine-run	1.40 @ 1.35	1.20 @ 1.15	1.30 @ 1.25	1.25 @ 1.20
Nut, pea and slack	0.70 @ 0.65	....	0.75 @ 0.70	0.75 @ 0.70
Coarse slack	0.60 @ 0.55	0.85 @ 0.75	0.65 @ 0.60	0.65 @ 0.60

HAMPTON ROADS, VA.

Heavy dumpings during the week, principally for shipment into New England. Railroad yards well cleaned up and suppliers pressed for tonnage. Domestic trade opening up.

Coal dumpings over the tidewater piers during the past week have been heavy, a large fleet of schooners, as well as cargo steamers, having been loaded for ports in New England. There has also been a good movement in the foreign trade of both cargo and bunker coal. On account of the heavy dumpings and the light movement to tidewater, there is little accumulation in any of the railroad yards. A large number of the suppliers are short of coal, with a considerable number of vessels waiting in the stream.

There is practically no spot coal offering as the agencies are using all available on contract business. Prices for Pocahontas and New River grades have remained about the same as during the last two weeks.

Dealers in domestic coal, who have been doing practically nothing during the summer months, are now being rushed with orders as householders are beginning to get in their winter supply. Prices for domestic coal range from $4 for New River and Pocahontas to $7.50 for anthracite nut, stove and egg.

There have been foreign shipments to Dakar, Rio, Coronel, La Plata, Panama, Georgetown and Puerto Gallegos, Patagonia.

LOUISVILLE, KY.

Slack coal experienced a sharp reversal in form and is now heavy. Car supply becoming tighter and the new hopper bottoms are again a factor in the situation. Indications point to high prices for October delivery.

The local market for screenings has experienced an abrupt and unexpected change from almost famine conditions to an exceeding heaviness, certain grades being almost impossible to move. Some of the high-grade eastern Kentucky coals are only in moderately excessive supply, but of the western Kentucky, and other cheaper coals, the production is far in excess of the demand. The increased movement of western Kentucky domestic coal to the South and into the Kentucky market has resulted in an excessive production of screenings; as a result there has been a heavy movement of this grade into Louisville, its natural market. Large orders from the railroads have also resulted in an excessive production of pea and slack.

The lack of sufficient cars in the eastern Kentucky field has kept the supply of high-grade screenings from that district down to a comfortable margin. It is stated on reliable authority that a great deal of western Kentucky coal is being applied on contracts calling for Straight Creek and Jellico screenings, the market being flooded with the former and the latter in moderately short supply.

Eastern Kentucky operators are again experiencing a great deal of difficulty with the big hopper cars, which they are now being forced to load in the absence of an adequate supply of gondolas. Consignees north of the Ohio River refuse flatly to accept shipments in this class of equipment.

so that they are confined almost entirely in the state. While they are being accepted there, a great deal of dissatisfaction and complaint is heard regarding them. Where shipments have been made in the hopper cars, contrary to instructions specified in orders, an allowance of 15c. per ton is usually made for unloading.

In view of the prospective labor troubles next month, operators are making no contracts for deliveries beyond September, and $2.25 is expected to be the minimum on block for October deliveries. At the moment this grade is quotable at $2.10 with round at $1.60 to $1.65, and screenings 85c. to 90c. The over-supply of western Kentucky screenings has created a heaviness in that market, which is now quotable at about 50c. or 60c., and even less for nut and slack, and 30c. to 40c. for pea and slack.

BIRMINGHAM, ALA.

Demand continues good for steam and domestic coal. Coke shows improvement. Car shortage still serious. Pig iron firm with large sales. Cast-iron pipe very quiet, both in amount of business and price.

The demand for steam coal is very good in this district, and lump coal is picking up after about ten days of rather a quiet market. The market on both furnace and foundry coke is good, with prices from $3.25 to $3.50 on furnace coke, and $3.50 to $4.25 on foundry. The pig-iron market is booming. One producer has sold since July 4 over 120,000 tons for delivery during the balance of this year. Some iron is being sold for the first quarter of next year, at prices from 25 to 50c. above this year's deliveries.

The car supply is still serious, many of the mines running from one-third to one-half time on account of the shortage. The railroads are making every effort to get their cars back from all foreign lines, but it is quite evident that this winter will show them far short of the necessary equipment to move the product. Manufacturers of cast-iron pipe state that there is very little doing in that line and that prices are far from being satisfactory.

NEW ORLEANS

Spirited competition on between the agencies. Heavy shipping stimulates bunker trade. Coal men do not expect to see early conversion of Southern Pacific ships to oil burners, despite company's announcement.

The placing of the contract for the school board's annual coal supply developed some of the most spirited competition between the different agencies that has been seen in the city for years. The Tennessee, Coal, Iron & Railway Co. secured the bituminous and the C. A. Andrews Coal Co., Ltd., the anthracite contract.

Car shortage is becoming more pronounced but large quantities of Alabama coal continue to arrive daily.

An oil-tank steamer, the "Topila," has been put in service by the Southern Pacific Co. between here and Tampico, and fuel oil is being stored with the announced intention of beginning the use of oil as soon as the vessels of the company can be converted. While coal men are inclined to doubt that a change to oil will be made while same is at the present price, the loss of this business, even if it comes this winter, will be more than replaced by the new lines.

Exports for the week were confined to the regular shipments to Bluefields and Cape Gracias, Nicaragua; Port Barries, Guatemala; Belize and Stann Creek, British Honduras.

DETROIT, MICH.

Prompt coals steady at a relatively high level. Car shortage becoming more serious and free tonnage scarcer. Anthracite improving.

Bituminous—The local steam market continues to show a steady improvement from day to day, and it is difficult to anticipate what the future will bring forth. However, all indications point to a still further advance. There is very little spot coal to be had, and a pronounced scarcity of cars has developed in the West Virginia field. Contracts figures continue as strong as ever and many enticing offers are being rejected by operators, indicating that they desire as much free tonnage as possible for use in the open market this fall. There seems to be a general disposition among all classes of coal men to speculate on the probabilities of a rising market this winter.

The domestic situation is also beginning to attract attention locally. Inquiries are becoming steadily more numerous and large distributors are showing a disposition to get into the market. Prices are advanced over last year and some of the local agencies who have neglected to lay in their winter supply, are now finding themselves in a precarious position. Very little Pocahontas coal is coming in and it commands a ready premium, all sizes having advanced 10c. per ton within the last week. Spot coal is selling for 25c. above circular.

The local market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.75	....	$1.75	....	....	$2.60	$2.50
Egg	1.75	....	1.75	....	....	2.60	2.20
Steam lump	1.45	....	....	....	....	....	....
¾-in. lump	1.20	$1.25	1.15	$1.15	$1.20	....	....
Mine-run	1.10	1.10	1.10	1.10	1.10	1.60	....
Slack	0.90	1.00	0.75	0.80	0.85	....	....

Anthracite—The hard-coal market has failed to show any change during the week. The domestic sizes seem to be moving about as usual, stove and egg being the most active at the present time. Pea coal is moving a little more freely and expectations are that it will continue to improve as the cool weather advances.

INDIANAPOLIS

Cooler weather resulted in a further tightening in the car situation. Some activity in the retail trade. General industrial conditions improving.

There is some complaint of a shortage of cars at the mines, now that there has been a few days of cool weather that has stirred up the trade somewhat. In the Terre Haute district it is stated that mines could put in full time, if the Big Four, Chicago and Eastern Illinois and Vandalia roads would supply enough cars. The Chicago and Eastern Illinois reports that it has 1500 men at work getting coal cars in good condition. This road is the heaviest coal carrier in the state. Since it has been separated from the 'Frisco system, some of the old directors are back on the board and they at one time gave the coal traffic good attention. Operators are therefore hopeful.

In the retail trade consumers of domestic are hurrying to get in a supply before an expected advance in prices, Oct. 1. This activity reflects back to the mines. Prices hold steady, with some slight improvement in the inquiry for screenings, and a gentle pushing of industrial activities to their usual fall schedule. Mine-run, too, is in somewhat better demand.

ST. LOUIS, MO.

Cool weather locally has developed some demand. Country trade improving. Franklin County and Carterville particularly strong. Standard grades the weak department.

The local market did not hold out as was anticipated last week practically every grade breaking from 5 to 20c. a ton. However, with the beginning of this week things looked different, and it is likely that prices will be maintained from now on. The main cause of the weakness was the extreme warm weather; with the first of this week conditions changed, and there is a general demand for coal. Country business is also picking up, and everything indicates that the balance of the month will be good.

Franklin County is unusually strong and Carterville is creeping along fairly well; the end of the month should see both these coals commanding a good figure on account of the car shortage and other minor troubles that are besetting the operators. Standard coal is still being sold at cost of production. The operators in the 5th and 9th Districts seem unable to get out of the rut they have been in for several months.

There is little anthracite and smokeless moving, but there is an abundance of coke coming in for which there is no demand. A fairly good tonnage of Arkansas is moving in this season, which is taking the place, to some extent, of West Virginia smokeless.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	$1.40	$1.05@1.15
3-in. lump	....	....	1.50	....
6-in. lump	$1.60 @ 1.70	....	1.60	1.25@1.35
Lump and egg	1.50 @ 1.60	$2.15	1.60	....
No. 1 nut	1.30 @ 1.40	....	1.05	....
Screenings	0.55	....	0.40	0.30@0.35
Mine-run	1.50	....	....	....
No. 1 washed nut	1.60	....	1.60	....
No. 2 washed nut	1.30	....	1.50	....
No. 3 washed nut	1.20	....	....	....
No. 4 washed nut	1.15	....	....	....
No. 5 washed nut	0.40	....	....	....

PORTLAND, ORE.

The announcement of an advance in wholesale coal prices at the Wyoming and Utah mines here last week was followed this week by an increase in the price on standard coals to the extent of 25c. per ton. The opinion prevails that there will be no oversupply of coal in the market the coming winter, but rather a shortage, unless shippers are fortunate in getting rolling stock promptly.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for August and the first eight months, of the years 1912-13, in long tons:

	August		8 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading.	855,343	1,286,651	8,616,490	18.91	7,765,878	19.93
Lehigh Valley....	1,035,934	1,261,814	8,640,052	18.90	7,119,159	18.27
Cent. R.R. N. J...	656,154	901,870	6,007,368	13.14	5,139,578	13.19
Del. Lack. & West	862,602	918,734	6,523,639	14.27	5,519,630	14.17
Del. & Hudson...	603,876	896,130	4,698,004	10.28	3,957,185	10.16
Pennsylvania.....	469,875	525,732	4,076,893	8.79	3,426,278	8.80
Erie............	686,985	743,950	5,449,938	11.92	4,620,058	11.86
Ont. & Western ..	199,131	241,710	1,697,222	3.72	1,410,958	3.62
Total........	5,369,900	6,576,591	45,709,606	100.00	38,958,723	100.00

Stocks at Tide on Aug. 31 were 575,385 tons as compared with 537,404 tons on July 31.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Sept. 1, as follows:

	Surplus	Shortage	Net*
New England Lines..........	5	185	180
N. Y.; New Jersey, Del.; Maryland; Eastern Penn..	1,741	759	**982**
Ohio; Indiana; Michigan; Western Pennsylvania....	300	1,328	1,028
West Virginia, Virginia, North & South Carolina....	614	1,953	1,339
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida.	131	864	733
Iowa, Illinois, Wis., Minn.; North & South Dakota..	1,087	18	**1,069**
Montana, Wyoming, Nebraska.........	218	0	**218**
Kansas, Colorado, Missouri, Arkansas, Oklahoma...	2,203	55	**2,148**
Texas, Louisiana, New Mexico..........	504	4	**500**
Oregon, Idaho, California, Arizona..........	1,810	43	**1,867**
Canadian Lines..........	76	0	**76**
Total..........	$8,689	$5,209	**3,480**

	Mar. 15	Apr. 15	May 15	June 14	June 30	July 15	Aug. 1	Aug. 15
Surplus........	17,867	21,845	12,267	11,098	11,055	13,203	8,810	8,293
Shortage.......	3,776	2,196	4,226	2,033	2,821	1,826	4,029	7,038
Net*........	**14,091**	**19,649**	**8,041**	**9,065**	**8,234**	**12,377**	**4,781**	**1,255**

*Bold face type indicates a surplus.

FOREIGN MARKETS

GREAT BRITAIN

Sept. 5—The market is quiet and irregular. With the exception of two or three leading descriptions, supplies of large and small coal are more than ample, colliery outputs being much increased.

Best Welsh steam......	$4.90@4.92	Best Monmouthshires..	$4.08@4.14
Best seconds..........	4.50@4.68	Seconds..............	3.96@4.02
Seconds...............	4.26@4.44	Best Cardiff smalls....	2.46@2.58
Best dry coals........	4.32@4.56	Seconds..............	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while these for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

COAL FREIGHT DECISIONS

I. C. C. No. 4631—In the matter of alleged irregularities and discrepancies in the weighing of freight by carriers subject to the act to regulate commerce.

1. Inaccuracies in weighing result in the imposition of unreasonable charges and in discrimination between shippers just as effectually as do differences in the freight rate itself.

2. The record herein discloses that a majority of the track scales now in use should be at once rebuilt in order to obtain reasonably accurate results. It is also apparent that many additional scales should be installed.

3. A modern scale, properly installed and kept in proper condition, should be accurate within at least 100 pounds, and when under test it shows a variation of 100 pounds or more it should be considered out of order. All scales should be tested by the test car at least once in two months; in many cases every month.

4. Cars should never be weighed in motion coupled at both ends. They may properly be weighed in motion when uncoupled upon scales especially designed for that purpose and in charge of thoroughly competent men. Cars should not ordinarily be weighed when coupled at one end, and never unless at points where the greatest attention is paid to the condition of the scale and the competency of the weighmaster.

5. A prolific source of error is the wrong stenciling of the tare weight of cars; when the car weighs more than the stenciled tare the shipper loses, while when the car weighs less than the stenciled tare the shipper gains. Correction of an erroneous stenciled weight is by a proper reweighing of the car at stated times.

6. Inaccuracies in weighing particular commodities, such as grain, coal, and lumber, discussed and various remedies considered; and criticism of certain team-track weighing made.

7. General rules and practices of carriers whereby large amounts of carload freight are exempted from all weighing whatsoever considered and various criticisms and recommendations thereon made.

8. Remedies for the defects in weighing revealed by this investigation discussed at length, and the opinion advanced that some federal tribunal, perhaps this Commission, should be given authority in the following respects: (a) To fix the points at which track scales shall be installed; (b) to prescribe the standard of such scales and their installation; (c) to test or supervise the testing of such scales; and (d) supervise the operation. **Opinion No. 2399.**

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Sept. 13:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products..........	85	85	85	87	80
American Coal Products Pref........	....	....	105	109¼	105
Colorado Fuel & Iron..............	33⅝	31½	33⅝	41½	24½
Colorado Fuel & Iron Pref..........	....	....	155	155	150
Consolidation Coal of Maryland.....	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales...........	210	195	200	....	....
Island Creek Coal Com..............	55	53	55	53½	47¼
Island Creek Coal Pref.............	86	84	86	85	80
Pittsburgh Coal....................	20⅜	19½	20½	24⅜	14½
Pittsburgh Coal Pref...............	86½	84½	86½	95	73
Pond Creek.........................	22	21	22	23¾	16½
Reading............................	167¼	159¼	166⅝	168⅞	151⅜
Reading 1st Pref...................	84	84	84	92½	84
Reading 2nd Pref...................	89¼	88	89¼	95	84
Virginia Iron, Coal & Coke.........	46	42	46	54	37½

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s.........	93½	98	95¼	95¼	93½	99⅛
Colo. F. & I. gen. 6s............	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.........	83¾	Sale	83⅝	83¾	77½	85
Cons. Ind. Coal Me. 1st 5s........	76	78	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s.........	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s........	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s.......	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s.......	85	85⅞	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s......	77½	79	78½	Aug. '13	73	80½
Tenn. Coal gen. 5s...............	98½	99	99	99	98½	103
Birm. Div. 1st consol. 6s........	101⅜	102	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s..............	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s..........	..	103¼	103	July '13	103	103
Utah Fuel 1st g 5s...............	..	..	..	.....	..	..
Victor Fuel 1st s f 5s............	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s........	92	92⅞	92	Aug. '13	92	98

DIVIDENDS

Ashland Coal & Iron Ry.—Dividend of 1% payable Sept. 25 to holders of record Sept. 20.

Lackawanna R.R. of N. J.—Regular quarterly of 1% payable Oct. 1 to holders of record Sept. 9.

St. Louis, Rocky Mtn. & Pac.—Regular quarterly No. 5 on the preferred of 1¼% payable Sept. 30 to holders of record Sept. 21-29.

American Coal Products Co.—Regular quarterly of 1¾% on both the common and preferred, the former payable Oct. 1 to holders of record Sept. 25 and the latter payable Oct. 15 to holders of record Oct. 10.

⁂

Coal and Coke Ry. (West Virginia)—This company owns in round numbers 100,000 acres of coal land and coal-mining rights and practically a perpetual lease on all the properties of the Davis Colliery Co., which latter concern owns about 25,000 acres of coal land and is one of the principal operating companies in West Virginia. The tonnage handled by the road has shown a steady increase from about 700,000 tons in 1907 to 1,300,000 in 1912.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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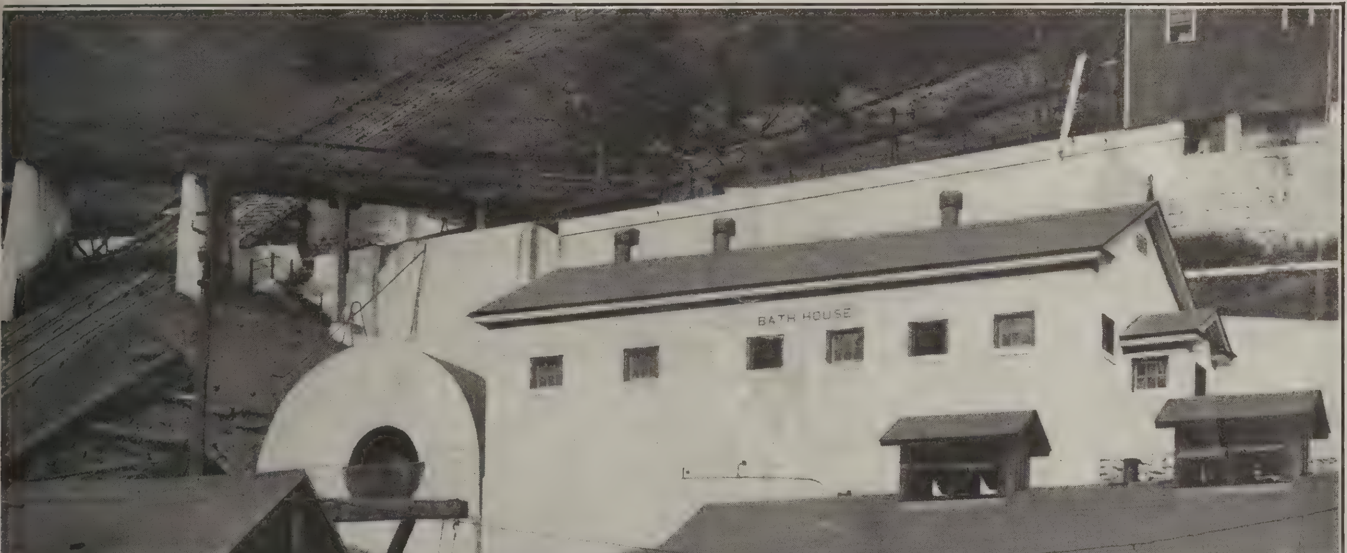


Hickory Swamp Colliery Outside First Aid Team at Cameron Colliery of Mineral Railroad & Mining Company, Shamokin, Penn.

An Actual Record
of the service rendered by
Baldwin-Westinghouse
Electric Mine Locomotives

Standard Westinghouse bron armature bearing with oil a waste lubrication as suppli on these locomotives.

At the mines of the Ray Consolidated Copper Company, Ray, Arizona, there are eleven ten-ton Baldwin-Westinghouse Electric Mine Locomotives in operation. The following information is proof of the phenomenal record of **low repair and maintenance** cost made by these locomotives:

Brushes and Commutators

The first shipment of locomotives was put into operation May, 1911, and additions have been made from time to time until now a total of 11 locomotives are in use. In this time not a single brush has been changed, nor a single commutator turned down.

Bearings

In the spring of the present year, one of the motors was removed from the first locomotive installed to ascertain the general condition and amount of wear in the bearings. General condition of the motor was A-1. The armature, commutator and brushes were in perfect shape. A careful test of the armature bearings showed that in practically two years of operation the wear was only .003.

Controllers and Resistors

A careful system of inspection is carried out at Ray, and when it is found that contact fingers become badly worn or burred, they are either smoothed u or replaced. Up to date not a single segment ha been replaced on any of the controllers.

No trouble has been experienced with the gri resistors; only three grids having been replaced i three years time, and this was due solely to a collisio in which the grid was damaged.

Mechanical Parts

The foregoing does not cover repairs to wearin parts, such as brake shoes, trolley poles, etc., which c necessity must be replaced from time to time. Wit regard to wheels, however, only one pair of wheel has been changed in two years.

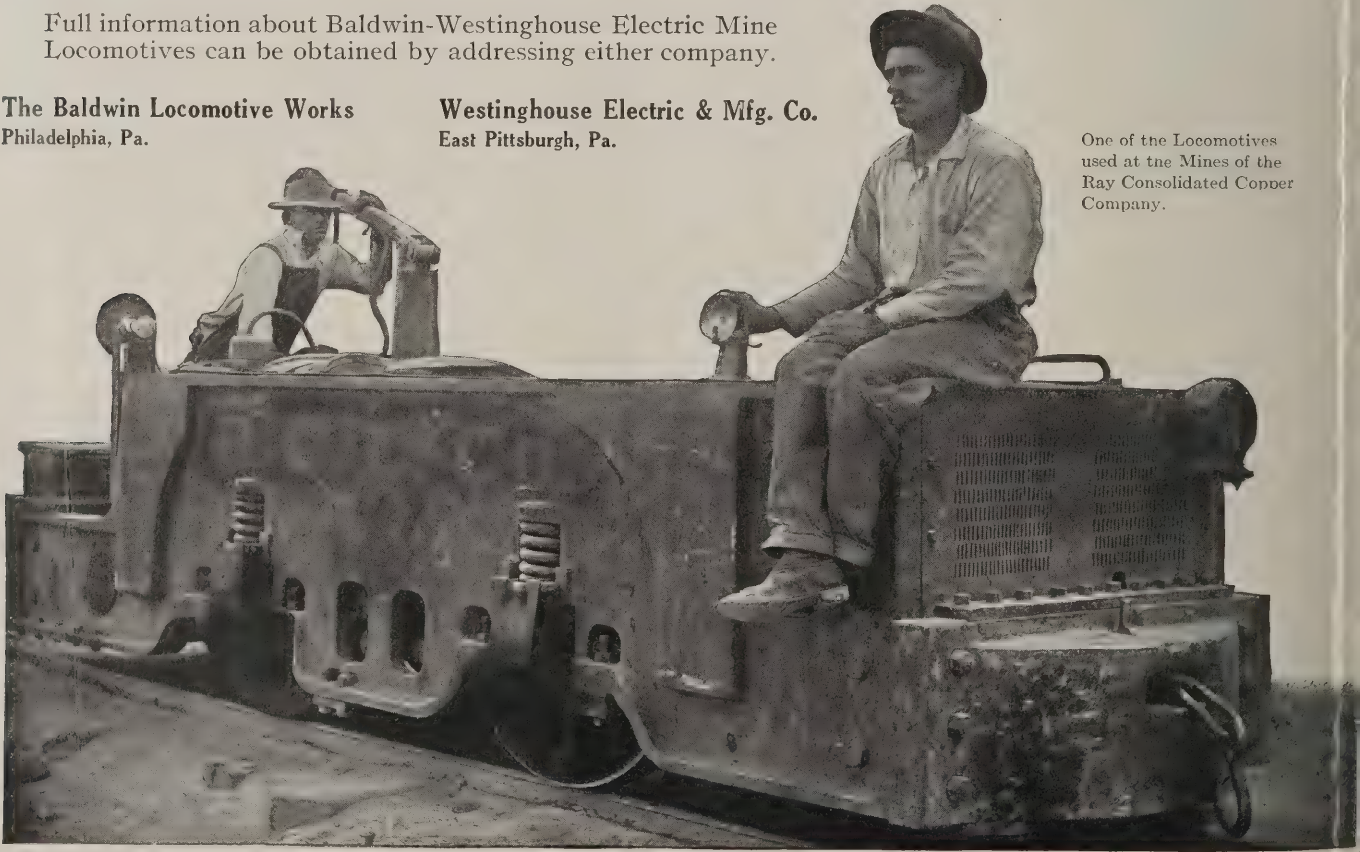
Two of these locomotives are used for genera purposes, such as hauling mine timbers, etc. Th remainder are used for hauling ore. The output o the mine is 6000 tons in 16 hours, at the present time The average train consists of 20 to 25 cars holding tons of ore each, and weighing approximately 2 ton each.

The above statement emphasizes the reliability o Baldwin-Westinghouse Mine Locomotives. Th newer cast steel bar frame design has many feature that are far superior to the earlier types, used by th Ray Company.

Full information about Baldwin-Westinghouse Electric Mine Locomotives can be obtained by addressing either company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



One of the Locomotives used at the Mines of the Ray Consolidated Copper Company.

COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,350

None sent free regularly, no returns from news companies, no back numbers

A Tale From Texas

The Weekly Ad-Talk Page

One morning a few years ago a peculiarly interesting story came out in the New York newspapers. It stated that the town of Brownsville, Texas, had involuntarily seceded from the Union—

That during the recent heavy rains the Rio Grande River had swelled, overflowed its banks and pursued a new and original course across the country—

That by this change of route the Rio Grande, instead of flowing in its time-honored bed *south* of Brownsville, now ran in a new course fifteen miles *north* of that growing town—

And that, as the Rio Grande River was the boundary between the United States and Mexico, Brownsville was now thrown south of the river and was, therefore, in Mexico!

After reading this article, the writer, being of a more or less skeptical nature, dropped a line to the postmaster of Brownsville asking him how much truth there was in the startling report.

About three weeks later he received a lengthy, wrathful letter from the Texas P.M.

It said, in effect: "There is no truth at all in the story.

"The Rio Grande hasn't changed its course an inch and even if it did this foolish dream couldn't happen—the boundary line is absolutely fixed by the treaty between the United States and Mexico.

"If the Rio Grande turned and ran up to Oregon the boundary would remain unchanged and Brownsville would still be an American town.

"The story was sent out by a promoter who thought any kind of publicity would pay—and nothing has done us more harm than the circulation of this ridiculous report.

"What we want to advertise to prospective settlers from the North is that, by coming to Brownsville, they can become prosperous *Americans*—not Greasers."

The point at once struck us that it was the promoter, and not the Rio Grande, that had overstepped the boundary.

He was attracting attention to his product, Brownsville, by making false statements about it. He thought he was an advertising man when really he was only a press agent.

He told a lie to incite curiosity instead of telling the truth to inspire confidence. His fanciful story had to be authoritatively denied broadcast before the tide of homeseekers again turned toward the Texas town.

That this principle of profitable advertising has become gospel today you can see by reading the ads in your paper.

It would be business suicide for an advertiser in Coal Age to print a "Brownsville" story over his name.

The modern manufacturer works on a different method.

He spends his time, his brains and his money to make his product so good and so reliable that, when it comes to advertising it, the *strongest* things he can say about it are the *true* ones.

This is why the advertising pages of your technical paper are so informative. It's why many a man today reads the advertising section before he does the reading matter.

COAL AGE

Vol. 4 NEW YORK, SEPTEMBER 27, 1913 No. 13

Has it ever occurred to you that in these days of dawning in efficiency organization and safety first, many coal officials fail to scrutinize the warp and woof in the fabric of their mining operations? These same individuals regale themselves in wordy talks on economy, hold up their hands in holy horror at the semblance of an excessive "first cost" when purchasing, yet fail to extract efficient service from the material they buy.

Should we classify this personal quality as a human frailty? Perhaps, but let us look still farther.

"Safety first" flashes across your mental vision by instinct as the first and last care of operation. The efficiency of the workman holds, logically, the next place in your thought. On the heels of this comes the necessary balancing of cautious purchases with the careful attention to the service rendered by the material. Yes, *careful attention* is right.

Can you, Messrs. Manager and Superintendent, be candid with yourselves in answering the next two questions?

Have you steel rail, compressed-air or water pipe, electric wire or anything else in your abandoned workings which is still available for use in some other part of your mine? Have you thought of that, or are you merely putting off the utilization of this second-hand material until "tomorrow"?

Without casting reflections, grant that you have these materials in accessible but worked-out rooms. Still further, for the sake of discussion, admit that these materials (partly used) have not been reclaimed because of the oversight of an inside boss. Again, since neither you nor the engineers ever wander through these abandoned workings, you know nothing of the conditions there and hence cannot order an adjustment.

Is this consistent with the extreme caution you exercised in purchasing this rail, pipe or what not? *Decidedly not.*

To bring out more clearly the inconsistency of this pseudo-economy, which saves at the spigot and wastes at the bunghole, let us review the following instance, which by the way is not an hypothesis.

A coal-mining company whose annual output is over two million tons, installed an electric power plant, to operate on the exhaust steam from noncondensing engines. The newly installed plant, which cost $70,000, enabled the operators to abandon the former electric plant whose annual operating cost was $15,000. This was consistent with efficient management and operation.

On the other hand, this same company has one 1000-ton mine with 3000 ft. of 3-in. compressed-air pipe, with half its use still available, lying in an old heading. In a second mine there are 30 idle-room switches and two miles of steel rail that has not outlived its usefulness. In yet another mine, electric cable and lighting wire hang on the timbers in old workings.

A rough estimate shows that the company loses between $500 and $1000 annually at each of ten mines. The reason is self evident.

It would cost this corporation five dollars per day to have one of its competent engineers make the rounds, and report possible economies to his general manager. Such a report, made once in 60 days, taking 10 days to cover 10 mines would cost $300 per year. The total resultant saving would vary between five and ten thousand dollars annually—a nice return on the $300 invested.

There are, of course, mines where the cost of labor in reclaiming material from old workings makes such a scheme impracticable; however, these instances are isolated exceptions to the general rule.

Nothing is more rare than consistency. Most of us practice economy upside down. In such matters we are generally ambidextrous, easily and heedlessly spending with our left hand what we save with our right. Sit a moment and think—

Are *you* saving at the spigot and wasting at the bunghole?

—Outlined by Newell G. Alford

Working Thick Highly Inclined Seams

By John E. Ambrose*

SYNOPSIS—Description of the general methods employed for working thick seams of coal on steep pitches, in Colorado and British Columbia.

⁂

The following description of the general method employed in working semibituminous and lignite coals in Colorado and used, also, extensively in British Columbia, is of particular interest in connection with all deep-pitching seams.

In most cases where this method is in use, the seam of coal pitches from 50 to 85 deg., or is practically vertical. If the location is favorable, a shaft or slope is sunk on the outcrop of the seam. This shaft or slope has generally three compartments; namely, two hoistways and a pumpway, which is used also for installing the electric wires supplying light and power to the mine. The shaft is sunk in the seam until it reaches a point where the latter dips away at a greater angle from the vertical. From this point the shaft is continued downward in the rock, until a certain required distance is attained for a lift of, say from 300 to 350 ft. Here, a tunnel is driven wide enough to afford ample room for the handling of the coal, at the landing.

This tunnel is driven over to strike the seam of coal and will vary in length, according to the depth of the shaft and the pitch of the seam. Gangways are then turned to the right and left, on the strike of the seam, and should be of sufficient size to handle a good car with ease and safety. These gangways are pushed ahead to insure a quick development of the mine. They should be given a grade of one-half of 1 per cent., or about 6 in. per hundred feet, in favor of the loaded cars.

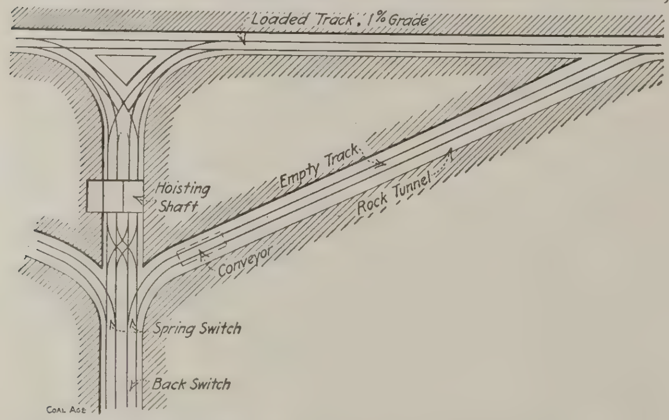


Fig. 1. Proposed Plan for Loaded and Empty Tracks at Landings Underground

Another force of men can be put to work, at the mouth of the tunnel, where it strikes the seam, to widen out the gangway, to accommodate two tracks. These sidings built at the mouth of each gangway should be long enough to hold about 100 loaded cars, on each side of the tunnel. Long collars should be used of sufficient size and strength to withstand the top pressure, so that there will be no necessity for center posts, as these are always a source of danger both to drivers and others who are handling the coal, on the sidings or making up trips. Unless the conditions prevent it, steel I-beams should be used instead of timber, for the collars. These should be supported on concrete walls. This arrangement would give more room, look 50 per cent. better, cause less risk from fire, and possess greater strength and durability.

As shown in Fig. 1, the empty cars are run off the cage to the back switch and then to a point on the cutoff marked "conveyor." This conveyor, which is kept constantly running, picks up the empty cars and carries them through the cutoff, or tunnel, shown driven through the rock on each side of the shaft. Where this cutoff meets the gangway, the cars are picked up by the motors and hauled to the face of the workings.

At the end of each siding, a sufficient barrier pillar should be left to protect the shaft in emergency. This pillar should vary in width according to the depth from the surface and the thickness of the seam of coal. Beyond this pillar the rooms should be turned on 80-ft. centers. Chutes *BB* are first driven up the pitch from the gangway to the air course above, a distance of about 50 ft., as illustrated in Fig. 2. The chutes are continued above the air course, a distance of about 20 ft., at which point the rooms *CC* are widened out on a 45-deg. angle, as shown in the figure, to a width of from 40 to 50 ft., depending on the condition of the roof and floor of the seam. In many cases a separate manway *AA* is driven the same distance, up the center of each pillar and branched to meet the manways in the rooms.

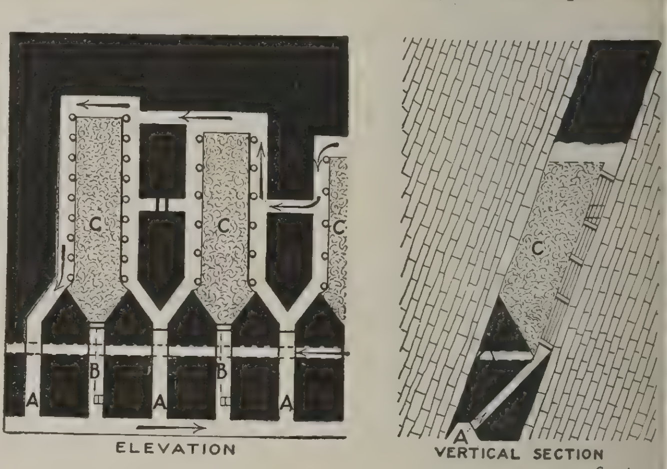


Fig. 2. Vertical Elevation and Cross-Section of Chambers and Chutes

The rooms are driven up the pitch of the seam, and a manway constructed on each side of the room. Crosscuts are driven in the pillars, at regular intervals, as shown in the figure, to conduct the air current from room to room, and cause it to sweep the working face better. The length of the rooms will depend upon the distance to the gangway above; but a chain pillar or barrier should be left, of sufficient strength to protect the upper gangway. This chain pillar will vary from 100 to 150 ft. in thickness.

It is common practice to drive the rooms up on a yardage basis, since the coal is stored in the chute in each room and is only drawn as required. The pillar separating the gangway and the air course above is about 50 ft. in width. The size of the air course is slightly less than that of the gangway, being 7 ft. collar, 10 ft. spread and 7 ft. clear headroom. The timber sets on both the gangway and the air course, are spaced 6 ft. centers and wedged or spragged at the top to prevent swinging. Good stout round lagging is used above the timbers.

---

*Mining Engineer, New Durham, N. J.

It is common, in deep-pitching seams, to drive the gangway and air course, as shown in the vertical section on the right, in Fig. 2, next to the top slate. This enables the loading chutes to be driven across the seam at a suitable angle for loading. By reducing the angle of the chute, in this manner, the coal is more easily controlled as it slides down the chutes to the cars. The manways on each side of the chute are from 7 to 8 ft. wide and furnish the means of ingress and egress to the working face. The system of ventilation generally adopted makes the hoisting shaft a downcast. Where the tunnel meets the gangway, the air current is divided, part going to the right and part to the left. The air follows the gangway to the face and returns through the rooms. In case of accident or fall of roof in one or more rooms, the air is conducted across the trouble, by means of the short "monkey airway" or crosscut connecting the room with the airway above the gangway.

⁂

Cost of Small Frame Buildings

The bills of material and costs of three frame buildings erected for a construction camp are of interest to the mining industry, since the buildings are of the type and description frequently found installed in small camps and remote properties. The buildings are described by Clark A. Bryan (*Eng. & Cont.*, July 2, 1913) as follows:

One building was used as a store and dining-room combined. It was 36x16 ft. in plan, built with a gabled roof 7 ft. 3 in. from the top of the floor to the top of the plates, with a total height of 11 ft. 9 in. There were two rooms, 11 ft. 6 in. and 24 ft. 6 in., respectively, the former used as the store. The sills were made of 4x6-in. lumber, the four corner posts and the intermediate posts, of which there were two on each of the long sides, of 3x4-in. material. These upright posts were all mortised into the plate, which was of 4x4-in. material. As an additional brace a piece of 2x4-in. was run completely around the building between the uprights, 3 ft. above the floor. The building was braced in the direction of its short dimension by running a piece of 2x4-in. material from the top of one of the intermediate posts to the top of the opposite post, these braces set flush with the top of the plate. The 2x4-in. rafters were nailed to the plate. There were 19 rafters on each side, 10 ft. long, overhanging the sides by about 8 in. A piece of 1x5-in. material was nailed over their ends as a sort of trim.

The 1x3-in. purlins were laid at right angles to the rafters and nailed to them; they were spaced 1 ft. 6 in. on centers. Corrugated-iron roofing, weighing 115 lb. per square, was nailed directly to the purlins. This provided plenty of ventilation, inasmuch as at the sides the building was not tightly sheathed. The 2x8-in. joists were 16 ft. long, notched 3 in. on the sills; they were spaced 1 ft. 6 in. A 1-in. floor was laid. The sides were of 1-in. rabbeted barn boards, 10 in. wide. The partition was of this same material. There were five windows, each 2 ft. 6 in. x 2 ft., with six lights. There were three doors, each 2 ft. 9 in. x 7 ft. Table I gives the bill of materials and cost of construction.

The building used for a bunk house was 14x50 ft. in plan, built with a shed roof. It was 9 ft. 6 in. high on the high side and 6 ft. 6 in. on the low side, divided into five compartments, each of which was designed to accommodate eight men. The sills were of 4x6-in. material; the corner post and the eight intermediate posts on the long side, of x4-in. material. The 2x4-in. plate was spiked to the top of the posts; the 3x4-in. by 16 ft. rafters were spaced 2 ft. and overhung the plate about 8 in., being spiked to the latter. The roofing and purlins were the same as in the other house. The bracing also was similar to that of the first house. The partitions were of barn boards, 6 ft. high. Each room had one door and two windows; against each side were two tiers of bunks ft. wide and 7 ft. long, the lower being 1 ft. above the floor, and the upper resting on the 2x4-in. brace which extended around the building. The bunks were supported at the center by means of a trestle built of 2x4-in. material, braced on the sides. Table II shows the material consumed and the cost of the building. The cooking shed consisted of four upright posts about 7 ft. high, supporting a corrugated-iron roof 12 ft. square. In Table III are given the material and cost of the shed.

TABLE I. COST OF DINING ROOM AND STORE

Items and Size	Rate	Cost
114 lin.ft. sills, 4x6 in.	$0.05	$5.70
100 lin.ft. posts, 3x4 in.	0.0275	2.75
16 lin.ft. frames for doors, etc., 3x4 in.	0.0275	0.56
104 lin.ft. plates, 4x4 in.	0.03	3.12
104 lin.ft. braces, 2x4 in.	0.015	1.56
32 lin.ft. braces at plate, 2x4 in.	0.015	0.48
380 lin.ft. rafters, 2x4 in.	0.015	5.70
432 lin.ft. purlins, 1x3 in.	0.005	2.16
144 lin.ft. ridge, 1x3 in.	0.005	0.72
36 lin.ft. ridge pole, 3x4 in.	0.0275	1.00
416 lin.ft. joists (26 pieces 16-ft.) 2x8 in.	0.028	11.70
576 sq.ft. flooring, 1-in.	0.025	14.40
782 sq.ft. barn boards in sides, 1x10 in.	0.025	19.55
72 sq.ft. barn boards in gables, 1x10 in.	0.03	2.16
150 sq.ft. barn boards in partition, 1x10 in.	0.025	3.75
40 lin.ft. tin ridge	0.06	2.40
5 windows (six 8x10-in. lights), 2 ft. 6 in. by 2 ft.	1.25	6.25
3 doors, 2 ft. 9 in. by 7 ft.	0.90	2.70
2 mess tables, 16 ft. by 3 ft.	2.50	5.00
4 benches, 18 ft	0.40	1.60
720 sq.ft. corrugated iron roof	0.046	33.12
90 lb. wire nails	0.035	3.15
7 lb. galvanized nails	0.06	0.42
3 pairs hinges (10-in. strap)	0.25	0.75
3 hooks and staples	0.05	0.15
2 hasps and staples	0.10	0.20
1 padlock	0.28	0.28
112 lin.ft. trim, 1x5 in.	0.035	3.92
Total cost of materials		$135.28
Labor—		
14 hr. foreman carpenter	$0.275	$3.85
66 hr. carpenter	0.22	14.52
41.5 hr. carpenter's helper	0.17	7.06
Total cost of labor		$ 25.45
Total cost of building		160.73

TABLE II. COST OF BUNK HOUSE

Items and Size	Rate	Cost
128 lin.ft. sills, 4x6 in.	$0.05	$6.40
93 lin.ft. posts, 3x4 in.	0.0275	2.56
65 lin.ft. frames for doors, etc., 3x4 in.	0.0275	1.78
132 lin.ft. plates, 2x4 in.	0.015	1.98
128 lin.ft. braces, 2x4 in.	0.015	1.92
224 lin.ft. braces at plate, 2x4 in.	0.015	3.36
416 lin.ft. rafters, 3x4 in.	0.0275	11.44
650 lin.ft. purlins, 1x3 in.	0.005	3.25
405 lin.ft. joists (27 pieces 16-ft.), 2x8 in.	0.028	11.34
75 lin.ft. braces foot of posts, 3x4 in.	0.0275	2.07
800 sq.ft. flooring, 1-in.	0.025	20.00
1000 sq.ft. barn boards in sides, 1x10 in.	0.025	25.00
336 sq.ft. barn boards in partitions, 1x10 in.	0.025	8.40
500 sq.ft. barn boards in bunks proper, 1x10 in.	0.025	12.50
60 lin.ft. 2x4-in. supports for bunks	0.015	0.90
50 lin.ft. braces, 2x4 in., for bunks	0.015	0.75
132 lin.ft. trim, 1x5 in.	0.035	4.62
10 windows (six 8x10-in. lights), 2 ft. 6 in. by 2 ft.	1.25	12.50
5 doors (2 ft. 9 ins. by 6 ft.)	0.54	2.70
800 sq.ft. corrugated iron roof	0.046	36.80
128 lb. wire nails	0.035	4.48
7 lb. galvanized nails	0.06	0.42
6 pairs hinges (8-in. strap)	0.18	1.08
6 pairs hooks and staples	0.05	0.30
6 pairs hasps and staples	0.10	0.60
Total cost of materials		$177.28
Labor—		
24 hours foreman carpenter	$0.275	$6.60
95 hours carpenter	0.22	20.90
34 hours carpenter helper	0.17	5.95
Total cost of labor		$33.45
Total cost of building		$210.73

TABLE III. COST OF COOK SHED

Items and Size	Rate	Cost
40 lin.ft. corner posts, 4x6 in.	$0.05	$2.00
Other lumber		1.00
144 sq.ft. corrugated iron roofing	0.046	6.63
Total cost of materials		$9.63
Labor—		
7 hr. carpenter	0.22	$1.54
Total cost of shed		$11.17

⁂

No Pennsylvania Report before 1914

The Annual Report of the Pennsylvania Department of Mines for 1912 will not be printed before some time in 1914. The reason for this is that they have a new state printer in Harrisburg and he is snowed under at present getting out this year's laws.

Submarine Coal Mining

By John E. Spicer*

SYNOPSIS—The necessary thickness of cover an important factor. The nature and thickness of the strata overlying the seam are determined by soundings and test holes put up in the roof of the mine. Faults and washouts a menace. Submarine mining in Nova Scotia, British Columbia and Great Britain.

⁂

The interest in the submarine mining of coal has greatly increased within the last few years. There is little doubt but that large areas of coal now lying under the sea will be worked in the near future. If these attempts are successful, the life of the coal industry will be greatly extended.

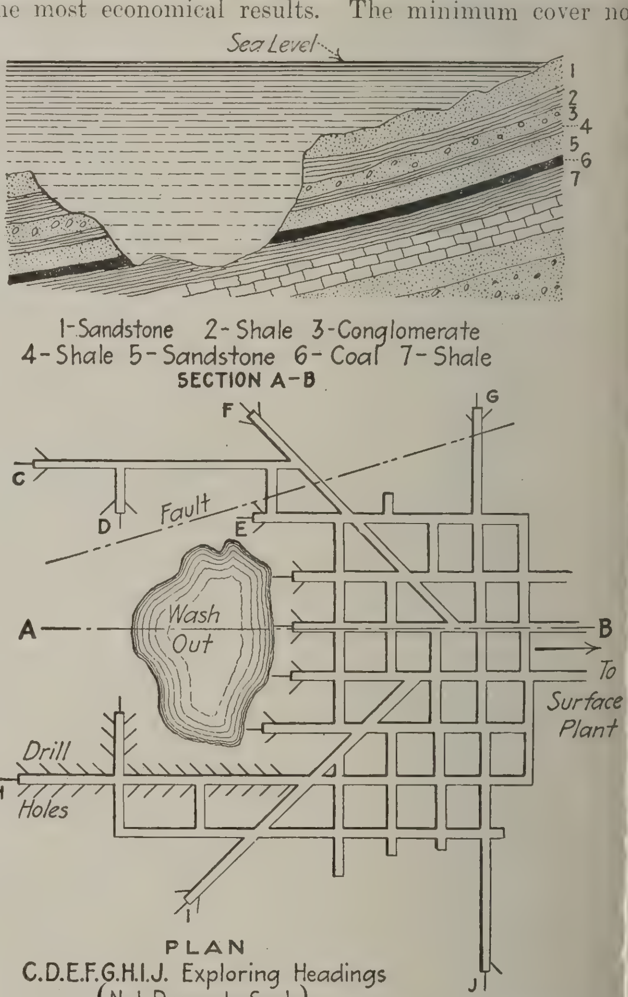
The opinions of mining men vary considerably on the question of the minimum cover that may be allowed with safety. This question assumes a very grave importance where it is desired to rob the pillars, or where the longwall method of working is adopted. A considerable loss of life and property has resulted, in the past, by the error of allowing an insufficient cover for the support of the ocean bed.

The sizes of pillars and openings that may be considered safe, in submarine mining, depend primarily on the character and thickness of the overlying strata which form the bed of the sea. The nature of the strata is of the greatest importance. The presence of beds of clay intervening between the water and the mine workings permits the work to be done with greater confidence under less cover than would be permissible in the case of alluvial or sandy deposits. A thick deposit of alluvium, forming the bed of the sea, often makes it difficult to ascertain the true thickness of solid cover overlying the coal. Beds of shale are better than sandrock but by no means as good as those of clay. The experience, in many collieries in Durham, England, where the coal has been worked under beds of magnesium limestone and other Permian strata, proves that the danger of working under these beds is practically as great as that arising from an insufficient cover, owing to the numerous washouts and solvent action of the water on these rocks.

It is customary, in submarine workings, to ascertain the thickness and character of the rocks overlying the seam, by means of soundings taken in the sea above, and by putting up drill holes in the roof strata below. The precaution is always taken, in submarine mining, of keeping a prospect or exploring heading well in advance of the other work. This heading is driven as narrow work, and a drill hole not less than 15 ft. in depth is kept in advance of the face of the heading. The purpose of this heading is not only to prospect the seam but to determine beforehand the possible presence of any faults in the strata, which are always a present danger in submarine mining. The heading also guards against the possible outcrop of the seam at the sea bed. The thickness of cover is carefully watched, in this heading, by test holes in the roof. The heading also affords protection against large washouts, or the filled-in beds of ancient lakes, rivers, etc.

The presence of faults is a continual menace to safety, in submarine mining; because the fault line affords a natural channel along which the water finds its way into the workings below. This is a common source of trouble in ordinary mining, but the danger is greatly increased when mining under the sea. The most common method to guard against danger from this source is to leave a barrier pillar of sufficient size on each side of the fault.

In Nova Scotia, there are important submarine workings, and this class of mining was made a subject of special legislation. The restrictions laid down were considered, a few years ago, too severe for accomplishing the most economical results. The minimum cover now allowed by law over all submarine workings is 180 ft., except for prospect headings, which cannot be driven under a cover less than 100 ft. The law provides that where the cover is less than 500 ft., these workings must be laid out in panels not greater than one-half mile on each side, the panels to be separated by a barrier of at least 90 ft. of solid coal, pierced by not more than three openings not exceeding 6x6 ft., each.



Ideal Plan and Vertical Section of Submarine Workings

Practically, the same restrictions are in force in British Columbia, where a minimum of 180 ft. of solid cover is required above the seam in all submarine workings, except for prospect headings driven in the solid coal, where the cover must not be less than 100 ft. unless expressly permitted by the chief mine inspector. The proposed stem of working must also be submitted to the chief spector for his approval, and cannot be altered without s permission. The mine plan must show the depth of lid cover at specified distances along all main roads and ound the working faces; and soundings must be taken reasonable distances and recorded on the plan; and hen required (if reasonably practicable) the depth of arine or alluvial deposits overlying the solid cover must so be determined.

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*Cumberland, B. C., Canada.

The question of minimum cover allowable when drawg pillars or working longwall is not easily determinble, even where the character of the strata is known; but uch valuable information may be obtained from workgs that lie under water-bearing strata.

There are many interesting instances of submarine orkings in Great Britain. Among these may be menioned the Whitehaven colliery, Cumberland, where the orkings of a 10-ft. seam have extended three miles nder the sea. In this colliery, the pillars are 60 ft. ide and the bords or chambers, are driven 18 ft. wide. n this case, the minimum cover under which the total xtraction of the pillars was allowed was 360 ft. Where he cover was less than this amount, only 50 per cent. f the coal was taken out, the remainder being left for he support of the roof.

The complete extraction of the coal by the longwall nethod, with well packed wastes, seems to be more reiable and afford greater protection than is possible when he pillars are drawn in bord-and-pillar work. The subidence of the roof is more gradual in the former case han in the latter; and, as a result, heavy fractures of the verlying strata are largely avoided. In any case, the nethod of working adopted must be determined by the revailing conditions; and the success of the operation vill depend largely on the care, foresight and good judgnent exercised by the management.

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A Tape-Repair Outfit for Field Use

A recent issue of the *Engineering and Mining Journal* gives the following illuminating description of an old, out none the less reliable and prompt method of repairng ribbon tapes:

> It seems not generally known among engineers that a teel tape can be mended quickly in the field by solderng the two ends together, and this repair is more permannt than the usual method of riveting. A riveted joint always as a lap which has a tendency to catch on every little proection over which the tape passes, and is usually soon ipped off. A much better joint can be made by soldering, specially on the narrow 300- and 500-ft. tapes, which are specially difficult to rivet. Directions for making a soldered oint are here given:
>
> First straighten out the rough ends of the break with pair of pliers and clean the ends of any rust or mud. A ittle rubbing with a piece of paper or a small stone will suffice. Then cut a sleeve of soft tin plate, the kind used or the inner seal of some coffee cans is handiest to work with, as it can be easily cut with ordinary scissors and ent into shape with the fingers. The sleeve should be bout an inch long and fitted to the tape, so that when olded down snugly the edges just come together. It is hen folded around one end of the broken tape. The other nd is then slipped into the sleeve just far enough to make he tape the proper length. This is determined with some ther part of the same tape. The sleeve is then clamped lown with the pliers to an almost snug fit, leaving just a ery small crack still open. The joint is now ready to be oldered. First run in some soldering compound, holding the oint with the pliers. Now hold the joint in the flame of a andle and drop a little solder on the crack in the sleeve. t will run around in the sleeve covering all the joint. The sleeve is now squeezed down tight with the pliers and the job is done. The tape may break again but rarely at one of these repaired joints.
>
> A repair outfit, consisting of a small piece of candle, a few inches of soft wire solder, which can be easily melted in the flame of the candle, an inch or so of stick soldering compound, such as electricians use, or a piece of resin, a piece of a tin can, a small pair of scissors and pliers to match, weighs less than a pound and can be carried in a 6-in. canvas sack, along with the regular field outfit. A broken tape can then be repaired in a few minutes right on the job.
>
> The writer once lost two days' time going to town to get a jeweler to rivet a tape, because he didn't know this simple scheme. He had been told "solder wouldn't hold" and believed it.

◆

A Coal-Buying Syndicate in the Philippines

According to the *Daily Consular and Trade Reports*, a coöperative coal-purchasing organization has been perfected in the Philippines for the purpose of reducing costs, both in buying and handling, and to assure an adequate supply of good-grade fuels being always on hand. We quote from the report, in part, as follows:

> The organization includes the Government of the Philippines, the Philippine Railway Co., which operates various railways in the archipelago, the Manila Railway Co., which operates railways in the vicinity of Manila, and the Manila Electric Railway & Light Co. At present they use, respectively, 36,000 tons, 10,000 tons, 35,000 tons, and 40,000 tons, while the Compania General de Tobaccos uses 16,000 tons. The association is controlled by a board of five directors, of which two are chosen by the Governor General and the other three by other members of the association.
>
> The association has employed a coal expert, E. Randolph Hix, who is now making an investigation of the coal mines of China and Japan and who is also collecting data as to coal tests and coal consumption from the larger industrial concerns in Hongkong, Shanghai and Japanese cities. It is thought that the entire enterprise can be managed upon an expenditure of not over 15 centavos (7.5 cents gold) per ton. The concerns, already in the organization, including the government of the islands, but not the Navy Department, which is likely to be directly concerned in it, import about one-third of the total imports of coal into the archipelago. The imports of coal into the islands from all countries have increased from 295,648 metric tons in 1907 to 322,928 in 1908, 342,047 in 1909, 375,518 in 1910, 413,735 in 1911, and 436,687 in 1912—an average annual increase of about 8.5 per cent., representing steady industrial growth in the Philippines. The purchases of the Navy average about 82,000 tons additional.
>
> It is planned to purchase coal for the association as far as possible in a single contract for the purposes of securing the lowest possible price per unit for the fuel, regulating the arrival of colliers so that no two will be in the harbor at the same time, thus saving lighterage and stevedoring costs; and especially to purchase the coal only after exhaustive tests as to ash and calorific power and on the basis of a bonus for increased fuel efficiency in the fuel bought. The value of the combustible material in most coals purchased in the Philippines from China, Japan and Australia runs about the same, allowing for a variation of about 5 per cent., ranging from 7500 to 7900 heat units per kilo (2.2 lb.); but the amount of ash and moisture carried varies so greatly as to materially affect fuel costs. In a recent purchase by a large consumer in the islands it was found that coal in one pile averaged 10 per cent. more efficiency than that in another pile bought of the same parties from the same locality and for the same price. The association expects to buy its coal on the basis of a contract price for a standard number of heat units and percentage of ash, the price to be increased for an increased proportion of heat units and a reduced proportion of ash. or decreased with decreased units of heat and increased proportion of ash. It is to ascertain the best and most economical proportion of combustible material and ash for the best price among the coals reasonably available in this field that investigations are now being made.

◆

The original supply of coal in the states of Iowa and Missouri is estimated to have been respectively 29,160,000,000 short tons and 40,000,000,000 short tons. Of this amount 0.4 per cent. has been mined or wasted.

Coal Development in Nagasaki

According to U. S. consular reports, the mining industry in the Nagasaki district of Japan was extremely prosperous during the season of 1912. Coal operators, especially, had a busy year, and at times had difficulty in getting sufficient tonnage to make their foreign shipments, which go to Vladivostok, Siberia, and Bombay, India.

One of the largest coal companies here contracted for the delivery of 55,000 tons of coal to the Great India Peninsula Ry., at Bombay, and it is expected that a contract will be made to supply coal to the Central India Ry. This invasion of Indian markets by Japanese fuel in competition with the best Bengal coal has aroused much interest. The competition will probably be keen. It is reported that the Kiushu coal is as good as the best Bengal fuel, and as there is plenty of it, and freight rates are low, it is likely that it will continue to go to Indian markets. There is now a large and increasing demand for Japanese coal in Singapore, Penang, Colombo and Manila, and prices have advanced in consequence from 30 to 50 sen (15c. to 25c.) per ton.

As a consequence of the increased demand for Kiushu coal, many of the smaller mining concerns are being consolidated with the larger companies, and new machinery is being installed and the output increased. One of the largest of these companies to amalgamate with the Mitsui Bussan Kaisha, the largest coal operators in Japan, is the Matsushima Colliery, a new company being formed with a capital of $1,000,000, of which 60 per cent. was taken by the Mitsui Bussan Kaisha, and 40 per cent. retained by the former owners, the Koga family. The present output of this mine is 300,000 tons, but this is soon to be increased to 500,000 tons.

Another mine near Nagasaki called the Sakito Colliers Co., and owned by the Kiushu Coal & Steamship Co., has an annual output of 250,000 tons, which is to be increased shortly. All the output of this mine is contracted for by the Imperial Government Railways Board. This mine gives employment to 1223 miners and 454 artisans and other laborers, while the Matsushima mine employs 1675 miners. Both of these properties have modern American machinery, which was installed in 1912.

The island of Amakusa, off the southwest coast of Kiushu, and some 20 to 25 miles distant from Nagasaki, has a fair-sized area of anthracite, which hitherto has been worked only in a primitive way. The Daito Kogyo Kaisha, a Tokyo mining company, has a plan for the development of the Shiki collieries of this field, and claims that, by the introduction of modern machinery, the daily capacity of 250 tons can be increased to 1000 tons, as the field is extensive. The coal seams run under the sea some distance, and the pits are only three miles from the port of Tomioka, Amakusa Island, with a light railway making connection between the mines and the port. It is proposed to increase the capital stock to $500,000 in the reorganization and development scheme.

The coke plant of the Mitsui Bussan Kaisha, at its coal mines at Miike, has been very successful, and it is planned to establish similar plants at other mines to make use of the coal dust for coke and byproducts. The capacity of the Miike coke plant is 300 tons of coal dust at each charge, and the time of coking is 26 hours.

Kentucky's Coal Production

The State of Kentucky in 1912, according to E. W Parker, of the U. S. Geological Survey, produced 16,490,521 short tons of coal. This was an increase of 2,440,818 tons over the figures for 1911 and nearly 2,000,000 tons over the former maximum output of 1910 There was also an increase in value in 1912 of $2,845,749 over the figures for 1911.

The number of men employed in the mines in 1912 was 24,304, and the average production per man was 678 tons. In 1912, 66 per cent. of the coal produced was machine mined. There were during the year 51 fatalities in and about the mines, 41 underground, 2 in shafts and 8 on the surface.

Kentucky is the only coal-producing state which has within its borders areas belonging to any two of the distinctly separate great coal fields. The eastern counties are underlain by the coal beds of the great Appalachian Mountain system, extending entirely across the state in a northeast-southwest direction, while the southern limits of the central or eastern interior coal fields, are found in the more northern counties of the western section.

The total area underlain by coal in the eastern counties of Kentucky is estimated at 10,270 square miles, and the coal-bearing areas in the western part of the state are estimated to contain 6400 square miles. Up to the close of 1911, the larger part of the production has been from the western district, but as a result of extensive developments in Harlan, Johnson, Letcher and Pike Counties, the larger part of the coal production in 1912 was from the eastern part of the state. The eastern Kentucky coals are mostly of the high-grade gas or coking varieties, with some cannel coal.

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Track Work in Mines

The *Engineering and Mining Journal* recently published the following interesting notes on track work in mines:

The illustrations on next page show some details of underground track work and one of the motor turns used in the mines of the Republic Iron & Steel Co., on the Mesabi range. Figs. 1 and 2 show a right and left turn. As a rule, the location of a turn is determined before the drift is driven and the necessary sets are put in place to make the turn when required. Props are placed under the ends of the two caps resting on the opening set until that turn is to be driven. A 9-ft. by 6-in. post is used under both of these caps and on either side the posts of each set are shortened six inches until an 8-ft. post is reached, which is the length of post used in motor drifts. When the opening set is placed in position, a point is placed on the set and on the 10-ft. by 9-in. set and with this line the rest of the turn is put in with the aid of the other dimensions shown. Figs. 3, 4 and 5 show the track layout and frog details used in connection with a 25-ft. radius timber turn. The frog is designed so that it can be used for either a right or left turn. The stub switch has given better satisfaction for underground work than the point switch. The latter caused considerable trouble by dirt getting between the wing rail and track, which interfered with its closing. Figs. 6 to 10, inclusive, showing details of switch stand and tie-rod connections, are self-explanatory.

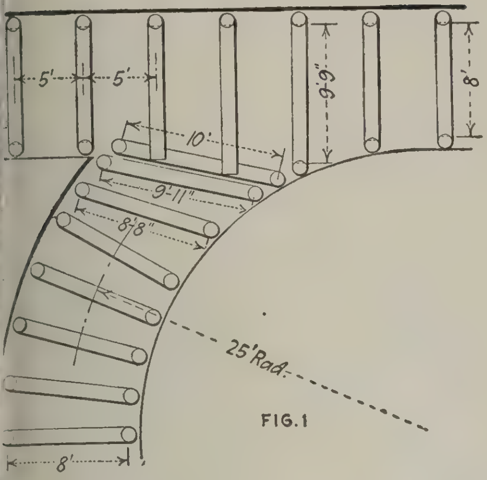


FIG. 1

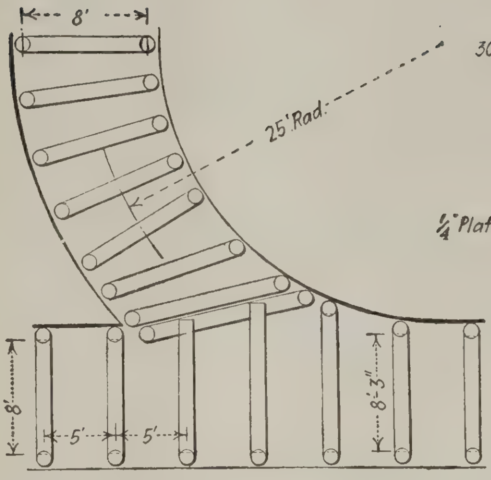


FIG. 2

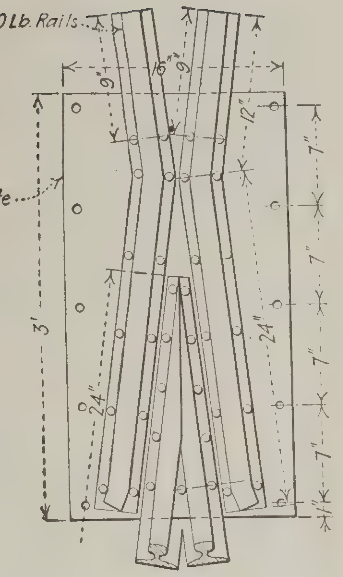


FIG. 3
RIGHT OR LEFT FROG

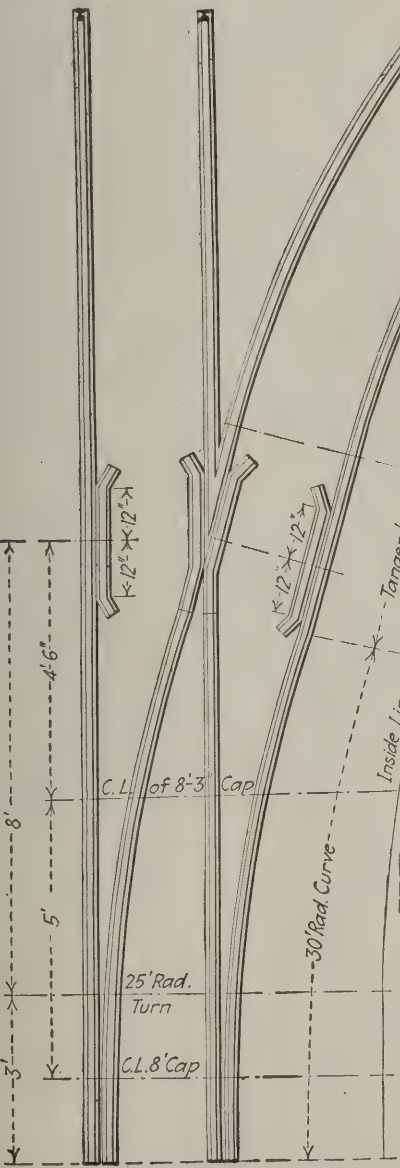


FIG. 4

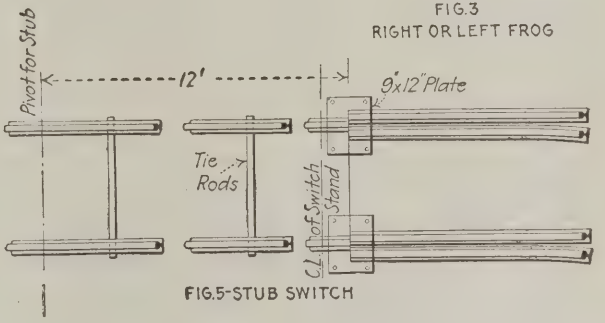
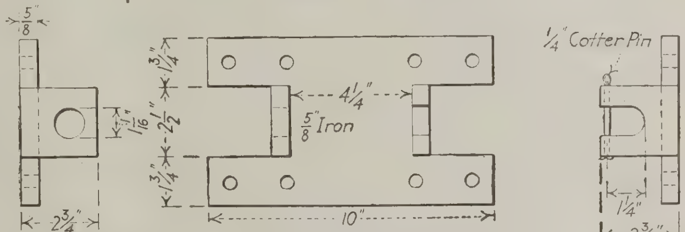


FIG. 5—STUB SWITCH



END FIG. 6—SWITCH STAND (TOP) END

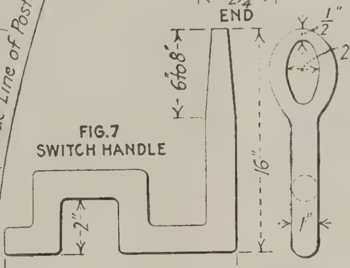


FIG. 7
SWITCH HANDLE

FIG. 7

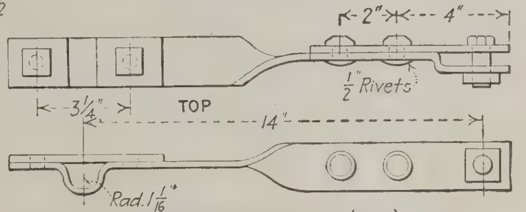


FIG. 8—CONNECTING ROD (SIDE)

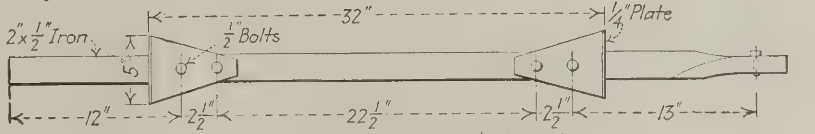


FIG. 9—TIE ROD FOR POINT SWITCH (36" GAGE)

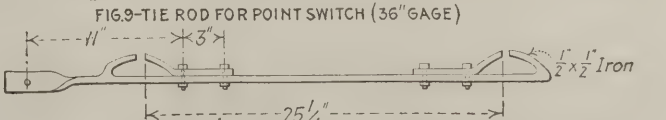


FIG. 10—TIE ROD FOR STUB SWITCH (24" GAGE)

ENG. & MIN. JOURNAL

Turnouts Used in a Minnesota Mine

Record Coal Output of Pennsylvania

The output of bituminous coal in Pennsylvania, according to E. W. Parker of the U. S. Geological Survey, established a new record in 1912 and exceeded the previous maximum of 1910 by 11,343,964 short tons in quantity and by $16,340,987 in value.

The production decreased from 150,521,526 short tons valued at $153,029,510 in 1910 to 144,561,257 tons valued at $146,154,952 in 1911, the smaller production being accompanied by a slight decline in price. In 1912 prices were somewhat improved and the production increased to 161,865,488 short tons valued at $169,370,497. The gain in quantity in 1912 over 1911 was 17,304,231 tons, or nearly 12 per cent. The increase in value was $23,215,545, or 16 per cent.

Production increased generally throughout the state, eighteen of the twenty-three counties showing gain, but, as previously stated, by far the greatest increases were in the two counties named. Fayette County showed a gain of 5,756,405 tons and Westmoreland a gain of 6,487,354 tons. The combined production of these two counties in 1912 was 62,956,116 short tons, which exceeded the entire production of Illinois, the third coal-producing state, and was equal to 94 per cent. of the production of West Virginia.

No less notable than the increase in production in 1912 was the extension of the use of mining machinery and a larger tonnage of machine-mined coal. In 1911, the quantity of coal mined by machines was 69,131,923 short tons, or 47.78 per cent. of the total. In 1912, the quantity so mined was 82,192,042 tons or 50.8 per cent. of the total. The number of machines in use in 1912 was 6176 against 5719 in 1911.

Pennsylvania, like West Virginia, presents a commendable record in the small percentage of bituminous coal improperly mined. Of the total production in 1912 only 4,801,784 short tons, or approximately 3 per cent., were reported as being shot off the solid. The quantity reported as mined by hand was 54,545,218 tons, which added to the machine-mined tonnage makes a total of 136,737,260 tons, or 84½ per cent. of the entire production that was undercut, sheared or otherwise mined before being shot or wedged down. The quantity produced in 1912 for which the methods of mining were not reported was 20,326,444, or 12½ per cent. of the total.

Very little of the bituminous coal produced in Pennsylvania is washed before being sold or used in the manufacture of coke. The quantity washed in 1912 was 4,819,330 tons, or 3 per cent. of the total. It yielded 4,326,162 tons of clean coal and 493,168 tons of refuse.

The statistics, compiled by the U. S. Bureau of Mines, show that 437 men were killed in and about the bituminous coal mines of Pennsylvania in 1912, a decrease of 92 from 1911 when there were 529 fatalities.

⁂

A New Mammoth Breaker

Not content with the largest and most uptodate breaker in the anthracite field, the Truesdale, the Lackawanna Coal Co. have begun excavations for the foundations of the Loomis breaker, which will surpass all previous attempts in breaker building. The structure, which will be a mammoth affair, will be built entirely of concrete, steel and glass. There will be no lumber used except in making the falsework necessary in the course of construction. The breaker is to be erected within 1000 ft. of the old Dundee shaft, which was abandoned about 50 years ago because of the inability to cope with the danger surrounding mining at that time. The fact that a new breaker is to be built in this location shows plainly the advance in coal-mining methods in a half century.

The contract was recently awarded to the Walter F. Gahagan Co., of New York. The breaker and washery from surface level to the top of the pocket line will be of reinforced concrete, and from the pockets to the roof structural steel inclosed by metal and glass. The work of excavation has already begun, and about a year will be required to complete the two buildings. Like the other Lackawanna collieries in the Nanticoke district the new plant will be operated by electricity furnished by the big Nanticoke power plant. When completed and in operation, the Loomis will give employment to about 2500 men, and will have a capacity of about 6000 tons of coal in nine hours.

Two shafts have already been sunk to the Hillman bed, a depth of 930 ft. below the surface. At the present time the Hillman and Mills seams are being worked. Plans for the sinking of an additional shaft 14x53 ft. 4 in., and about 900 ft. deep, are now under consideration. This shaft will be sunk approximately 800 ft. east of the power plant and will open up virgin territory. The coal will be handled on the surface by 15-ton electric motors.

The old Dundee, which was sunk in 1851, and which for many years has been abandoned on account of the gas will soon be widened. Its present dimensions are 10x16 ft., with a depth of 810 ft. When the Dundee shaft was in operation there was no such machinery in the anthracite field as a ventilating fan. The shaft is to be extended to the Ross bed, which is about 1500 ft. below the surface, and will be increased in size to 14x43 ft. 3 in.

The steel headframes for Loomis shafts Nos. 1 and 2 are already on the ground, and preliminary work for their erection has been begun. A number of substantial buildings for the housing of engines, etc., erected of concrete and pressed brick are now completed. Two 34x48-in. Corliss-valve hoisting engines have been installed at these openings. They are the products of the Vulcan Iron Works, of Wilkes-Barre, and are equipped with all modern safety devices, such as steam brakes, steam reverse, Welsh overwind device, three throttle valves, one on the main steam line and one on each cylinder. In addition to the above, each cylinder has two relief valves under control of the engineer in case of emergency.

FULL ACCOUNTS OF THE DIFFERENT
MINE-SAFETY AND FIRST-AID MEETS
WHICH HAVE BEEN HELD IN VARIOUS
COAL FIELDS THIS
MONTH WILL APPEAR IN
OUR SPECIAL MINE-SAFETY NUMBER
NEXT WEEK,
OCT. 4.

Coal Shipping on the Great Lakes

YNOPSIS—A description of the harbors at Toledo and ilwaukee. Toledo is already an important shipping int for bituminous coal and now has improvements unr way that will give it the largest capacity of any of e loading ports. Milwaukee is the second largest reiving point and also has important reconstruction of its rbor facilities under consideration.

Toledo Harbor*

Following the completion of the new docks of the ocking Valley Railroad Co., in East Toledo, this city ill rank among the first ports on the lakes in the shipent of coal. Toledo is a natural distributing point for al coming from the South or Southeast for reshipent. It has an aggregate of 12 miles of dockage alady developed with an additional 35 miles of available cking sites. During the year of 1912, two million tons coal were shipped by vessel to up-lake ports, while six d a half million passed through Toledo by water and il together. All coal destined for Detroit vessels reshipped at this port.

Car Dump on the Hocking Docks at Toledo

Steamer "Champlin," 8500 Tons Capacity

Toledo has three large docks, the Hocking Valley, T. O. C., and the C. H. & D. The largest ore dock is that the C. H. & D.; it is built of concrete and is 1700 ft. ng and 433 ft. deep. It is equipped with two 15-ton ulett fast ore unloaders with a capacity for discharging 10,000-ton steamer in 10 hr. The C. H. & D. coal docks rank third in Toledo and have yard space for 3500 cars. These docks carry a stock of about 80,000 tons of coal and are among the most modern on the lakes.

Bituminous coal alone is handled at the Hocking Valley and T. & O. C. docks, which are splendidly equipped and have a 2500-car capacity. These docks have loading machinery with a capacity of 20,000 tons every 20 hours. The new Hocking Valley docks, now in course of construction, will be open for use, about June of next season, and will be equipped with more loading machinery than any port on the lakes. With the completion of these docks, which will be of concrete and equipped with every modern improvement known, Toledo will take precedence over all other ports as a coal center. All the Hocking Valley and Chesapeake & Ohio coal, which is now going to Sandusky and other points, will be diverted to Toledo, more than doubling the present tonnage. During last year, 1497 vessels arrived at Toledo and 1477 cleared.

Railroad Facilities at Toledo

The railroad shipping facilities here will also be further increased next season by the immense improvements being made at Air Line Junction by the New York Central lines. The yard capacity at that point is being increased to five times and additional shops will also add to the efficiency of the service. The value of this movement to the coal interests will be more apparent when it is understood that Detroit is extremely short of yard space and is in no position to increase its capacity, ow-

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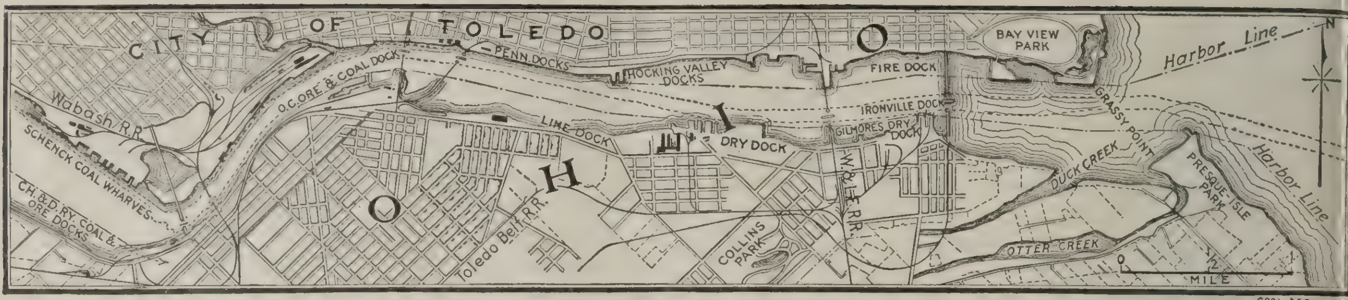
*By E. F. Baker, Nicholas Bldg., Toledo, Ohio.



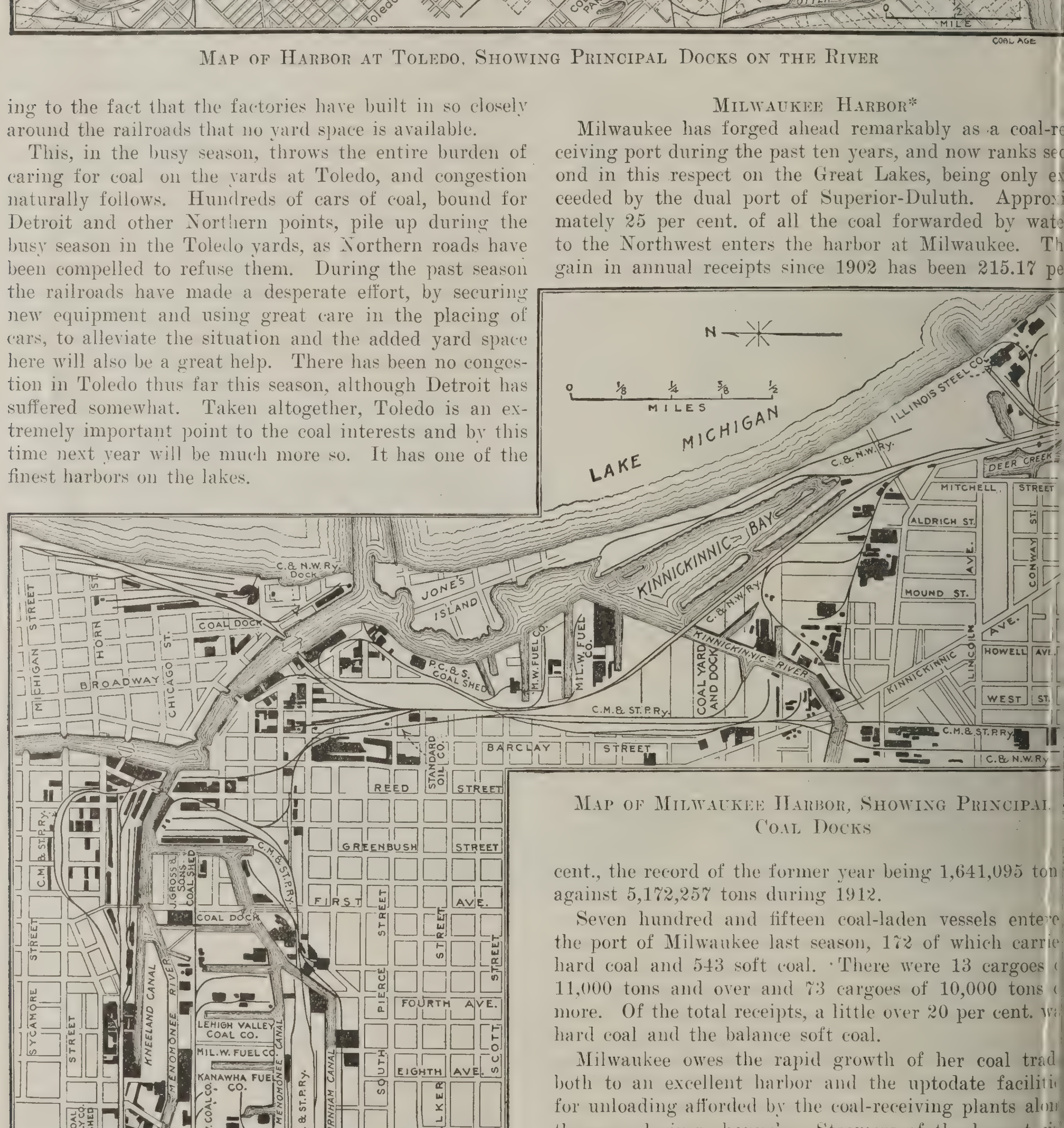
Map of Harbor at Toledo, Showing Principal Docks on the River

ing to the fact that the factories have built in so closely around the railroads that no yard space is available.

This, in the busy season, throws the entire burden of caring for coal on the yards at Toledo, and congestion naturally follows. Hundreds of cars of coal, bound for Detroit and other Northern points, pile up during the busy season in the Toledo yards, as Northern roads have been compelled to refuse them. During the past season the railroads have made a desperate effort, by securing new equipment and using great care in the placing of cars, to alleviate the situation and the added yard space here will also be a great help. There has been no congestion in Toledo thus far this season, although Detroit has suffered somewhat. Taken altogether, Toledo is an extremely important point to the coal interests and by this time next year will be much more so. It has one of the finest harbors on the lakes.

Milwaukee Harbor*

Milwaukee has forged ahead remarkably as a coal-r ceiving port during the past ten years, and now ranks se ond in this respect on the Great Lakes, being only e ceeded by the dual port of Superior-Duluth. Appro mately 25 per cent. of all the coal forwarded by wate to the Northwest enters the harbor at Milwaukee. Th gain in annual receipts since 1902 has been 215.17 pe cent., the record of the former year being 1,641,095 ton against 5,172,257 tons during 1912.



Map of Milwaukee Harbor, Showing Principal Coal Docks

Seven hundred and fifteen coal-laden vessels ente the port of Milwaukee last season, 172 of which carri hard coal and 543 soft coal. There were 13 cargoes 11,000 tons and over and 73 cargoes of 10,000 tons more. Of the total receipts, a little over 20 per cent. w hard coal and the balance soft coal.

Milwaukee owes the rapid growth of her coal trad both to an excellent harbor and the uptodate faciliti for unloading afforded by the coal-receiving plants alo the several river channels. Steamers of the largest si are able to deliver cargoes at docks fully two miles fro the harbor entrance, and, as a rule, these docks a equipped with coal-handling machinery of the most mo ern type, one dock having an unloading capacity of 10,5 tons in ten hours.

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*By Herman Bleyer, Milwaukee Press Club, Milwauke Wis.

Proposed New Docks at Toledo

There are 27 coal-receiving plants along the three rivrs and tributary canals which comprise Milwaukee's ommercial harbor, with a combined storage capacity of lose to 3,000,000 tons. Four of these are private plants onnected with local industries. The others do a local nd trans-shipping trade. Of the private plants, the argest receives 60,000 tons per season. The fact that everal of the leading yards are enlarging and improving heir facilities indicates that those engaged in the trade ave confidence in its stability and future growth.

The matter of providing more river territory, to accommodate the increasing coal trade, is now receiving the ttention of the Harbor Commission, which has recommended that the city proceed at once with the development of the Kinnickinnic Basin and Kinnickinnic River. With the completion of a proposed inner basin behind what is known as "Jones Island," near the harbor entrance, Milwaukee will be able to accommodate from 50 to 60 loaded vessels of the largest class with mooring places for the winter; it will thus add to the coal-storage capacity of the port and make it an object for vessel-owners to send their craft to Milwaukee with coal cargoes on the last run of the season. The absence of mooring room has been detrimental to Milwaukee's receipts at the close of navigation, but the proposed improvement will remove this objection and enable shippers to order coal in quantities far beyond the maximum storage capacity of their yards.

Pittsburgh Coal Co.'s Loader at Fairport, Ohio

Milwaukee is an extensive manufacturing center and consequently is a heavy consumer of steam fuel, while several surburban industrial points also draw heavily upon the coal supply. These facts, together with a large coke- and coal-product plant, which requires about 1,000,000 tons of soft coal annually, makes Milwaukee a consumer of coal to the extent of about 50 per cent. of the total receipts. The remainder is forwarded to points in the interior. The plant alluded to is now erecting an auxiliary establishment at Mayville, Wis., the raw product for which will have to be received at Milwaukee and transferred by rail. This will increase the receipts at that particular dock in the course of a season to nearly half a million tons.

Shippers and dealers report a satisfactory condition of trade, especially in the shipping territory. The consuming area is steadily increasing and orders indicate that buyers intend to be well supplied for the winter.

Freighter "Ontario" in the Canadian "Soo"

The movement is good for the season of the year and it promises to outstrip all previous records by a million tons or more. Between the first of January and the first of September, the gain in receipts over last year aggregates something like 850,000 tons. Even if this high rate of increase is not fully maintained during the balance of the season, it is reasonable to expect that Milwaukee's coal receipts by lake during 1913 will reach the 6,000,000-ton mark.

COLLIERY NOTES

To clean badly rusted steel tapes, use a mixture of lubricating oil and cement. Do not rub too hard.

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An open light should not be taken by the fireboss on his rounds; and to avoid suspicion, the fireboss should wear a cap or hat on which it is impossible to hang the ordinary open miner's lamp.

⁂

As far as possible, the use of continuous currents in mines employing over 50 men should be avoided, as not only are the men compelled to breathe impure air by this system, but any fire occuring on the intake would send its smoke all over the mine.

⁂

Generally speaking, it is advisable to ventilate the old and abandoned workings. When it is not done, the only proper alternative is to surround the old workings with solid fireproof dams, that is, heavy permanent stoppings of masonry, brick, concrete or other fireproof construction.

⁂

The practice of having other engines, such as electric pumping, haulage, etc., in the same engine house with the hoisting engine is responsible for many hoisting accidents, as the noise of the other engines make it exceedingly difficult, if not impossible, for the engineer to hear and attend to the signals properly.

An Analysis of the Coal-Car Situation

Compiled by A. T. Shurick

SYNOPSIS—The beginning of the crop movement and the opening up of the winter coal trade throws the maximum load of the season on the railroads at about this time. Car supply, therefore, becomes an item of serious moment to the producers. A review of the outlook is presented here, together with comments from officials of the leading coal roads. Indications point to a relatively easy situation this year.

⁂

With the nearer approach of the customary car-shortage season, coal operators are naturally interested in what the indications are for this year. It might be well to state here that any prophecies in this connection are subject to impending developments, and furthermore that all the information available in regard to this subject is of a more or less contradictory nature. The most reliable information is, of course, obtained from a study of railroad statistics with special reference to expenditures for additional equipment and motive power, as well as grade elimination, improvement in terminal facilities, etc.

A comparative statement of such data with previous years forms the best available index to the position of the road. The only remaining unknown quantities in the equation are the weather conditions and the increase or decrease in tonnage to be handled.

The Situation in General

The latest accurate statistics regarding equipment and motive power for the entire country are those of the Interstate Commerce Commission recently made public. Unfortunately these are more than a year behind as of June 30, 1912; however, a review of the situation on that date presents some interesting features.

At that time there were a total of 2,368,658 cars on all the roads of the country, this being an increase of only about 25,000 over the statement for the previous year. It is thus obvious that buying new equipment was rigidly curtailed over that period, but such has not been the case during the past year, as will be noted when the statistics become available. Of this gross number of cars in service on June 30, 1912, 2,203,108 were freight cars, 852,720 of these being coal cars. The gross number of locomotives in service on this date was 61,250, of which 36,600 were freight and 9465 switch engines.

The opinion of the average railroad man on the situation appears to be that the deficiency in equipment will be no worse this season than last. The reason most generally advanced for this belief is the broad campaign which manufacturers' associations and civic bodies have conducted and by which shippers and consignees have been impressed with the necessity of rapid loading and unloading of cars. It is interesting to note in this connection that the average trip of freight cars is 14.9 days, during which time the shipper has the use of the car 5.74 days, or about 37 per cent. of the time. This, of course, involves a tremendous loss, which may be materially reduced by coöperation on the part of the shippers.

The Sunset-Central lines, of the Southern Pacific Co., issued an instructive circular offering suggestions for facilitating the movement of freight, which we quote as follows:

> **1.** By giving as much advance notice as possible of your requirements. If there is no suitable car on hand, opportunity should be given to secure it from another point.
>
> **2.** By calling on the agent for his approval before reloading cars made empty on your tracks. Such cars may or may not properly be used in the direction you desire, and their misuse may necessitate transfer of freight, with consequent delay to your shipment.
>
> **3.** By loading cars to the greatest possible percentage of their capacity, and by using your efforts with your customers to induce them to place orders for full car loads. If you use two cars to handle the load of one, you reduce the supply 50 per cent.
>
> **4.** By regulating, so far as possible, your inbound shipments so as to avoid receipt of cars in excess of your ability to promptly unload. Congestions which delay your freight and hurt your business are almost always caused by over-shipments. The effect on the car supply is also obvious.
>
> **5.** By calling the agent's personal attention at once to any condition which retards the loading or release of cars and which it may be in the power of these lines to correct. Our own deficiencies in facilities or service may be chargeable with a detention for which you are being held responsible.

Orders placed by railroads for new freight equipment during the year have exceeded those for any previous year. The number of new freight cars ordered in this country, Canada and Mexico during the year 1912 aggregated 226,195, or nearly twice that of the previous year. Only in two past years has this been exceeded, that is in 1905 and 1906, when the equipment orders were 341,315 and 310,315, respectively. The following table shows the number of freight cars ordered during each year since 1901:

Year	Cars	Year	Cars	Year	Cars
1901	193,439	1905	341,315	1909	189,360
1902	195,248	1906	310,315	1910	141,204
1903	108,936	1907	151,711	1911	133,117
1904	136,561	1908	52,669	1912	226,195

Statement of the American Railway Association

In a review of the situation by the general agent of this association, in *The Railway Age Gazette,* he says:

> First, let us ask: What is a car shortage? Is it necessarily a lack of cars? The answer to this, of course, is "No." We have enough cars if we can move them faster. To avoid a car shortage, then, we need either more cars or more movement, and it will be better if we can have both more cars and more movement.
>
> As to the cars, the answer is easy. Last year the roads built 150,000 new freight cars, and this year they are nearly 10,000 cars ahead of their last year's record. Something is being done in this line. What do we mean when we say the movement can be improved? Do we mean that our freight trains ought to be run faster? Any railroad man will tell you no—that to run freight trains faster is not the best way to secure a better movement. He will explain that the freight car is in motion only a small fraction of the time, and that what is needed is more movement of the kind we have now, and not faster movement.
>
> The usual arrangement with train employees is that they are to be paid overtime when the freight train makes less than ten miles an hour. This ten miles an hour is generally accepted as a proper movement for a freight car. At this rate our freight cars in the fiscal year 1910 were in motion one-tenth of the time, and in our record months they were in motion about one-ninth of the time. Certainly there is a chance for more movement of a vehicle which stands still eight hours for every hour it is in motion.
>
> Let us consider who is responsible for car delay. This responsibility is divided between the public and the railroad. Delay by shipper and receiver should be adequately taken care of by demurrage rules, and there is a general impression that on the whole there is less delay by the public than there used to be. Unfortunately, there are no statistics by which this can be proved. The only information which covers the whole of the country is a figure given by the Interstate Commerce Commission of $7,764,964 demurrage collected by the railways in the fiscal year 1911.

We cannot, therefore, tell how much the shippers and re-ivers should help us, but we shall know more on this point the future. Certainly, some of the shippers and receivers ade great efforts to secure prompt handling of cars during e car shortage last fall and winter, and we trust they will ntinue these efforts even more successfully this year.

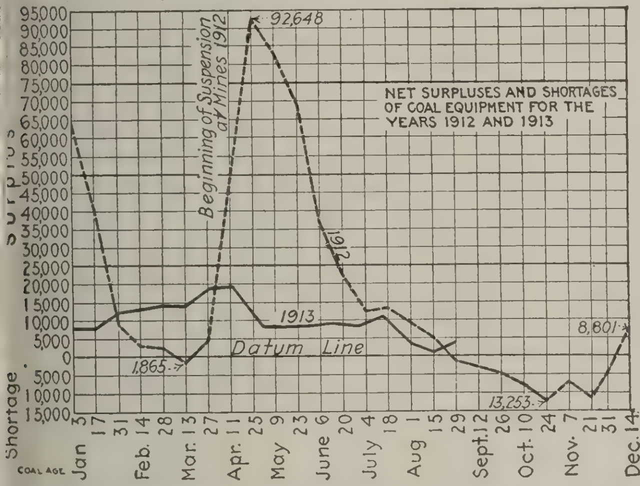
Now, as to delay by railroads, and in this delay I will in-ude shifting movements. As stated above, the railways do t credit themselves with any mileage on account of these ifting movements, and usually the time occupied in a switch ovement is much less than the time in which a car stands vaiting such a movement. Delays by railroads appear to be vided into four kinds—delays enroute, delays in yards, de-ys in shops, and delays in storage, and by this last word torage" I mean the holding of all available cars for which ere is no immediate prospective loading.

The bulk of delay in periods of shortage is to cars stand-g in yards awaiting movement. This includes both loaded id empty cars. There are cars delayed in this way waiting go into shops and coming out of shops; cars awaiting de-very to connections, and awaiting movement from inter-iange tracks, and lastly, and this is probably the most im-ortant item, there is a great total of cars, loaded and empty, vaiting road movement, some in terminals and others in irds where engines are changed.

Chesapeake & Ohio Railway

Vice-President M. J. Caples, of the Chesapeake & Ohio 'stem, sums up the car situation on his line as follows:

Considering the financial conditions prevailing through-ıt the country during the past year, this company has nade liberal appropriations for the purchase of coal quipment, motive power, passing and yard tracks and for ın additional coaling pier at Newport News, Va. There ıas been put into service 37 Mallet locomotives, having ı tractive power of 82,000 lb. each, and 26 Mikado loco-notives having a tractive power of 60,800 lb. each. The 'ollowing is a comparative statement of our coal equip-nent and motive power for this year and last year:



ᴾʀᴏꜰɪʟᴇ Showing Fluctuations in Car Supply for the Last Two Years

	1913	1912	Increase
Number of coal cars............	34,068	32,827	1,241 (3.8%)
Capacity of coal cars (tons).......	1,661,755	1,545,540	116,215 (7.5%)
Number of freight and switching locomotives..................	690	667	23 (3.4%)
Tractive power of freight and switching locomotives (lb.)	28,695,804	24,730,894	3,964,910(16.0%)

The condition of our equipment compares favorably with that of a year ago, and with the new cars received and others still coming, we should be able to take care of the shippers on our line. In addition to this, an expenditure of about three-quarters of a million dollars has been authorized for additional passing and yard tracks which will also tend to facilitate the movement.

At Newport News we are constructing a coal pier which, when completed, will be one of the largest and most modern on the Atlantic Coast. It will be 1200 ft. in length, 70 ft. in width at the water line, and 90 ft. high above high water. There will be 33 pockets on each side of the pier, each having a capacity of 100 tons, and the pier will be capable of handling 72,000 tons per 24 hr. continuous running. This pier is to be completed early in 1914.

The Norfolk & Western Railroad

D. E. Spangler, superintendent of transportation of this road, has furnished us with the folowing information regarding the situation on his line:

It is difficult to forecast the probable future car supply much beyond the immediate present. With us much of the coal produced on our lines is marketed at different points on other roads. While we have a very large coal equipment, which has been materially increased during the past summer, and to which further substantial additions will be made before the end of the year, we are nevertheless dependent for a full working supply upon the rapidity with which cars are released and returned.

In the fall there is always an appreciable slowing up in the movement of both loaded and empty cars on the Western lines, to which territory the greater portion of our coal goes; the promptness with which the cars are returned depends largely upon weather conditions.

Generally speaking, the Norfolk & Western is well equipped to render prompt service, and with reasonably quick handling on the part of the shipping public and connecting lines, it is felt that this road can provide a good working supply of cars throughout the fall. However, in view of the interruptions to service which the several roads are liable to be subjected to during the winter, and which cannot be avoided, coal consumers should, for their own protection, stock a reasonable tonnage during the summer and fall months. As compared with the increase in coal production, it will be seen that the additions to equipment have been quite liberal, particularly when it is considered that during some of the years practically a full supply of cars was furnished throughout the 12 months.

The increase in the tractive power of our freight engines during the past year has been 14.2 per cent., as compared with 1912, and 36.2 per cent. as compared with 1909. The additions to the coal-car equipment during the current year show an increase of 16.3 per cent. as compared with 1912, and 70 per cent. as compared with 1909. The increase in motive power and car equipment is in direct proportion, it being the policy of the management to do this in order to provide ample power to dispatch promptly all available equipment.

The following improvements and additions have been made or will be completed during the current year: 78 miles of second track; 19 miles of passing track; 25 miles of yard track; a new coal pier at Lambert Point, and numerous shop additions.

The condition of car equipment and motive power is as good as heretofore. The percentage of cars out of service, owing to being out of order, rarely exceeds 5 per cent., and the number of locomotives out of service on that account seldom exceed 10 per cent.

COMPARISON OF LOCOMOTIVE AND COAL-CAR EQUIPMENTS

Year	Freight Engines		Coal Cars	
	Number	Tractive Power	Number	Capacity
1909..................	844	27,538,674	21,996	993,080
1912..................	890	32,840,725	29,175	1,451,690
1913..................	951	37,506,784	a34,914	1,688,254

(a) Includes new equipment to be delivered to Jan. 1, 1914.

It will be noted that the gross tractive power of the freight engines has been increased 36.2 per cent. since 1909, 14.2 per cent. of which has been added in the past year. The coal-car equipment has been increased 70 per cent. since 1909, the increase in the past year being 16.3 per cent.

STATEMENT OF COAL SHIPMENTS*

Year	Tonnage	Increase
1909	12,428,385	....
1910	15,783,219	27%
1911	17,424,434	10%
1912	22,028,726	26%
1913†	23,008,258	4%
1913 *vs.* 1909		85%

* For fiscal years ended June 30.
† Ohio flood curtailed output.

Baltimore & Ohio*

Officials of the Baltimore & Ohio R.R. report that the car-supply outlook for the fall is encouraging and that unless there are extraordinary increases in the volume of business, the requirements will be met more satisfactorily this year than for several seasons.

It is explained in this connection, that with the large purchases of equipment made during the last two or three years, the rolling stock of the company is in good shape to move the fall traffic. The equipment purchased by the road during the last three years includes 25,000 freight cars and 600 locomotives. Most of the motive power bought was for freight service.

Liberal allowances for maintenance of equipment were made during the last fiscal year, the expenditures having amounted to $18,400,000. During the closing months of the fiscal year, the shops were kept on full time repairing the equipment and it was not until recently that the scale was put back to normal.

The most serious shortages in freight equipment occurs in coal cars and box cars, but no unusual concern is felt in respect to this. It is possible, however, that for a period the coal cars may be supplied on a percentage basis, but it is not expected that such practice will be necessary for an extended time.

New regulations covering the distribution of coal cars were recently issued to shippers by the transportation department and became effective Aug. 1. During extended periods of full car supply, all mines are given up to their orders as far as possible to do so, provided such cars are promptly loaded and consigned. Mine ratings for each operator are based upon the calendar month showing the highest average daily shipments of all mines of such operator during twelve consecutive months ending with the last month for which shipment figures are available. Ratings are revised each month. If the average daily shipments of any subsequent month exceed those of the highest month for which shipment figures are available, shipments of such subsequent month are the rating. Established rating of a mine is the basis for car distribution. Cars are pro-rated on a tonnage basis with a 50-ton car as a unit. One 50-ton car is counted as one car; one 40-ton car, one 30-ton car and one 25-ton car are counted as eight-tenths, six-tenths and five-tenths of a car, respectively.

For several months past, the transportation department, under the direction of C. C. Riley, general superintendent of transportation, has made a scientific study of the car-supply situation. A corps of transportation experts have studied the road's problems with effectual results, and the expectations are that there will be a saving of several thousand cars during the present season. The studies embrace a careful examination of the method of loading freight, selection of proper cars, packing shipments to prevent loss and damage and the expediting of cars through classification terminals and in the yards.

New York Central Lines

H. J. Merrick, general superintendent of freight transportation, says under date of Aug. 19, 1913: It is a hard matter to anticipate the car supply, months ahead, as so many conditions enter into the problem. It is my thought, however, that the New York Central Lines will have a better supply of equipment than last fall. Everything points to that end, owing to increased equipment and more of our cars on home lines, which was largely brought about by an agreement between the lines in the West, not to misuse open-car equipment, but return them home empty or loaded. So far this year, our mines have had practically 100 per cent. supply of cars, with largely increased production.

There will, without question, be some shortage the last three months of the Lake season, as in previous years. It is my opinion, however, that under normal conditions our coal-car supply will be better than last or previous years.

Illinois Central R.R.*

There has been a steady movement of coal from the Illinois fields throughout the summer and some sections have shown a fair increase in the tonnage as compared with last year. The indications for the coming fall and winter are for a volume of business equal, at least, to last year, with some signs pointing to increased demand for certain grades, on account of the diversion of some Eastern coals to other markets, creating advanced prices in the West and perhaps for other reasons.

The amount of domestic coal stored by dealers during July and August has been no greater than in former years, and as compared with some, is actually less. Warnings were sent out by the mine operators and railroads and suggestions made to the retail trade and others during the spring and early summer to store as much as possible, but the effect has not been very noticeable. One reason for this may rest in the scarcity and high cost of labor for unloading.

Consumers of steam coal, as a class, do not seem to have grown any more provident, in the direction of insuring against irregularity in the operation of their plants, due interruptions to, and difficulties of transportation as a result of winter weather. It is the same in all localities, including even public service corporations and institutions and buildings that must keep up a steady and continuous fire, or run the risk of financial loss and bodily discomfort for many people. It is rather surprising but none the less true that there are numberless plants that expect the carriers to deliver the daily requirement of fuel with the same regularity with which the dairyman each morning deposits the bottle of milk on the kitchen doorstep, and this regardless of weather conditions, or other difficulties.

Many of the principal coal-originating roads have made material increases during the year, in their power, equip-ent and facilities for the handling of this traffic and nder the most unfavorable financial conditions that have btained in years. Notwithstanding this fact, however, real car shortage is not unexpected, and persons unamiliar with all the facts, may be inclined to blame the nitial carriers. It is also possible that under certain onditions a coal-car shortage may appear to exist, which s, to a large extent, fictitious.

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*By Hampton Baumgartner.

*By C. C. Cameron, Coal Traffic Manager, Illinois Central R.R.

The rating of mines for the purpose of car distribuion is based upon the hourly performance, which multilied by the number of hours in the working day, fixes he car capacity for which the mine may daily order quipment from the railroad. Mines served by two or nore roads are permitted to add 50 per cent. to this ratng, in ordering cars. It results, then, the potential ratng of the mines in a given field for a single day often xceeds the productive capacity for two days, or, in other vords, is beyond the real working capacity of the mines, y perhaps as much as 30 or 40 per cent. In case of evere weather, causing increased demand and higher rices, the mines will order their full rating, including hose which may have been shut down, or working part ime. When this occurs the railroad, while furnishing within, say 15 or 20 per cent. of the actual productive apacity of the field, will be charged with having only 45 r 50 per cent. car supply and blamed accordingly. This, of course, is not fair nor justified by the conditions.

Another difficulty, which the initial roads in Illinois have to contend with, and which amounts to a severe disadvantage at times, is the fact that a very large percentage of the coal mined along their rails, is delivered to the consignees, on other lines. The connecting roads receiving this traffic, furnish practically none of the equipment for its transportation, and on this account a considerable proportion of the initial roads' cars, are on foreign lines at the time when they are most needed at home.

While there has been some improvement along that line, it may be said that generally speaking, very little has been done by consumers in the way of providing for prompt unloading and release of cars; although the proportion of self-dumping cars is constantly increasing, many consignees continue to take advantage of the full time for ordering, placement and unloading.

Some Difficulties of the Carriers

The function performed by established and reliable jobbers in finding markets for the operator, and coal for the consumer, is a perfectly legitimate one, and a commercial necessity. In times of stress, however, there appears a class known to the trade as "snowbirds," who are able to do a certain amount of business by making use of the reconsignment privilege. But they greatly abuse this privilege by "kiting" cars from point to point, which adds immeasurably to the carriers' expense and causes congestion and delay. The spectacle is both familiar and discouraging, of cars wanted at a particular mine for shipping to anxious dealers and consumers, while others loaded at this same operation are being jockeyed from station to station by speculative brokers for as long as 30 days before they are unloaded.

It is evidently not generally appreciated that the carriers have not the same ability to move trains and tonnage in severe winter weather that they have at other seasons. When the temperature is low, the snow falling and drifting, and sleet covers the rails and breaks down the telegraph wires, neither the plant nor the men can work up to normal capacity. It thus frequently happens that for days at a time no more than half the usual tonnage can be handled and double the number of trains is required. These conditions in themselves have a considerable bearing on the movement of both loaded and empty cars and yet it is usually at this time that the heaviest demands are made upon the carriers.

It is true that some coals have better storing qualities than others; but it is also true that practically all the standard grades can be stored for a reasonable time without serious deterioration, if handled with care and properly protected from the sun and rain. But, of course, this involves some expense which the dealer will avoid so long as he can.

As to conditions immediately confronting the coal shipper, receiver and the carriers, coöperation along the following lines will undoubtedly do much toward preventing and ameliorating the severity of a car shortage during the next six months:

1. Ordering no more cars at the mines from day to day than can and will be fully loaded and shipped on the day placed.
2. Loading each car to its full safe carrying capacity.
3. Billing through from the mines to the final consignee and destination, and avoiding reconsignment in transit, so far as may be practicable.
4. Omitting, so far as possible, all unnecessary routing instructions on billing, and leaving it to the carriers to utilize the most available routes, and avoiding points of possible congestion and delay; also avoiding unnecessary roundabout routes.
5. Limiting the amount of coal forwarded on consignment.
6. Unloading and releasing cars immediately upon arrival at destination.

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The Coal Output of South Wales

A general strike lasting six weeks reduced the output of the South Wales coal field in 1912 by some two million tons, says the *Daily Consular and Trade Reports*, and together with war and other factors produced erratic fluctuations in prices and freight. The quantity produced during the year exceeded 50,000,000 tons, of which 36,000,000 tons were shipped by water. The general average of prices was high, the range for the year being $4.06 to $6.57 per long ton, f.o.b. Cardiff, for best admiralty large; and $2.20 to $4.24 for best bunker smalls.

The nearly 3000 ovens in the South Wales coal field produce not far from 2,000,000 tons of coke per annum. A growing number of mines producing bituminous coal convert the slack into coke. New ovens are constantly being erected, and there is continuous replacement of the old ones by modern plants, most of which are Coppées. The bulk of the output goes into domestic consumption, the local iron works being the chief consumers.

The surplus for export is increasing, the principal non-British buyers being Spain and the South American countries. Buenos Ayres takes 10,000 to 15,000 tons each year from the ports of South Wales. Montevideo about the same quantity. Rio de Janeiro about half as much. All the ports from Venezuela south take small quantities, totaling more than 100,000 tons per annum. High freights in the last few months of 1912 checked shipments, but under normal conditions coke may be shipped from South Wales to South American ports at $3.50 to $4.50 per long ton.

The Situation in Colorado

Colorado is at present facing an industrial crisis. The state convention of miners recently convened in Trinidad, and after listening to impassioned speeches by such notorious union workers as "Mother" Jones, unanimously adopted a resolution to strike on Tuesday, Sept. 23, unless an agreement with the operators could be reached prior thereto.

The demands made by the miners are seven in number, namely: (1) A 10 per cent. advance in wages on tonnage rates and a daily wage scale on the same basis as that of the State of Wyoming; (2) a 10 per cent. advance on wages paid coke-oven workers; (3) an eight-hour day for all classes of labor in the coal mines and at coke ovens; (4) pay for all narrow work and dead work, including brushing, timbering, removing falls, handling impurities, etc.; (5) check weighmen at all mines to be elected by the miners without any interference by company officials; (6) right to trade in any store that mine workers please, and the right to choose their own boarding place and their own physician; (7) enforcement of the Colorado mining laws and abolition of the guard system, which has prevailed in Colorado for many years.

The strike-call will affect about 9000 men, and 60 mines in Las Animas and Huerfano Counties. It is claimed by the mine workers that they have a fund of $1,000,000 with which to carry on the strike, and that a monthly assessment amounting to $350,000 can be levied throughout the country. They also aver that they are ready to shelter miners and their families in tents at the mines, and have leased land for this purpose and the establishment of a commissary.

The operators, on the other hand, allege that probably not more than 10 per cent. of their men will leave the mines for any length of time. They admit, however, that miners as a class are somewhat timid and readily yield to intimidation. They have given their employees every assurance, however, that those who are loyal and remain at their places will be given ample and adequate protection. In substantiation of their belief, they affirm that the delegates who willingly voted the strike order did not adequately represent the miners of southern Colorado, but were, in many cases at least, imported from other districts, or from outside the state in order to further the ends of professional, and to a certain extent, disinterested agitators.

Anticipating serious trouble or rather as a precaution thereagainst, Governor Ammons has instructed Adjutant General Chase to hold the National Guard of the state in readiness for immediate mobilization. The Governor, however, entertains strong hopes that the employment of the militia will be unnecessary, and that an agreement between the opposing factions may be arrived at without disorder.

What the outcome of this difficulty may be, time alone can disclose. Both parties to the strike affirm that the struggle will not end indecisively, but will be carried to the finish, one way or the other. The indications appear to be that the men in the mines themselves do not have any serious grievance against the management, but seem to have been led into the controversy by "missionaries" sent from other states by the United Mine Workers of America.

King Coal

By Berton Braley

Written expressly for Coal Age

Kings rule full many a state,
Armies and ships they command,
Glory have they that is great,
Splendor and pomp that are grand,
Wealth that the universe brings
Pays to the purple its toll.
Yet, in the roster of kings,
Greatest of all is King Coal.

King Coal!
And whose kingdom is vaster?
King Coal!
And the modern world's master,
Through triumph or blackest disaster—
King Coal!

Gold rules the markets of men,
How they have bartered and sold,
Risen and fallen again,
All for the glamor of gold!
Gold is the prize of the game,
Gold is the ultimate goal,
Yet—on the roster of fame
Greatest of all is King Coal.

King Coal!
He's the miracle maker,
King Coal!
He's the wilderness breaker!
The dreamer—the universe waker,
King Coal!

Steel has its empire of might,
Coal is the maker of steel,
Shaping it, daytime and night,
Into the sword—or the keel,
Rousing the magic of steam,
Driving the world to its goal,
Making a fact of the dream,
Greatest of all is King Coal!

King Coal!
And whose kingdom is vaster?
King Coal!
And the modern world's master,
Through triumph or blackest disaster—
King Coal!

WATCH FOR MINE-SAFETY NUMBER
NEXT WEEK

Exports of Fushun Coal

The exports of Fushun coal now reach about 1,000,000 tons per year, says the *Daily Consular and Trade Reports*. The particulars of shipments and consumption are as follows: To Shanghai, 150,000 tons; Hong Kong and Canton, 150,000 tons; Singapore and Penang, 100,000 tons; Manila, 100,000 tons; Tientsin, 30,000 tons; Government Railways of Japan, 200,000 tons; Corean Railways, 200,000 tons, and North Manchuria, 70,000 tons. The South Manchuria Ry. has now 14 colliers under charter, which are all kept busy carrying Fushun coal to the different ports of consumption.

POWER DEPARTMENT

Notes on Rail Bonding

By Vincent Rhea*

YNOPSIS—The comparative costs in power expended ith two types of rail bonds are here discussed and the esults compared upon the basis of a one-mile track of 0-lb. rails per year.

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An important phase of electric haulage systems in ining work is more or less neglected by many mine anagers and foremen, namely, the proper bonding of e rails. Apparently the great importance of a well onded return is not realized by mining men, other than ectrical engineers, and until recently there has been ttle tendency to use anything but the channel-pin and ire method that was in vogue when electric haulage sysems were first installed. It is the purpose of this article o show how defective bonding affects the electrical quipment of a colliery and how good bonding may be ecured.

The familiar channel-pin method of bonding has but ne good feature, the initial cost is low. The solid wire has o flexibility and the constant vibration of the joints ither causes the wire to break or the pins to work out rom the rails. As it is impossible to obtain an intimate ontact between the rail and the channel-pin, corrosion oon takes place and a high resistance in the joint is the esult.

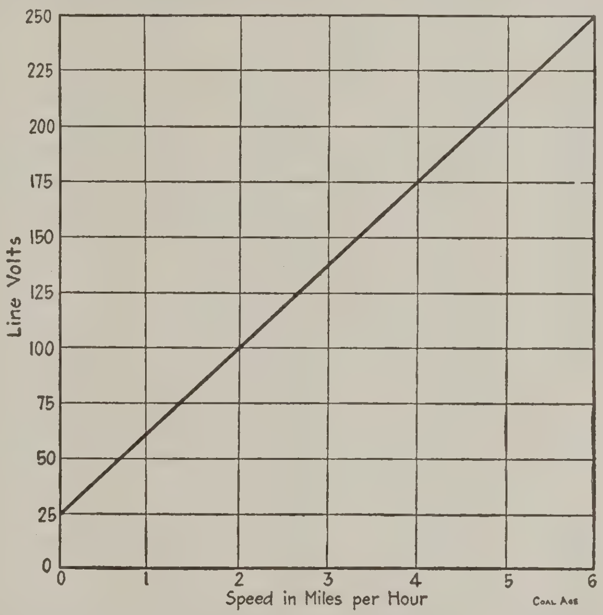
Tests made of channel-pin bonds at their installation nd three months later showed that out of 40 joints five ad a resistance greater than that of a 30-ft. length of ail and the resistance of the balance had increased 100 er cent. Numerous tests have shown that this increase characteristic of this method of bonding. The effect f this increase in resistance in the return path of the urrent is to materially lower the voltage.

As the performance of standard mine locomotives is ased on a certain voltage the effect of a reduction is imediately apparent in the work done by the machine. ssume that a certain locomotive takes 300 amperes at 50 volts to haul a given load at the rate of 6 miles per our and takes 10 min., actual running time, to haul e trip from the gathering point to the foot of the shaft. ow, if, owing to defective bonding, the line voltage drops 125 volts, which is not a rare occurrence by any means, e speed of the locomotive decreases from 6 miles per our to 2.6 miles per hour, and the time to haul the trip om the gathering point to the foot is 22.5 min. instead 10 min.

The current consumption of the motors is practically e same, 300 amperes. As the thermal condition of the otors is based on the time and the current, it is not surising that excessive field- and armature-coil "burn outs" e found where the bonding is defective. The period of ll-load current is too long, and the motors become so ot that they do not cool sufficiently during the light-load trip and the insulation is soon damaged and breaks down.

The relation, then, of defective bonding to the output of a colliery and the maintenance of the locomotives is apparent. The motor does not make the number of trips per day that it should. Armature and field repairs are expensive, as every operator knows, to say nothing of the locomotive being out of service at times, due to these troubles.

The generating plant is directly affected by poor bonds. It requires a certain amount of power to overcome the resistance in any transmission system, and the high resistance made by channel-pin bonds in each joint in the return side of the circuit means that a certain amount of power is being generated to overcome this resistance instead of being applied to the transportation of coal.



Curve Showing Variation of Speed with Voltage

In many cases the power required means a heavy overload on the generating plant. With power at 1c. per kilowatt-hour, the cost of overcoming the resistance of one mile of two 40-lb. rails in parallel for a year of 240 working days is $15.78 per 100 amperes, assuming that there are no joints. If the 350 or more joints in this mile of rail are bonded with channel-pins the resistance is increased from 75 to 200 per cent. As the power required to overcome resistance is the square of the load times the resistance it can be readily seen that an excessive cost in the power house is a result of defective bonds.

The maintenance of a channel-pin return is high as the bonds have a short life and must be replaced frequently. Motormen will complain of "poor power" and a section of the road will be re-bonded, only to be in bad condition again in a few months. A colliery using this method of bonding has its output limited by the low efficiency of the locomotives and the unnecessary load on the generating plant, and maintenance and operating costs are considerably higher than they should be.

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*Scranton, Penn.

Experience has shown that the best method of securing a return of low resistance for mining work is the use of a flexible cable bond with compressed terminals. This bond is installed outside the splice bar, on the inside of the rail, thus minimizing chances of the bonds being injured by derailment of cars. A small compressor having a power of 25 to 30 tons is used to upset the terminals in the rails.

The result is an almost homogeneous and molecular union between the rail and copper terminal. Moisture cannot enter and the low resistance thus obtained does not vary during the life of the bond. The flexible cable, composed of many fine wires, takes care of vibration caused by trips passing over the joints and relieves the terminals from such stresses. The bond is readily inspected for mechanical injury.

The initial cost of a good bond installation is considerably higher than that for channel-pins, but this expense is offset by the low resistance secured and the long life of the bonds, without any increase in resistance.

Some interesting data, showing what can be accomplished by the use of this type of bonding, have been secured. Tests made at a colliery in Pennsylvania showed that the bonding was so bad that the return current was leaving the rails and finding its way to the generating plant by way of the ditches and water pipes, which, of course, had a high resistance.

The locomotives with a rated speed of 6.3 miles per hour were found to be traveling at about 2.5 miles and making an average of 12 trips per day. The actual load on the generator was 30 per cent. over the rated load on the line. The main haulage roads were bonded with compressed terminal bonds of sufficient capacity to equal the size of trolley and feeders.

The first month following this installation the production was the largest in the history of the mine. The locomotives instead of making 12 trips per day were averaging 18 trips. Later another locomotive was added and the whole load on the generator was less than that carried before the bonding was changed.

At another colliery the bonding resistance of the main haulage road was reduced 80 per cent. by the use of compressed terminal bonds. During the last six months of the channel-pin installation the track bonder had averaged three days per week on this road replacing broken and defective bonds.

During the first seven months of the new installation the bonder spent two hours on the road replacing some bonds broken by a wrecked trip. Numerous other cases could be cited where the output was increased and maintenance and operating costs decreased by the replacing of channel-pin bonds by those of compressed-terminal, flexible cable type.

Any mine manager or foreman who recognizes his own conditions in those mentioned in this article and wan to get better results from his electric haulage system c rest assured that this is possible by the use of good bond

TABLE SHOWING COST OF ENERGY-LOSS IN RETURN CIRCUIT PER 100 AMPERES LOAD, PER YEAR OF 240 9-HOUR DAYS, POWER COSTING ONE CENT PER KILOWATT-HOUR.

One Mile. Two forty-pound rails in parallel, assuming continuous joints	$15.78
One Mile. Two forty-pound rails in parallel, bonded with channel-pin bonds, resistance found by actual test	37.80
One Mile. Two forty-pound rails in parallel, bonded with compressed terminal bonds, resistance found by actual test	17.99
Fixed cost of rail resistance	15.78
Increased cost with compressed bonds	2.21
Increased cost with channel-pin bonds	22.02
Saving per year with compressed bonds for power alone per 100 amperes	19.81

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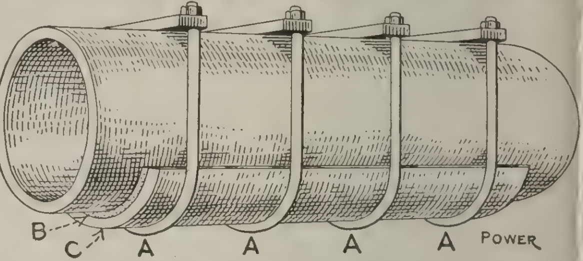
Stopping a Bad Leak

The 4-in. suction pipe leading from a pond to the ci culating pump froze and burst, says Earl Pagett, i *Power* for Aug. 26, 1913. As there was no union ne the fracture, to put in a new length of pipe would mea



How the Leak Was Stopped

to take up the pipe from the pond to the fracture. Th illustration shows how it was repaired. *AAAA* are U bolts, *B* is a gasket and *C* is a piece cut from a pipe slightly larger diameter than the pipe to be repaire

DON'T MISS READING THE SPECIAL MINE-SAFETY NUMBER OF COAL AGE WHICH WILL APPEAR NEXT SATURDAY, OCT. 4. THIS SPECIAL ISSUE WILL BE THE MOST INTERESTING WE HAVE EVER PUBLISHED.

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Mine-Safety Meeting in Pittsburgh

The second meeting of the American Mine Safet Association was held at Arsenal Park, and the Fort Pi Hotel in Pittsburgh, Monday, Tuesday and Wednesda of this week. About forty first-aid teams from coal com panies located in various parts of the United States pa ticipated in the contest.

Many valuable prizes were distributed in the evenin after speeches delivered by notable men. Several the most celebrated mine surgeons in the country we present and took part in the discussion relative to firs aid methods. James Roderick, chief of the Departme of Mines, in Pennsylvania, and Earl Henry, chief of th Department of Mines, in West Virginia, were in atten ance with a number of their deputies.

One of the interesting exhibits was the mine-rescu automobile truck belonging to the Birmingham statio of the Federal Bureau of Mines. This car is sai to be capable of traveling 35 miles an hour in respon ing to a call for help, in case of a mine disaster. Th new truck is believed to be an improvement over th rescue cars, now in use by the Federal Bureau.

A full account of this meeting, as well as the Miner Field Day Meet, held at Knoxville, Tenn., Sept. 20, wi be printed in our special "mine-safety" number nex Saturday, Oct. 4.

EDITORIALS

Strikes and Their Cause

When we analyze labor conditions the world over and en compare wages abroad with those that American rkmen receive, we are forced to the conclusion that ssatisfaction and strikes are not alone due to the pay a an gets for his labor.

That great majority of humans who work with their nds are fast coming into their own, if they have not ready arrived there. The danger is, will they stick to e highway of reason and right, or be piloted to a distrous finish by some of their unscrupulous leaders ose chosen profession is the exploitation of their felw men.

Time was when capital believed it best to hold worken in a state of ignorance for fear that the acquisition knowledge might shed a light on the injustice being ne them; but that day has passed, and the safety of e future lies in a campaign of enlightenment, whereby e workingman is taught to think for himself. Such en will recognize *only* proper leaders and will not atmpt to change conditions of a century in the lapse of night.

American coal owners have naught of which to be hamed. Our miners are the best paid in the world. It not at all unusual for a good worker to draw from 100 to $125 for four weeks' labor. Even negro miners West Virginia at the present time are earning as high $140 in a month. We know of one "darky" who earned 148 in July; a Greek, 68 years old, earned $86 in 18 ays; two Italian youths, 19 years old, made $90 each 17 days; and a Hungarian earned $121 in 18 days.

Compare such conditions with those that exist in reat Britain, which is again on the verge of a national bor war. Think of 480,000 British railroad employees ceiving an average wage of only $6.42 per week. Last ear in the United Kingdom there were 900,000 paupers spite of the old-age pensions. Nearly a million men nd women over 70 years of age are on the pension roll r $1.25 a week apiece.

In such a country, where national success is only atined by forcing a scale of wages so low as to menace he freedom and citizenship of the people, we are not urprised that a great and serious industrial adjustment hould take place through ever-recurring strikes. 'Tis etter so, than that millions of deserving people should ace a hopeless future of hardship and suffering.

But in this country things are diffierent, and still we ave equally as much labor trouble as our British cousins. e may continue to add increase after increase to the ages of workingmen, and still we will have strikes plenty. There is but one solution—education. We talk f "safety first" and our great corporations are spending housands of dollars in this praiseworthy work, but merican industry, mining and otherwise, will not be laced on a proper efficiency basis until the boss and his en understand each other.

The menace of business today is the dishonest professional agitator. It is these parasites that must be eliminated. Unionism properly conducted is all right, and no employer who is just and fair wants such confederations abolished. However, it is essential to stable progress that the men have leaders who will fight their battles honorably and not betray them.

Any business that must be conducted on lines of secrecy is unfit to exist. Any company that cannot confide in its employees and survive their scrutinizing gaze deserves no consideration in the final accounting. If all the miners in this country were encouraged to take a greater personal interest in the affairs of their employers, they would not be so ready to respond to the appeals of agitators who harangue them from street corners.

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First-Aid Judging

It is well known that the judging at first-aid meets may be divided into two classes: Inadequate judging by competent judges, and adequate judging by incompetent judges. In the anthracite regions, the former prevails, and in the bituminous-coal fields the latter.

Both forms of judgment are so unfortunate, undesirable, provocative of wrath, and subversive of discipline that we are not going to decide between them. We propose only to state the issue, and gracefully "dodge the bricks."

Of course, it is easy to say that every meet should have such a large number of competent judges present, that every event may be umpired completely from start to finish. But unfortunately doctors are busy men, and often when not actively engaged are detained by prospective cases. Moreover it is hard to secure enough of these who have made a sufficing study of first-aid. So it is difficult to secure enough medical men to act as umpires.

Of lay judges, little can usually be expected. Managers of coal mines rarely spare sufficient time to learn the many details of first-aid to such a degree that they are more proficient than the men they judge.

In the anthracite region, it is the custom for a few judges to go round after the maneuvering and bandaging are all done. There is no attempt to find out *how* the work has been performed; the result is all that is sought. A rapid declaration of the manner of execution on the part of the captain informs the judges in general of what has transpired and reveals principally whether the team took the most important step first.

But every physician and every layman knows that unless a moving picture were taken of the team in action, no body of men, however skilled in first-aid science, could hope to judge of the work by any such method. No pretense is made of supervising resuscitatory work or the loading of stretchers. A hasty action which the position or tightness of no bandage can exhibit or a false movement which the report of the captain fails to reveal might give more agony and do more harm to an injured man than the action of the team might remove and yet those faulty pieces of technique would not offend the judgment of the surgeon who made the final examination.

True, the doctors are watching and see perhaps more than is supposed, but very many errors in practice are committed which they never see. How can a mere quarter dozen of men watch effectively about 50 teams of six men each, all in action at one and the same time, three hundred possible offenders violating any one of perhaps twenty different rules. Thus the means is sacrificed to the end so that the team and even the training physician learn to belittle a knowledge of those details which do not have to be stated to the examining physicians.

But what, on the other hand, can be said as to the line up of laymen in the bituminous meets, who frequently award one hundred marks in every event, whose liberality is only exceeded by their lack of knowledge of the science of physiology and of the art of healing.

If any solution of the vexed problem of judging at first-aid meets is possible, it is this: Competent laymen should be appointed to watch the manner of execution, there being perhaps one to each team. Medical men should be the critics of the condition of the victim after the event is completed.

Certain mistakes should be left to the laymen for penalization; demerits for other faults should only be imposed by the examining physicians. The doctors could help the laymen decide whether any actions they have observed are deserving of penalties.

Neither the practice of the hard-coal nor the methods of the soft-coal regions are to be commended. There would be merit, however, in a skillful blend.

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Oil in the Boiler

In many plants, especially those which operate condensing or where open feed-water heaters are used, drawing their steam supply from reciprocating engines or pumps, oil in more or less quantity finds its way into the boilers along with the feed water. This introduces an element of danger which is worthy of no light consideration and which may take two forms of manifestation.

Oil in a boiler, particularly if it be of animal or vegetable origin, is apt to cause foaming or priming to a more or less marked degree. This, however, is seldom detrimental to the boiler itself unless it becomes so violent and prolonged as to lower the waterline below the point of direct heat from the furnace. It is, however, usually cylinder oils that find their way into the boilers, and these are almost always of mineral origin.

It is this type of oil that is a source of real danger to the boiler itself. As is well known, oil has a marked tendency to adhere to and thinly coat the boiler surfaces. This film of oil effectually prevents the water from coming in direct contact with the metal of tubes or sheets. Small particles of scale-forming matter are attracted by this oil and with it from eventually a coating which is thoroughly impervious to the water. The latter is thus prevented from rapidly abstracting heat from the shell or tube, as the case may be.

The heat of a boiler furnace may be and frequently is well up around 2,000 deg. F. and unless the boiler tube or shell is effectually cooled from the inside when subjected to this high temperature from without, the result is obvious—the material will stretch, due to internal pressure, and eventually give way.

In water-tube boilers the presence of oil not infrequently causes a tube failure, which although decidedly less dangerous than the rupture through bagging of the shell of a multitubular boiler, is nevertheless not infrequently accompanied with disastrous results.

When for purposes of scale softening, we intentionally introduce crude oil into our boilers, we at least know of its presence and its approximate amount; in other words, we are forewarned not only of its existence in the boiler, but of its quantity, and can act accordingly. When, on the other hand, oil finds its way through inefficient or defective separating apparatus, into the boiler along with the feed water, the danger which its presence entails is doubly perilous, because it is unsuspected.

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Supervision of Miners

Under this title, in another column, in the discussion of means and methods for producing greater safety in mines, a correspondent has suggested among other things a closer supervision of miners by deputy foremen. He suggests that each deputy foreman have charge of a prescribed district of the mine, for which he be held responsible in respect to the safety of the men, the methods they employ and their behavior in the mine. The suggestion is drawn from the practice in vogue in the north of England.

We are glad to note in this connection that the Lehigh Valley Coal Co., one of the largest coal-producing companies in the northern anthracite valley of Pennsylvania, has practically adopted this method of a closer supervision of miners during working hours. In common with other companies, it has been the practice in the Lehigh Valley mines, for the assistant mine foreman to make a thorough inspection of the mine each morning, and having warned the men of any existing dangers and recorded same, to leave the mine to the general supervision of the inside foreman.

Under the system recently adopted by the Lehigh Valley Coal Co., there has been a redistribution of responsibility. The fireboss makes his usual examination in the morning, while a number of assistant foremen are authorized to supervise the work of the miners and inspect their working places closely throughout the day. Each assistant foreman is held responsible for the safety of the men in his district, which is small enough to enable him to give the necessary attention to every detail. We are glad to say that the system has proved a success. It is patterned along lines similar to that described in COAL AGE, Apr. 5, p. 539. Chief Mine Inspector J. B. McDermott, of Montana, there drew attention to the systematic division of labor recently put in operation in the mines of the second-largest-coal-producing company in that state. By the system described, each class of work is in charge of men especially authorized and instructed in its performance. All shots are prepared and fired by shotfirers; trackmen lay all tracks and switches, the timbermen set all timbers. The system is reported to have produced an increased efficiency and economy in working. We believe there is no question but that greater attention will be given to such systematic arrangements in mining work, in the future, than ever before.

e Value of Study to Mining Men

By Samuel M. McMahon*

ave been much impressed recently with the need of
study on the part of mining men and, particu-
mine officials. Much of our work is performed in
tine, matter-of-fact manner; and to most of us the
task becomes quite ordinary because we fail to think
y and appreciate the great laws and principles in-
d.

a brief illustration, I may ask how many of us stop
nsider what a wonderful thing it is to breathe, see,
taste, smell and move from place to place. The
performs unconsciously the various functions in-
d in each separate act. We are not impressed with
wonders because they are continually with us, per-
ing their regular tasks with ease and requiring no
tion.

ut the most perfect physical health and strength are
ned only by a thorough knowledge of the laws of
re that control the physical life. It is the same in
rofessions: the doctor must be familiar with the
n body, its composition and the effect of drugs; a
r must be intimate with Blackstone and have a
ugh knowledge of technical law; the clergyman
study and know bible history; the merchant must
ate himself along commercial lines. Likewise, in
walk of life, success depends on an intimate knowl-
of the laws and principles that govern one's work or
. Men who possess such a knowledge are the mas-
of the situation.

ut, admitting the need of knowledge, the question
rmost in the mind of the practical man and, par-
arly, the mine foreman, is how this is to be attained.
l with the day's work, the idea of study or mental
t at night is irksome; unless a thorough-going in-
t in the daily work in the mine serves to make a
ter from a book on mining or a few pages in a min-
journal as much desired as the newspaper. The
le is that we submit too much to the routine and
tony of life; we get in a rut; we read the daily
paper as a habit; but we fail to devote a proper por-
of our spare time to secure the advancement that is
tial to success. The well balanced successful man
e one who mixes work and enjoyment in their proper
ortion.

hat study did for Lincoln, Hugh Miller and others,
n do for our mine superintendents, foremen and fire-
s. The great Scotch geologist, Hugh Miller, left
in life with the care of his mother, was the son of
ilor. Fortune made him a stonemason; but study
application developed the famous geologist who later
ne the author of many books. Miller said: "The
schools I have attended are the schools that are open
l; the best teachers I have had are easy of access to
hough severe in their discipline. My success as a
was my inclination to learn; and there are few of
natural sciences that do not lie as open to the work-
nen of America and Great Britain as geology did to

the same study and application, coupled with an
nation to learn, men of all classes can fit themselves
igher positions. I have quoted the words of Miller, because he had few advantages and received his education in the woods, under the earth, studying the trees and brooks and observing natural laws. In closing, let me say that mine foremen, because of their responsibility, have greater need to study than most other men. Theoretical, as well as practical mine foremen, are in demand. Try the plan of reading for self improvement and the habit will grow.

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uperintendent, West Virginia-Pittsburgh Coal Co.,
burg, W. Va.

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Coal Production in Illinois

The following summary shows the relative figures for the years ended June 30, 1912 and 1913, respectively. The figures include the local mines and show that coal was mined in two less counties, and that the total number of mines has decreased from 879, in 1912, to 840 mines, in 1913; the shipping mines show a decrease of nine. The tonnage for 1913, however, shows an increase over 1912 of 4,331,964 tons, or about 7.5 per cent. The total tons mined for the year ended June 30, 1913, is 61,846,204.

The number of persons employed in and around the mines has increased slightly; the increase being only 86 above that in 1912. The number of fatal accidents for 1913 is 177, or three less than for 1912, while the nonfatal accidents have increased from 800, in 1912, to 1030, in 1913.

There are a number of reasons that can be advanced for this increase in nonfatal accidents, which will be explained fully in the Annual Coal Report.

ILLINOIS COAL STATISTICS

Summary for the years ended June 30, 1912 and 1913.

	1913	1912
Number of counties producing coal	50	52
Number of mines and openings of all kinds	840	879
New mines or old mines reopened during the year	85	176
Mines closed or abandoned since last report	124	142
Total output of all mines, in tons of 2,000 pounds	61,846,204	57,514,240
Number of shipping or commercial mines	371	380
Total output of shipping mines, tons	60,515,416	56,096,695
Number of mines in local trade only	469	499
Output of local mines, tons	1,330,788	1,417,545
Total tons of mine-run coal	14,979,990	13,336,509
Total tons of lump coal	20,850,125	21,795,527
Total tons of egg coal	6,819,980	4,940,431
Total tons of nut coal	3,130,065	3,193,956
Total tons of pea coal	13,734,537	11,109,191
Total tons of slack coal	2,331,507	3,108,626
Total tons shipped	55,972,374	51,502,382
Tons supplied to locomotives at the mines	904,570	924,854
Tons sold to local trade	2,345,233	2,615,678
Tons consumed (or wasted) at the plant	2,624,027	2,471,326
Average days of active operation for shipping mines	179	172
Average days of active operation for all mines	170	160
Number of motors in use	466	381
Number of mines in which mining machines are used	139	139
Number of mining machines in use	1,661	1,581
Number of tons undercut by machines	30,228,520	25,550,019
Number of tons mined by hand	31,617,684	31,964,221
Average number of miners employed during the year	35,401	39,149
Average number of other employees underground	35,662	31,687
Average number of boys employed underground	1,430	1,526
Average number of employees above ground	7,004	7,049
Total number of employees	79,497	79,411
Average price paid per gross ton for hand mining	$0.664	$0.636
Shipping mines		
Average price paid per gross ton for machine mining	$0.521	$0.496
Number of kegs of powder used for blasting coal	1,308,381	1,313,448
Number of kegs of powder used for other purposes	3,685	3,040
Number of pounds of permissible explosive used	603,420	328,075
Number of men accidently killed	177	180
Number of men injured so as to lose a month or more time	1,030	800
Number of gross tons mined to each life lost	349,414	319,524
Number of employees to each life lost	449	441
Number of deaths per 1,000 employed	2.23	2.26
Number of gross tons mined to each man injured	59,922	71,893
Number of employees to each man injured	77	99

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Legal Department

In this section of our paper next week we will print a discussion relative to "Removal of Coal through Adjoining Land." It will be shown that *the proper basis for valuation of a right-of-way is damage to landowner and not benefit to operator.* A number of recent coal-mining decisions will also be published next week.

SOCIOLOGICAL DEPARTMENT

Gardens in the Arid West

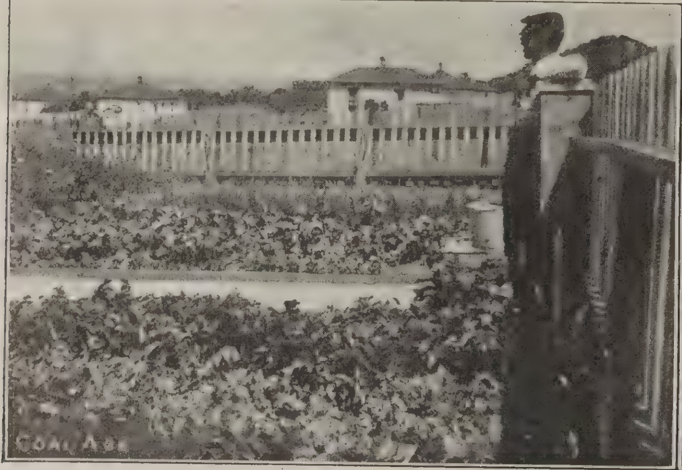
By F. W. Whiteside*

When visiting many of our coal-mine towns, especially in the western portion of the United States, the visitor is unfavorably impressed by the prevailing absence of neatness. The great American tin can is strikingly in evidence while ash heaps, rubbish, scrap iron and broken-down or cast-off machinery are scattered promiscuously about the village.

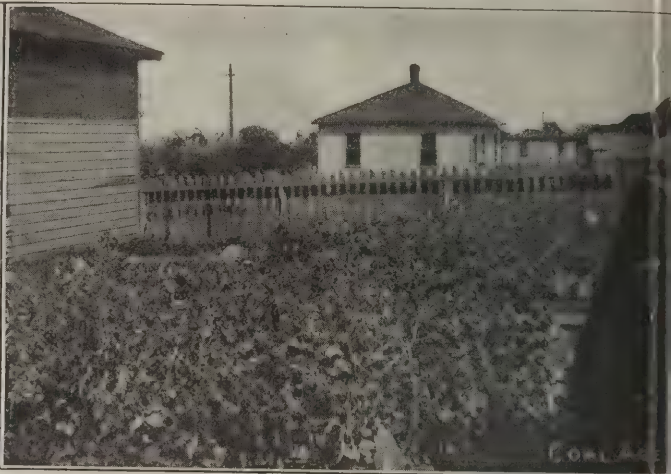
With few exceptions, the yards and roads about the dwelling of the miner are without tree or shrub. An occasional weed alone relieves the craving of the eye for something green and flowering. The fences about the cottages are either entirely wanting or in a sad state of repair. Taken altogether the picture presented is not alluring and the impression left upon the mind is not of so pleasant a cast that the visitor is tempted to tarry lon in the place.

In localities where water is scarce, where it must b hauled from some distant source by car or wagon tank, landscape of vines and flowers is not to be considere In such a place the closest approximation is a yard neatl fenced and all traces of weeds and rubbish eliminate It might be asked if it is worth while to go to the expense of building a fence to inclose a barren and unproductive yard. It appears, however, that unless a lot has some definite boundary line, the matter of up-keep is left to Mother Nature and the gentle breezes.

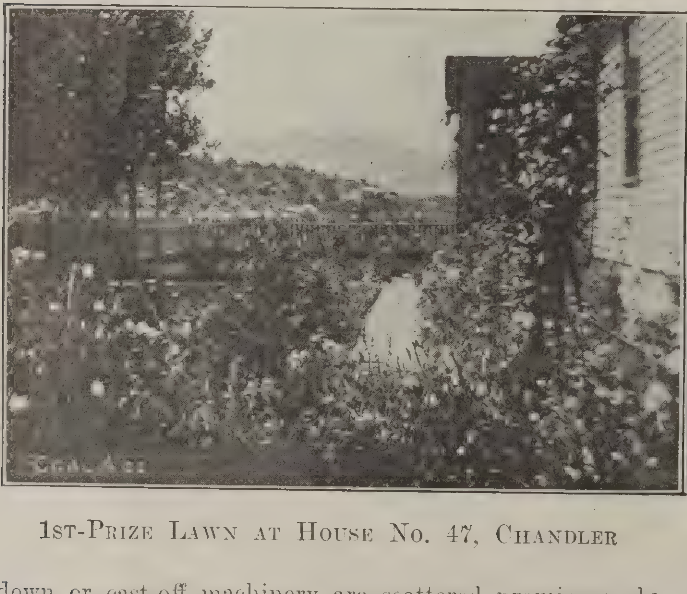
I well realize that, in many mining towns, especially in the long-established districts of the Eastern and Central States, neatly fenced yards are the rule rather than the exception. These remarks are directed toward those localities where the miner lives in a "coal camp." The term camp here being used in its original and primitive sense.



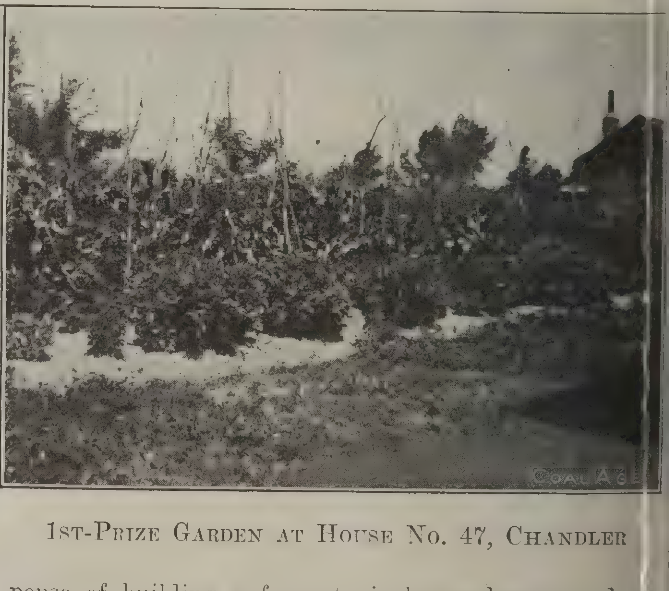
1st-Prize Garden at House No. 52, Ravenwood



2nd-Prize Garden at House No. 56, Ravenwood



1st-Prize Lawn at House No. 47, Chandler



1st-Prize Garden at House No. 47, Chandler n is greatly influenced by his environment. If ysically and morally good, it so casts a refining inence upon him. All the great corporations have come realize this fact. Their employees are provided with ygrounds, swimming pools, rest rooms, amusements, raries, theaters and schools. If the workman is eduted and entertained he will become more efficient and ntented. This is axiomatic.

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*Chief engineer, the Victor-American Fuel Co., Denver, Colo.

Chandler School House
Note Neatness

2nd-Prize Lawn, House
No. 74, Chandler

Superintendent's House,
Chandler

It now follows that the miner, being provided with ll or many of these good things, will devote more interest and labor toward improving the condition of his ome and its surroundings. The first step is a neat house nd a well kept yard. The next is a tiny garden with a ower or two. The last step is to cover all the available ard space with flowers, lawn and garden.

In order to stimulate a healthy interest in this direcion, J. C. Osgood, chairman of the board of the Victor-American Fuel Co., of Denver, personally offered three ash prizes of $25, $15 and $10 for the prettiest yard in ach of the company's mining towns, where irrigation vas possible.

At Chandler, near Cañon City, the subject of lawns nd gardens has been given attention for several years, o that much was to be expected from it. At Ravenwood, near Walsenburg, a more modest start had to be made, as some of the soil had never before been broken for cultivation and it was an interesting and somewhat amusing spectacle to see some of the contestants attacking the hard-packed earth, with a pick, in the endeavor to soften it sufficiently so that they could dig it with a spade.

3rd-Prize Garden, House No. 53, Ravenwood

3rd-Prize Garden, House No. 26, Chandler

In order to secure fair and impartial judgment, when the yards were ready for the awards to be made, a judge, having knowledge and experience in gardening, was selected from one of the larger towns nearby. As he was unacquainted with the occupant of the house on whose yard he was passing judgment, it is fair to assume that the decision was just and impartial.

Only two of the company towns had sufficient water this summer to participate in the contest, the season being exceptionally dry, irrigation water was not available in sufficient quantity at the balance of the company's properties. Next year it is hoped that with perhaps two exceptions, all the Colorado division mines will be represented.

The awards were as follows:

	Chandler	Ravenwood
First prize, $25.	August Hudder.	John Happs.
Second prize, $15.	R. F. Perrine.	Frank Nodeck.
Third prize, $10.	James Rampone.	W. S. Smith.

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The Tenderfoot

That accidents are largely due to inexperience is illustrated by the story of John Karpi, a Finnish miner, who recently commenced his first shift at the International Coal Co.'s mine at Bearcreek, Montana.

Instead of carrying his powder under his arm he placed the keg on his shoulder when he started up the slope. His keg touched the electric-transmission wire and a flash resulted followed by an explosion.

Karpi was not killed and managed to walk to the mouth of the slope, but an anæsthetic, a stiff brush and some sterile bicarbonate of soda will be necessary to make Karpi a good looking Finn again. A mule which stood by was burned even worse than the miner.

With all the stolidity of his countrymen Karpi thought his experience a good joke and appeared at the drift mouth with a broad grin over his blackened countenance.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 16—I have had some experience with mixed lights in coal mining and was greatly interested in the discussion on this subject. I would advocate the use of mixed lights in any mine where gas is only found in certain districts, or at the head of an entry, or at the face of a room, or in some old workings, providing the fireboss or mine examiner knows his business thoroughly and is a conscientious man and one who can be depended on to put up the necessary fences and danger signs.

Suppose, for example, gas makes its appearance at the head of an entry; this entry should be put on safety lamps at once. It should then be fenced off a sufficient distance back from the gas, to prevent any person from approaching the face with an open light. In such a case, the fireboss must keep a close watch over the place and examine it often, as well as all adjoining places.

It is well known that safety lamps are only safe in the hands of experienced persons. It may happen that 50 per cent. of the persons working in a certain mine have never used a safety lamp before and do not know how to handle such a lamp even after being instructed. After letting a lamp fall, an inexperienced person will often try to light the lamp before it has been examined to see that it is safe. Many have a habit of tilting the lamp on one side, or raising the wick too high, in order to get a better light. On these accounts, the danger is often increased by the use of the safety lamp.

A number of explosions have occurred in mines where safety lamps are used exclusively and I venture the remark that such explosions have been more frequent than where mixed lights are in use in a well regulated mine. If a miner is so ignorant as to cross a fence or a dead line, with an open light, he is liable to prove a dangerous man with any kind of light and should be sent out of the mine.

The law in Alberta requires that the ventilation in mines shall be sufficient to dilute and render harmless noxious gases to an extent that all working places in the mine shall be fit to work in and travel through with safety. The law specifies that where safety lamps are used in any part of a mine, no naked light shall be used in any other part of that mine situated between the place where the safety lamps are in use and the return airway. If these laws are enforced the volume of air in circulation will be sufficient to permit of the use of open lights even in some places generating a little gas.

I agree with John Rose and would use mixed lights under the conditions stated in the last part of his letter (No. 14, COAL AGE, Sept. 6, p. 354.) In Letter No. 15, on the same page, John A. McDonald, in speaking of the use of mixed lights, states: "There will always be fear of some careless or reckless person, with an open light on his head, setting off some gas and causing a violent explosion; whereas, if safety lamps were used exclusively, this could not occur." I want to say that the same careless, reckless person would be just as liable to cause an explosion if required or permitted to a safety lamp. If he would risk going into gas with open light he would no doubt take greater chances a safety lamp; and if the lamp was not properly han or was defective a disaster would result.

GEO. WM. HALLIDA

Commerce, Alberta, Canada.

Letter No. 17—The several letters published rece in COAL AGE, relating to the use of mixed lights mining, have been both interesting and instructive. have been surprised, however, to see how many of writers whose duty it is and should be to guard the li of miners, seem to consider the use of mixed lights gaseous territory, as not a serious matter.

It has frequently happened that the antipathy miners in respect to safety lamps, together with a l of moral force on the part of mine officials in this gard, has brought disaster to both. The knowledge t the miners are opposed to the use of the safety la has deterred many mine officials from adopting th when their better judgment has dictated otherwise.

I regret to say that on the part of many miners th is an uncanny idea associated with the use of the saf lamp, the repugnance possibly arising from the dan the presence of the lamp in the mine suggests. some cases, a safety lamp in the hands of a mine offic creates uneasiness and a feeling of alarm, which is ma fested by remarks passed from one to another, such "A body of gas has been found somewhere; somethi has gone wrong, etc."

To a large class of miners, the safety lamp sugge danger, just as would the presence of an open light, the mind of an intelligent mine official. This is pa ticularly true in respect to the foreign element. Whe a change from the use of the open light to that of t safety lamp is made necessary, instead of this being garded as a wise precaution, it suggests to many a pre ent danger. The dread of an explosion, on the part many, causes an exodus from the mine.

In addition to the danger the presence of the lan suggests, the antipathy of the miner is due largely to t dim light it affords and the inconvenience of handli the lamp owing to its size and shape. There is al the fear of losing the light and not being able to relig the lamp, besides the prohibition of smoking where th lamp is used. For these reasons, many miners, pe haps a majority, prefer to run a considerable risk rath than be compelled to use a safety lamp.

After all that has been taught and demonstrated, reference to the ignition of gas and dust, there aris the question, in the thoughtful mind: Why should risk be run that is unwarranted? Why should there hesitation in the adoption and use of safety lamps whe conditions demand that they be introduced? Ever practical miner realizes, if he will admit the fact, tha in a territory producing an almost undetectable amou of gas, there is always the possibility of an outburst gas from the strata, that cannot be foreseen but whic would suddenly transform the mine from a safe to an alarmingly dangerous condition. Also, an unexpectedly dangerous condition may result from a breakdown of the ventilating apparatus, a heavy fall of roof in the air course, the setting open of a door, or a sudden fall of barometer, or any one of a number of other causes known and unknown.

In most cases, the mining law draws a narrow enough margin of safety, which should not be reduced but rather expanded, for the greater protection of life and security of property. While, in many cases, there has been a disposition to encroach on the requirements of the law (and this goes without saying), I am glad to say that many of the larger companies have established high standards of safety by widening the law's margin in respect to all possible danger. Where the law winked at the practice of mixed lights, these companies have become a law unto themselves and abolished the practice. Where the law was satisfied with a stipulated amount of ventilation, they have doubled and trebled that amount, in order to increase the security of the mine.

A brief review of recent catastrophes in mines operating in gaseous territory and under the mixed-light system, cannot but convince any unprejudiced mind that immunity from disaster is impossible under such conditions. The purchase of a few score of safety lamps of an approved type is not a matter of financial embarrassment; but the neglect to do this and thereby avoid a possible danger may cause ruin, besides producing untold misery.

Where entries develop gas, there should be no temporizing, but an approved type of safety lamp should be adopted at once; or, if preferred, an approved form of electric light should be used throughout the mine. The electric lamp does away with the miner's chief objection to the safety lamp; namely, the dim light it affords. In regard to the electric lamp, I feel safe in predicting that, not in the remote future, miners will demand its general adoption, in gaseous mines and in all mines. The use of this lamp will practically eliminate the question of fire in stables and other parts of the mine where timbers, brattices and other inflammable materials are exposed. In my opinion, the passage of laws in every mining state, that would make compulsory the use of the electric lamp in mines, would be a benefit and a blessing. This suggestion may seem radical, but it has the redeeming quality of being made in all sincerity.

CHARLTON DIXON.

Pittsburgh, Penn.

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The Safety Lamp and the Eyesight

I have seen numerous references to this subject, in previous issues of COAL AGE, but the question as to whether or not the continued use of the safety lamp impairs the miner's eyesight and finally curtails his producing power appears to be unsettled. While the opinions of miners who have had the same number of years' experience in the use of the safety lamp differ widely, the preponderance of sentiment so far expressed seems to strongly favor the negative side of the controversy.

While acting in the capacity of mine foreman and fireboss, I was compelled to use the safety lamp constantly for several years and am forced to agree with Messrs. Sutton (Vol. 3, p. 1008), Virgin (Vol. 4, p. 244), Hogarth (p. 278) and Fireboss (p. 170), who have stated that, in their opinion, the constant use of the safety lamp has no ill effect on the eyesight of the miner.

My experience of eight years, in a mine operated with open lights, followed by an experience of 13 years in the same mine operated exclusively with safety lamps, has given me the opportunity to observe closely what effect, if any, is produced by the constant use of the lamp. As a result, I am convinced that the eyesight of miners is not impaired by the constant use of safety lamps. I believe there is greater danger of injury to the eyesight, by the use of large lamps burning inferior oil. The heat and smoke from an open light produced by the burning of an impure oil together with the unsteady nature of the light is, in my opinion, more harmful to the eye than the small steady light of the safety lamp.

I frankly admit that the safety lamp is not as convenient as the open light, which the miner carries on his head, and that it is, to some extent, a burden to the miner, in the performance of his work. However, my experience and observation convince me that the use of the lamp does not perceptibly reduce the man's producing power. It may require a little more effort on the part of the miner to work with a safety lamp; but miners have loaded as many cars of coal and timbered their working places as well when using the safety lamp as when the open light is employed. While this statement may seem a little unreasonable to one with but a limited experience in the use of the safety lamp, it will not appear so to the man who has been long accustomed to its use. This, however, is the result of my observation and experience with both lamps.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

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Supervision of Miners

I was much interested in the foreword of July 12, which described a method of checking off every man as he enters or departs from the mine. The system is good as far as it goes and is in force, at present, in most of the mines in this state. It is open to the objection, however, that much time may elapse before it is considered necessary to look up a man whose check is still out. There may be no particular alarm felt at the man's home or boarding place, perhaps, until he is an hour behind his usual time of returning from work. In some cases, even then, it is necessary to send for the foreman or one of his assistants, if no one is stationed at the mine entrance charged with the duty of checking off each man as he goes out of the mine.

In my opinion, a far better system is that which has been employed for many years in two of the northern counties of England; namely, Northumberland and Durham. It is my belief that, for efficiency, economy and safety, that system cannot be surpassed. The mine is divided into districts and a deputy in charge of each district, is held responsible for the safety of the men in that portion of the mine. He must examine each working place before shifts and meet his men at the foot of the shaft when they go to work. If they are working in gas, he must examine their lamps and instruct them in reference to any danger that may exist in their several places.

It is the duty of each deputy, during working hours, to supply all timber and tracking needed in his district. He must see that each place is timbered securely and that this timber is recovered, as far as possible, when the place is finished. The deputies practically work the mine; they start and stop all working places. At the end of each shift he must see that every man and boy, in his district, have left the mine and gone home. If any fail to appear on time, he looks them up at once.

In this connection, the article on the Prevention of Accidents in Coal Mines, by John McNeil, in the same issue, p. 42, is interesting. It contains many wholesome truths and good suggestions; but, after all, the method of supervision that I have described as in use in England is a better plan. The deputy is there to instruct and supervise the miner and better results are obtained both in respect to safety and the output of coal, while the cost of timber and other supplies is much reduced.

I wish now to refer to a feature of mining work that is quite common in the North of England and to which Mine Inspector J. B. McDermott has referred as having been adopted by the second largest producing mine in Montana, in his excellent letter, No. 12, Vol. 3, p. 539, when discussing the question of post timbering at the working face. I have reference to the division of labor in mines, whereby all shots are prepared and fired by shotfirers; trackmen lay all tracks and switches; and timbermen are employed to set all timbers. In the North of England a miner is not allowed to touch a car, but the driver takes it out of the room and puts another car in its place. This method has the advantage that a miner is not obliged to leave his room, at a time when he should attend to setting a post or sprag to prevent a fall of roof or coal. A miner may have a bad piece of top that needs a post set at once; but just at that time the driver comes in for his car and the miner must go out and bring in his empty. Other things may delay him and, perhaps, on his return in a half hour or less, the roof has fallen and must be removed, which means much extra work on the part of the miner. Then, probably, the timber he was about to place when called away by the driver, will be too short and he must hunt a longer stick.

It is the lack of systematic arrangement, in the work of mining, that brings poor results and increases the number of complaints that appear so often, to the effect that the returns from capital invested are small. The question of the division of labor should receive careful attention at the hands of all mine operators and superintendents; and every effort should be made to systematize and regulate the work so as to obtain the highest degree of efficiency from the workmen. This is being done in all industries to a greater extent than in coal mining.

WILLIAM COULSON.

Spring Valley, Ill.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

HYGROMETRY

Hygrometry is the measurement of the amount of vapor in the air, at any given time The capacity of the air for holding moisture varies with the temperature. For example, at 32 deg. F., a cubic foot of air will hold or has a capacity of only 2.13 grains of water; while at 60 deg. the capacity is 5.77 gr. per cu.ft.; at 100 deg., 19.84 gr. per cu.ft.; and at 212 deg. F., air fully saturated with moisture holds about 258 gr. per cu.ft.

Hygrometric State of Air—Air absorbs moisture from bodies in contact with it, and thus exerts a drying action, which is of great importance in mining The absorptive power of the air varies with its degree of saturation. For example, air at 60 deg. F., containing, say 2.9 gr. per cu.ft., is only about half saturated and is then said to contain 50 per cent. of moisture. In this condition, the air will readily absorb more moisture. The degree of saturation of air is called its "hygrometric state."

Air is said to be "dry" or "wet," according to the degree of its saturation. It is important to observe that these terms have no reference to the actual amount of vapor present in a given volume of air; but only express how nearly the air is saturated. For example, air fully saturated at 32 deg. F. contains 2.13 gr. of moisture per cubic foot and is "wet" because it is full of water vapor; but if the temperature now rises to, say 60 deg., the vapor capacity of the air is thereby increased to 5.77 gr. per cu.ft., and its degree of saturation or "humidity" is then 2.13/5.77 × 100 = 36.9 per cent. In other words, the air at this temperature contains only 36.9 per cent. of its capacity, and is therefore comparatively speaking, "dry" air. Owing to the rise of temperature, from 32 to 60 deg., the air is capable of absorbing 5.77 — 2.13 = 3.64 gr. of moisture per cubic foot.

Calculation of Weight of Moisture In Air—In order to calculate the weight (w), in pounds, of moisture contained in one cubic foot of air, it is necessary to know the degree of saturation of the air (c), its temperature (t), and the vapor tension (t_v) corresponding to that temperature. This last must be taken from tables known as psychrometric tables. Calling the absolute temperature T = 460 + t, the formula is

$$w = 0.6235 \frac{c\, t_v}{0.37\, T}$$

The constant 0.6235 is the specific gravity of water vapor, and the constant 0.37 is the reciprocal of the weight of one cubic foot of dry air, at a temperature of 1 deg. F. (absolute) and a pressure of 1 lb. per sq.in.

Example—Calculate the weight of water vapor carried in an air current of 100,000 cu.ft. when the saturation is 80 per cent. and the temperature 70 deg. F., if the vapor tension at the given temperature is $t_v = 0.3602$.

Solution—The absolute temperature, in this case, is T = 460 + 70 = 530; and the total weight of vapor is

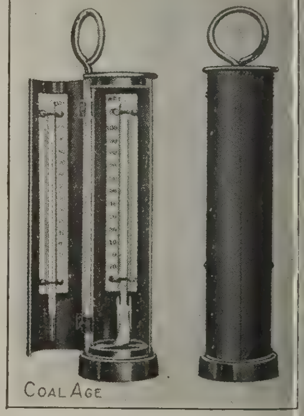
$$100{,}000 \times 0.6235 \frac{0.80 \times 0.3602}{0.37 \times 530} = 91.62 \text{ lb.}$$

The Coal Age Pocket Book

How Humidity Is Measured—The humidity of the air is commonly measured by an instrument called the "hygrometer" or "psychrometer." This is the "wet-and-dry-bulb hygrometer,"

Other forms of hygrometer have been employed depending on the absorption of the moisture from the air by certain hygroscopic substances, and dew-point hygrometers; but these are less simple and not as portable as the wet-and-dry-bulb hygrometer, which indicates the humidity by the difference in the reading of the wet-and-dry-bulb thermometers.

The Hygrometer or Psychrometer—A neat and portable form of the wet-and-dry-bulb hygrometer, designed by the Davis Instrument Manufacturing Co., is shown in the figure. Two delicate thermometers are mounted on springs on the inside of a light cylindrical folding metallic case, the dry bulb on the door and the wet bulb in the case. To the latter bulb is attached a fine silk or muslin sack, which forms a wick that extends downward to the small vessel which holds the water that keps this bulb wet.



A Pocket Hygrometer

Principle of Hygrometer—Unsaturated vapors, like gases, obey Boyle's law; and, for any given temperature, the ratio of the quantity or volume of vapor is equal to the pressure ratio, or the relative humidity (H), as expressed by the formula

$$H = \frac{\textit{Actual vapor pressure}}{\textit{Saturated vapor pressure}}$$

The saturated vapor pressure (dry-bulb temp.) is given in the tables. The actual vapor pressure, at the time of observation, is equal to the saturated vapor pressure of the tables, for the dew-point temperature, which, if known, would make the calculation easy by the use of the above formula. In the use of the wet-and-dry-bulb hygrometer, however, the relative humidity is calculated by the formula

$$H = \frac{P_w - \frac{B}{30}\left(\frac{t_d - t_w}{88}\right)}{P_d}$$

in which H = relative humidity; P_w and P_d the respective saturated vapor pressures of the tables, for the corresponding wet-and-dry-bulb temperatures t_w and t_d; and B the barometric pressure, in inches.

EXAMINATION QUESTIONS

Miscellaneous Questions

Answered by Request.

Ques.—What is the least amount of cover you would ow in the extraction of pillars in a 7-ft. seam of coal, under-sea areas? Show proof that your answer is proximately correct.

Ans.—The question appears to be incomplete, since does not give sufficient data in regard to the characr of the overlying strata or the depth of the water ove the solid formation. Without accurate informan in this regard and a knowledge or acquaintance th the action of the roof in the particular locality, it ould be difficult to give an intelligent answer to the estion and to name the minimum amount of cover, r any assumed thickness of strata; much less to give oof that such minimum thickness is even approxiately correct. The allowable thickness of cover must judged largely by the careful observation of working nditions and experience in the district.

While it is possible to assume that the strata overlyg the coal seam consist largely of shales and sandones, with a total thickness of not less than 60 ft. of ale, which is more dependable than sandstone, and to x the total minimum cover or thickness of overlying rata at, say 300 ft., it might happen that other unvorable conditions not mentioned in the question, exted, which would make the proposed thickness of strata nsafe. The question is not, therefore, one that should e asked in an examination, but must be left to be seted by the practical judgment and experience of the en in charge.

Ques.—What horsepower will it take to raise 60,000 al. of water up a shaft 250 ft. deep, in 1 hr., allowing 5 per cent. for resistance in the pump and the pipes?

Ans.—The weight of 60,000 gal. of water, allowing ight and one-third pounds per gal., is $60{,}000 \times 8\frac{1}{3} =$ 00,000 lb. Assuming a loss of 25 per cent. in friction, he power effective for lifting the water is $100 - 25 =$ 5 per cent. of the total power required. Therefore, the orsepower necessary, in this case, is

$$\frac{500{,}000 \times 250}{60 \times 33{,}000 \times 0.75} = 84+ \ hp.$$

Ques.—Assuming a volume of 25 cu. ft. of gas in the ace of an entry when the reading of the barometer is 0.7 in., how will this volume be affected if the baromter falls to 29.9 in.?

Ans.—Assuming that the temperature remains unhanged, the volume of gas or air expands in inverse roportion to the pressure; in other words, the volume atio is equal to the inverse pressure ratio. Calling the equired volume of the expanded gas *x*, we have:

$$\frac{x}{25} = \frac{30.7}{29.9}$$

nd

$$x = \frac{25 \times 30.7}{29.9} = 25.66 \ cu.ft.$$

Ques.—(a) Disregarding friction, what is the theoretical velocity of air corresponding to a water gage of 1.75 in.? (b) What is the pressure corresponding to this water gage?

Ans.—Since water is practically 815 times as heavy as air, the head-of-air column corresponding to a 1.75-in. water gage is $1.75 \times 815 \div 12 = 118.8$ ft. The theoretical velocity of air corresponding to this head-of-air column is:

$$v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 118.8} = 87.4 \ ft. \ per \ sec.$$

Ques.—In case a squeeze occurred in a mine of which you had charge endangering a heading and threatening to shut off a part of the work, how would you proceed to stop its progress?

Ans.—Much will depend on the conditions existing in the mine. The principal cause of a squeeze occurring in mine workings is the maintaining of too large a standing area, especially when the pillars are too small for the support of the overlying strata. When the pillars are insufficient or the open area is too large, the weight thrown on the pillars crushes the coal and starts a squeeze.

It is much easier to prevent a squeeze from starting than to stop one already in progress. To prevent such an occurrence, it is necessary to leave large pillars that will be sufficient to support the increased weight thrown on them by the extraction of the coal from the rooms. Also, in drawing pillars it is important to pull all timbers so that the roof will fall and thus relieve the pressure on the pillars.

In case a squeeze has started, the best way to arrest its progress is to rush work on the pillars and draw all timbers in abandoned places so as to start heavy falls of roof, in the path of the squeeze. Where possible, an attempt should be made to break the roof over the entry pillars, by placing shots in the roof, just inside of the mouth of each room. At important points on roadways, it may often be possible to build substantial "cogs," so as to reinforce the pillars at such points. This is also done in rooms to protect them from closing. The most effective method, however, is to relieve the pressure on the pillars by causing heavy falls of roof in all abandoned places adjacent to the squeeze.

Ques.—What must be carefully considered before the work of drawing the pillars is commenced?

Ans.—Before starting the work of drawing back pillars in a section of the mine, it is necessary to consider the effect this work will produce both on the surface and in the mine. Regard must be had to the future work and whether or not the drawing of the pillars will endanger the roads leading to other sections of the mine, or the work in those sections. It is also possible that the drawing of pillars may cause an inflow of water or gas into the workings that would prove a menace to the safety of the mine and this must, therefore, be taken into consideration before attempting to draw the pillars in any particular section of the mine.

COAL AND COKE NEWS

Washington D. C.

Within a short time probably a strong effort will be made to get Congress to adopt legislation giving the Interstate Commerce Commission power to completely control the physical equipment of railroads as well as to prescribe the condition in which they should keep their roadbed, trackage, stations, etc. Representative Stevens of Minnesota, an influential member of the House Committee on interstate commerce is behind the plan and it is understood that the scheme is supported by a number of Democratic members of influence.

The idea would be to enable the Commission to add this branch of labor to the powers it now exercises not only with the purpose of increasing the safety of passengers but also for the purpose of enabling it to end the socalled car shortage abuse.

As is well known, the Commission has conducted elaborate inquiry into car shortage during the past year, and it is claimed that the car shortage has been found to be due not only to actual scarcity of cars, as is frequently the case, but also to bad distribution or rolling stock, due in part it is alleged, to a disposition to favor given shippers. Particularly is this thought to be the case with regard to coal cars as to a shortage in which complaints have been numerous and constant for some time past.

The Commission has not had much success in enforcing its various orders with regard to the distribution of cars, various mines being said to have failed to get the quota to which they were entitled, or at all events to which they thought they were entitled.

A good many bills are now pending before the House Committee on interstate commerce with regard to the equipment question, many of them extreme and absurd in their nature, and some intended to deal directly with the alleged shortage of freight cars, including coal cars. The Committee is already making preparations to deal with the question of railway legislation at the approaching winter session, it being stated that the demand for further restrictive and repressive legislation has become irresistible, so that the legislative managers cannot afford to oppose it but must assent to the demand for doing something.

It is stated that the Stevens bill transferring the jurisdiction over the equipment question to the Commission would be more conservative by far than the adoption of measures prescribing in absolute terms what the railroads must do. In speaking on this point, Mr. Stevens says:

> Congress is too slow-moving a body to handle this question adequately. We are always ten years behind the times. The railroad problem should be solved by a small body of experts who are making a life study of it, rather than by 435 members of Congress who know nothing about the subject technically. Fifty bills are now pending in Congress on this subject. The way to deal with the problem is to turn the whole question over to the commission with power to act when occasion demands.

In spite of the relative conservatism which is thought to characterize Mr. Steven's proposal, it seems to find no favor whatever with the railroads but the information coming to hand is that they intend to oppose the scheme. Full hearings will be granted on the subject and it is believed that they may be undertaken shortly, without waiting for the winter session to begin, as Congress has now largely reconciled itself to the idea of remaining in session until almost December.

If this plan is followed, the effect may be to finish the preliminary work before the winter session technically begins, and thereby to render it possible to start the actual discussion of what is to be done with the equipment problem at the opening of the session.

The equipment discussion is likely to be closely associated with a debate on the rate question in which, a considerable proportion of attention will be given by Massachusetts members and others closely affected, to the question of how far present prices for coal are due to existing freight rates and how far the situation can be remedied through the adoption of proper legislation.

Investigating Experts Report

The Committee of special investigating experts appointed by Census Director Harris some time ago has completed its preliminary investigation of conditions in the Census and has made recommendations to the director. A part of the recommendations deals specifically with conditions as to t statistics of mining.

The Committee found that the current understanding wi reference to bad conditions in the census was by no mea exaggerated but that the Bureau was practically in a state disorganization and ineffectiveness while it has violated t law by delaying census statistics far beyond the time wh they were to have made their appearance. After outlini the situation and detailing the circumstances now obstruc ing work, the committee says:

> We therefore advise the Director to begin no new tabul tions or analyses in connection with the unfinished branch of the Thirteenth Census, namely, population, mining a quarries and to readjust the work of these branches on t delayed annual reports so as to insure their publication n later than Dec. 31, 1913. Further on the investigato suggest "That the tables relating to mines and quarri now in the form of printed bulletins, proofs, or manuscript sent to the public printer at once, the same to constitute t fiinal report on mines and quarries, and that no furth tabulations or text be prepared in connection with th report."

If these recommendations are carried out, they will e the further development of the mining census which h been generally conceded to be nearly as worthless as such enterprise could well be, particularly in its relation to co mining. The general opinion appears to be that the c operation between the Census and the Geological Survey regard to mining figures, which had been expected to yie beneficial results has been of no service in improving t data finally secured.

Coal Trade Changes Due to New Tariff

As a result of the new tariff, now practically law. which is carried as paragraph 459 in the free list the fo lowing: "Coal anthracite, bituminous, culm, slack and shal coke; compositions used for fuel in which coal or coal du is the component material of chief value, whether in brique of other form," it is expected that coal trade with Canad will be greatly altered in direction.

Considerable importations are expected to cross the bord into the United States both from the eastern and weste mines while on the other hand our export trade in coal t Canada via the Great Lakes is expected to be considerabl enlarged, as well as probably in other parts of the countr The precise changes that will be produced in this way ar however, not yet known, and experts are still uncertain to the precise direction they will take.

HARRISBURG, PENN.

Actual returns compiled by field secretaries of the Min Workers Institutes demonstrate that the fast growing min schools of the anthracite region of Pennsylvania have full proved their worth. Of the 56 candidates who presente themselves for the state examinations for certificates i Nanticoke Borough and Newport Township this year 4 of th 7 successful candidates for mine foremen's and 24 of the 3 successful candidates for assistant mine foremen's certificate were students of the mine schools.

At Mt. Carmel where the schools have not been in existenc long none of the students were sufficiently advanced to present themselves for examinations. One mine foreman's certificate and 6 assistant mine foremen's certificates wer granted at this year's examintions.

Of the 27 candidates who presented themselves for the examination at Shamokin, 2 of the 8 successful candidates fo mine foremen and 4 of the 14 successful for assistant min foremen's certificates were students of the mine schools.

The foregoing proves conclusively that the mine schools which open again next month, are adequate to equip me for the examinations and for better paying positions. A summary of the above returns shows that students of the school were granted 6 mine foremen's and 28 assistant mine foremen's certificates, which is a good showing for the schools

Mining Institute to Open in October

At a meeting of the board of directors of the Wilkes Barre District Mining Institute it was decided that the institute be opened the second Saturday in October. Secretar Devendorf made a report of the institute dinner held in Ma and reported that at present there is a membership or 114

The arrangements for the meetings of the institute for the coming winter were left in the hands of Mr. Devendorf. The November meeting will be devoted to the foreign speaking members of the association.

Work of Public Service Commission

The Public Service Commission of Pennsylvania has announced that the experts engaged on the inquiry into the rates for hauling coal from the anthracite collieries to Philadelphia have found that the work is greater than expected, but that a report will be filed shortly. The detail work is well advanced and an outline will soon be submitted to the commission, showing the charges and hauls on each railroad running into the anthracite territory.

The Commission will hold a hearing on Friday, Sept. 26, on one of the complaints concerning the rate on shipments of bituminous coal from the Clearfield district to York and Lancaster. On the same day the commission will give hearing to the Bell Telephone Co. on the tentative schedule of rates as published by the old Railroad Commission.

Reorganization Helps

A redistribution of responsibility, together with some increase in the number of assistant foremen, has been effected in the mines of the Lehigh Valley Coal Co. in the anthracite region. The former system was for the "fire-bosses," now known as assistant foremen, to make a thorough inspection of the mines each morning, as prescribed by the Anthracite Mine Laws, to warn the men of all dangerous spots, and to take whatever precautions were necessary to render the mines safe during the day; and then to leave the mines under the general supervision of the inside foreman. The driver bosses in charge of transportation only had no authority over the men, and could only caution them and report to the foreman whatever they saw that looked dangerous or wrong.

At present the mines are divided into districts, each one small enough to be patrolled easily by an assistant foreman, with time enough for him to stop and see that his orders are thoroughly carried out. The morning inspection before the men enter the mines is carried on as carefully as ever, but now the assistant foremen with authority over the men continue the inspection each in his own district throughout the working day. Each one is responsible for safe conditions in his district, and reports to the inside foreman. There are no more driver bosses, each assistant foreman being held responsible for the transportation through his district.

This system has been found to be a success, according to officials of the Lehigh Valley Coal Co., and has added greatly to the safety of the men who were prone formerly to forget the instructions of the fire-bosses and take a chance, when left to their own devices in order to hurry through the work.

PENNSYLVANIA

Anthracite

Hazleton—Orders have been issued by Kehoe & Co. which brought about a suspension of two of their big stripping operations. The suspension is due to the scarcity of water which has been prevalent in the Mahanoy Valley for several weeks. The company operates two big strippings, one at Packer No. 5, Lost Creek, and the other at Sayre, near Mt. Carmel. For the past two weeks operations have been hampered by the diminished water supply, but as long as it lasted the men were kept employed in the hope that a heavy rainfall would occur, eliminating the necessity for suspension. However, the drought has become so pronounced that it was found compulsory to close down the operations. About 70 men are affected.

Fern Glen—The miners at Fern Glen, an operation owned by the Lehigh Valley Coal Co., are on strike. The breast miners claim that it is their desire to buy their dynamite by the box, but that they are allowed only 3 lb. a day by the company, while the company miners get theirs by the box.

Plymouth—The Lance No. 11 Colliery, of the Lehigh & Wilkes-Barre Coal Co., which closed down on Aug. 8 in order that necessary repairs might be made to the shaft, breaker and engines, will soon be ready to resume operations. A concrete lining has been built in the shaft, from the surface to the rock, about 13 ft. Iron doors are to be placed over the shaft mouth as a protection against fire, the breaker being directly over the shaft. In a short time compressed air locomotives are to be put in service inside, the compressor engines being already in place on the surface.

Pittston—A squeeze in the workings of the Butler Colliery, of the Pennsylvania Coal Co., caused the bank of the old Hughestown reservoir, owned by the Spring Brook Water Supply Co., to give way, and the water rushed down to Mill St. and other thoroughfares in that section, causing considerable damage. The water flowed out of the reservoir through an underground channel, the stone walls holding firmly against the pressure. Part of the water went down into the mine, while the stream that took the surface course was much smaller.

Bituminous

Indiana—A large field of coal lying on the Indiana County side of the Conemaugh River, east of Garfield, is being taken up by Westmoreland and Fayette County coal operators. The field is a large one and adjoins land recently taken up by the Frick interests, who are interestd in brick manufacturing concerns located at Bolivar. The extent of the operations have not been decided, but a large block of coal has been taken up. The output of new mines, which will be located some distance from Garfield will be shipped over the Pennsylvania R.R. The spur to the new mines is so located that it will be possible to ship either over the Penn or Conemaugh Division or over the main line to points East.

Johnstown—George Ringler, aged 53, was killed when a steam pipe exploded in the power room of the Brothers Valley Coal Co., Ringler was killed instantly and another workman was badly scalded. The boilers were being prepared for inspection when the accident occurred.

Uniontown—There has been a considerable awakening of interest of late and no little inquiry for good coal land, and prices are buoyant. Uniontown men have been taking options for some weeks on the Pittsburgh vein of coal underlying farms in the vicinity of Ten Mile and Hackney in Washington County. The prevailing option price is said to be $600 per acre. It is said also that blocks of land of considerable size will likely change hands under the options now being secured. Brokers claim, however, that practically all large areas of coal available for operating in Allegheny County are controlled by the big corporations, so that the marketable supply is small.

WEST VIRGINIA

Charleston—The petty strike fever which has long vexed the Anthracite region seems to have been transplanted into the West Virginia coal fields. The men employed at the mines of the Eureka Coal Co. on Morris Creek, near Montgomery recently went on strike because a motorman was discharged. Five hundred men have been on strike for a short time on Paint Creek. Miners who are employed by the Edward Marmet Co. on Lens Creek have also been on strike. All of these contentions have been of a somewhat trivial nature and at the present time all the miners have returned to work. In order to cope with this situation President Thomas Cairns of District 17 United Mine Workers of America, has issued an ultimatum stating that "no more strikes will be tolerated unless ordered by proper authority." Resorting to petty strikes, he affirms is ruinous to the miners' cause and to the interests of the operators.

Coal operators with mines along the Chesapeake & Ohio, Kanawha & Michigan, Virginian and Norfolk & Western R.R. met in Charleston, Sept. 19 and organized an Operators Protective Association. A fund of $1,000,000 is said to have been raised to protect the interests of the mines in this organization.

KENTUCKY

Frankfort—Suit has been filed in the United States District Court, by J. W., A. W. and Hattie Sewell asking for a receiver for the properties being operated for coal and oil on Caney Creek by the Kentucky Block Cannel Coal Co., S. R. Collier and several others, being made defendants. The receivership is asked pending the settlement of a controversy as to the title, which is claimed by both plaintiffs and defendants. The Collier interests are said to be taking 1000 barrels of oil a day out of the property, while the coal rights are equally valuable.

Pineville—Many of the mines in the vicinity of Pineville, have been operating on a half-time basis, on account of the drouth, while a few have been compelled to shut down completely. Several recent light rains have given hope that relief is in sight, however, as there is now ample moisture in most parts of the state. Heavy orders are on hand, and over-time operations will probably be the rule as soon as there is sufficient water available for the work.

Dekoven—President L. B. Walker, of District 23, United Mine Workers of America, has declared a strike at the Dekoven mines in Union County, the matter under dispute being the disposition of unclaimed cars of coal finding their way out of the mines to the check weighman. Under an agreement with the operators it is claimed by the men that such occasional unclaimed cars were to have gone toward paying the wages of the check weighman, but that this arrangement has been discontinued.

OHIO

Columbus—It is rumored in railroad and coal mining circles that the southern division of the Detroit, Toledo & Ironton may be abandoned. The property was recently sold at receiver's sale and a considerable amount was required from the contractor to bind the agreement. After investigation it was found that the road was losing practically $45,000 per month and the purchasers have been loath to consummate the deal. Operators on the road have filed many complaints with the Public Utilities Commission as to lack of equipment and motive power.

John C. Davies, chief deputy in the mine inspecting department of Ohio in his report made to Governor Cox predicts that the year 1913 will be the banner year in Ohio's coal production. The state mine department has been taken over by the new Industrial Commission and goes out of existence as a separate department. Mr. Davies says that the business of 1913 should show a substantial gain over that for 1912 when it was 34,400,000 short tons. He also says one of the needs of the mining industry of Ohio is more thorough supervision and greater precaution on the part of the operator. He calls attention to the increased number of fatalities.

Athens—The commission appointed by Governor Cox to investigate the conditions surrounding the payment for coal mined in Ohio spent last week inspecting Mine No. 9 of the Circle Hill Coal Co., near Athens. Governor Cox accompanied the commission on its investigation trip. Next week mines in the Indiana and Illinois district will be investigated. It is the plan to bring the operators and miners together to agree on a number of witnesses from each state to testify before the commission. Every effort is being made to have the report ready by Dec. 1.

Massillon—Massillon city firemen recently fought flames in an entry of the Smith-Beaver mine 150 ft. below the surface of the earth until they had them under control. All of the fighters were equipped with smoke helmets.

INDIANA

Princeton—John G. Wright, deputy inspector of mines in Indiana, recently closed down the plant of the Princeton Coal Mining Co., for failure to obey certain orders with reference to the manner of operating. Inspector Wright said that the mines would not be allowed to reopen until his orders were complied with.

ILLINOIS

Belleville—In the Circuit Court here, the suit of Sherman Grant against the Chicago, Burlington & Quincy R.R. and the Southern Coal & Coke Co., for the loss of his right leg under a coal car while working for the coal company, resulted in a judgment of $6000. He sued for $10,000. While running down cars at the coal company's mine, in some manner he fell in front of a coal car, claiming the railroad company and the coal company at fault.

The annual report of the County Mine Inspector for the past year shows a death toll of 9 lives lost in the production of coal, a decrease of 4 from the previous year. Forty-one were injured, which is 12 less than last year. The report shows that one man out of every 630 miners was killed and one out of every 39 injured each year. The total number of employees in the mines in the county is 5717. The total production of coal was 4,738,198 tons, an increase of 217,672 tons in the 73 mines in the county, of which 8 did not operate during the year on account of the low price of coal. During the summer months 24 mines suspended on account of no business. Two new mines were opened during the year and four old mines abandoned, two on account of mine fires.

Herrin—Mine B of the Chicago & Carterville Coal Co. employing 350 men resumed operations Sept. 16. The indications are that the coming fall will be the greatest season ever experienced for the production of coal in this region.

Bush—It will likely be many months before work is resumed at the mine of the Western Coal & Mining Co., at this point. Progress in cleaning out the squeezes and falls is slow.

Springfield—Inability to meet a bond issue of $2,500,000 will result in a public auction within the next 60 days of the mining properties of the Illinois Collieries Co., valued at $3,000,000. The decree has been entered in the Sangamon Circuit Court. The sale will be made at the Court House in Springfield, of the eight different mines, located as follows: Springfield, mine known as the Dickerson Coal Co.; Chatham, abandoned mine; Auburn, a leased mine; Virden, two mines; Girard, one mine; Litchfield, one mine; Sorento, one mine.

Several of these mines have been leased to other parties and are being operated, but the leases were subject to an action of the above nature.

Chicago—Three additional involuntary petitions in bankruptcy were filed Sept. 15 in the United States District Court against concerns affiliated with the O'Gara Coal Co. These companies were the Middle States Coal Co., the Imperial Mining Co. and the Vivian Collieries Co. Judge Carpenter appointed Thomas J. O'Gara and Fred A. Busse to act jointly as the receivers for the companies. He later issued injunctions forbidding the sale of various bonds and other property held as collateral against two of these companies.

MICHIGAN

Bay City—All coal mines in the Michigan district were closed Sept. 15 and the operators insist that they will not be re-opened until the differences between the union and the Handy Brothers Mining Co. in Bay County are adjusted. About 3000 men are affected by this suspension of work the cause of which is the alleged refusal of union officials to consent to an arbitration of differences. Seven hundred men recently struck at Handy Brothers Mine claiming that the operators had refused to pay what was due them under the working agreement made in April 1912.

COLORADO

Trinidad—A strike of most of the coal miners of District 15, United Mine Morkers of America was declared Sept. 15 to take effect Sept. 23. The resolution of the Executive Committee of the United Mine Workers endorsing the strike was adopted by a unanimous vote at a convention of the district.

Several cars of provisions are being distributed among union commisaries, and union leaders have rented ground presumably for concentration camps. The operators are also making preparations to protect their property in case of serious trouble.

PERSONALS

Isidor Wulfson, city weights and measures inspector for Indianapolis, has made a ruling that coal must be sold by small dealers by the standard weight or measure and not by the basket. If they sell by the bushel they must give 80 lb. to the bushel.

A. H. Von Bayer, of Detroit, Mich., has arrived at Ashland, Ky., to take up his duties as superintendent of the new plant of the Solvay Coal & Coke Co., at that place. H. M. Cole, superintendent of construction, who has been at work on the new plant, has left Ashland.

George E. Smith, auditor for the Utah Gas & Coke Co., Salt Lake City, has been appointed assistant auditor of the American Public Utilities Co., at Grand Rapids, Mich. The latter company is a parent organization of the Utah concern and controls 11 gas and electric street railway corporations in various cities.

A. W. Calloway was appointed vice-president of the Davis Coal & Coke Co., Sept. 18, by J. M. Fitzgerald, president of the coal company and of the Western Maryland Ry. Mr. Calloway is at present general manager of the Rochester & Pittsburgh Coal & Iron Co. with offices at Indiana, Penn. He will assume his new duties not later than Nov. 1.

Hywel Davies, of Louisville, Ky., the active head of the Kentucky Mine Owners' Association, recently moved his offices to Lexington, where he has business interests which demand his attention. That location is also more convenient as the headquarters of the Mine Owners' Association, on account of its proximity to the rapidly developing eastern Kentucky field, and by reason of the fact that the State Department of Mines is also located in that city.

Earl Henry, state mine inspector of West Virginia, has announced the appointment of two new inspectors. Enoch Carver, of Charleston has been appointed to succeed J. H. Jackson in the Sixth District. E. B. Lambert, of Williamson, succeeds H. H. Pinckney in the Twelfth District composed of Wayne, Mingo and part of McDowell counties. Mr. Lambert has lately been general manager of the Glen Alum Coal Co.

William Haven, manager of the Inland Fuel Co., of Chariton, Iowa, in announcing to the company's employees the firm's intention to cease operations, paid a high tribute to upt. George A. Verner, son of John Verner, and to Hoisting ngineer W. S. Lowe. He said in part: "During a period of iore than 11 years not a man has been killed or even seriusly injured, and there has been no friction over labor onditions and no call for arbitration." This excellent record e attributes to the care and diligence of the superintendent nd hoisting engineer above named.

OBITUARY

James Ross, ex-president of the Dominion Coal Co., died at Iontreal, Sept. 20, from heart disease at the age of 65 years. Ir. Ross was born at Cromarty, Scotland, and came to the Jnited States in 1870 where he became chief engineer of he Ulster & Delaware Ry., and held other important posiions.

Removing to Canada he was appointed chief engineer and ubsequently general manager of the Victoria Ry. He built he Credit Valley Ry. in 1878 and 1879 and in 1883 had harge of the construction of the Canadian Pacific Ry. west f Winnipeg.

He took up his residence in Montreal in 1888 and became dentified with many extensive industrial and electrical enerprises occupying the position of president of the Dominion oal Co. for many years. At the time of his death he was resident of the Dominion Bridge Co. and the St. John Ry. nd a director of numerous other companies.

Mr. Ross was a member of the American Society of Civil ngineers and a noted yachtsman, devoting much of his ime to this sport. He was a liberal contributor to hospitals nd other charitable institutions.

CONSTRUCTION NEWS

Connellsville, Penn.—Work on the 200 new ovens at Leisenring, No. 2, is being pushed as rapidly as possible. One undred new ovens are also to be added to the Clarissa lant.

Pocahontas, Va.—The Pocahontas Consolidated Collieries o. expects to build a steel tipple near Bluefield, W. V., at a cost of about $65,000 with a capacity of 3000 tons in eight hours.

Bellaire, Ohio—The Cambria Mining Co. which is developing coal near here has its shaft completed and has let a contract for the erection of a steel tipple 50 ft. high, and 200 ft. long.

Boswell, W. Va.—One of the biggest shaft mines in the state and one of the most complete and up to date in America, will be constructed for the Consolidation Coal Co. on the old Biesecker farm near Boswell.

Birmingham, Ala.—A plant to manufacture benzol is to be erected at the by-product coke ovens at Fairfield in the next few months by the Tennessee Coal, Iron & Railroad Co. It is estimated that this plant will cost $1,500,000.

Champaign, Ill.—After considerable deliberation John O'Neill has decided to sink a shaft on his farm where a coal bed was discovered several weeks ago. The vein is 7 ft. thick which is somewhat thicker than the average in this part of the state.

Fairmont, W. Va.—It is estimated that the Louisville & Nashville, Chesapeake & Ohio and Baltimore & Ohio railways, have expended, or are about to expend over $55,000,000 developing the Elkhorn coalfields in southeastern Kentucky. The coal is claimed to be of the highest grade for coking, gas production and by-products.

Norwood, W. Va.—It is reported that work is well under way on a new branch line of the Norfolk & Western R.R., from Norwood, W. Va., up Laurel Hollow, a distance of four miles, in order to reach the properties of the Houston Coal & Coke Co., upon which shafts are already being sunk. The property is said to be unusually promising.

Jenkins, Ky.—Three hundred and fifty carpenters who have finished their work at Jenkins, the newest town of the Consolidation Coal Co., have gone to Fleming, the center of the Mineral Fuel Co.'s operations, to push forward the work of completing the buildings proposed for that town, before cold weather begins. The Nicola Building Co., of Pittsburgh, Penn., has the contract for most of the work being done, and is employing in the neighborhood of 2000 men in Fleming.

Columbus, Ohio—Coal operators, shippers and especially dealers in Columbus, are much interested in the plans for flood prevention, which are now the chief topic of discussion. Recently expert engineer Alvord submitted 10 different plans for preventing future floods in the Buckeye capital. He recommended plan No. 7, which provides for digging a new channel 880 ft. wide, and capable of taking care of 150,000 cu.ft of water per second. The cost of this plan is $12,000,000. The city council has taken steps to have the question of issuing $8,500,000 bonds for the city's share of the cost, submitted to the voters at the November election.

NEW INCORPORATIONS

Oakland City, Ind.—The J. M. C. Coal Co. has been incorporated to mine and deal in coal. The incorporators are John A. Jones, Janral R. Jones and K. Jones.

Cleveland, Ohio—The Balkan Mining Co., of Cleveland, Ohio, has filed papers with the secretary of state, increasing its capital stock from $300,000 to $500,000.

Cleveland, Ohio—The Kea Coal Co. has been organized in Cleveland to mine and deal in coal. The capitalization is $10,000 and the incorporators are Quay H. Findley, A. E. Bowdler, F. B. Pease, M. F. Edwards and T. F. Burton.

Columbus, Ohio—The Hazel Ridge Coal Co. has been organized to mine and deal in coal. The capital stock is $10,000 and the incorporators are Louis G. Addison, John R. King, Thomas H. Clark, L. L. Schaeffing and Arlington O. Harvey.

Pomeroy, Ohio—The Martin-Ersbach Co., of Pomeroy, Ohio, has been incorporated with a capital stock of $250,000, to mine and deal in coal. The incorporators are H. C. Royal, R. F. Marburger, C. L. Leher, C. E. Herrman and F. A. Siebold.

Williamsburg, Ky.—The Southern Mining Co. was recently incorporated, with a capital stock of $30,000, for the purpose of taking over the business of the Southern Mining Co. of Kentucky. The incorporators were E. C. Mahan, A. M. Stewart, P. G. McElroy and others.

INDUSTRIAL NEWS

Charleston, W. Va.—During the month of August 1913, the Norfolk & Western Ry. transported the following tonnage of coal from the West Virginia mining district: Pocahontas Field 1,318,149 tons, Tug River Field, 232,865 tons, Thacker Field, 296,422 tons, Kenova Field 89,271 tons, total 1,936,707 tons.

Washington, D. C.—Freight rates on coal, both bituminous and anthracite, shipped over the Chicago, Milwaukee & St. Paul Ry. and other lines from upper lake ports to destinations in the Northwest, particularly in South Dakota, were attached Sept. 19 before the Interstate Commerce Commission by the State of South Dakota. It was alleged that existing rates were unreasonable, discriminatory and excessive, and the commission was asked to readjust them downward on a basis of equity.

Fairmont, W. Va.—A deal was completed Sept. 19 by which the Fairmont and Cleveland Coal Co. purchased the holdings of the Parker Run Coal Co., for a cash consideration of $200,000. The new company is composed mainly of Fairmont and Cleveland men, and the capitalization is $600,000. The company also owns several hundred acres of coal land so far undeveloped on Kiverbaugh Creek. The Parker Run Co.'s holdings were developed and shipment was being made by boat and rail for the past two years. The new company will continue the present method of shipping and will also ship over the Baltimore and Ohio R.R.

Richmond, Va.—People living along the Norfolk & Western R.R. are soon to have a hearing against that carrier before the State Corporation Commission. The handling of coal from Virginia mines is the basis of the complaint. These mines are along the line of the Virginia Southwestern, and in order to get to the parties along the line of the Norfolk & Western, it is necessary to use both roads. The tariff on coal would therefore be higher. The Norfolk & Western is understood to demand nearly as much for bringing the coal from Bristol to points along its line as it does for coal brought from Pocahontas. The case will probably come up in the course of the next few days.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite coal more active although lake shipments are slowing down. Abnormal tonnages of bituminous being diverted to the Eastern markets but prices continue firm. Operators finding it difficult to meet their obligations.

If the winter weather opens up early, as conditions seem to indicate, there will be a quick rush for hard coal. There is already a notable change for the better in the retail trade, while reports from the mining regions are to the effect that the big producers are beginning to tune up production. There is an insistent and almost urgent demand for certain grades. Lake business is slowing up because of a congestion at the upper end, but ports on the Atlantic Coast, which are closed to navigation in November, are buying aggressively.

The inquiries for bituminous are plentiful and indications are that prices will shortly move to still higher levels. The lower grades, and shipments all-rail are inclined to be dormant with a slight disposition to sag but this appears to be only temporary. If the demand holds firm, a flurry of greater or less proportions seems to be inevitable this fall. The appearance of some inclement weather has interfered with the coastwise movement to such an extent that the accumulation at Boston has already been cleaned up.

The Eastern railroads are not permitting their equipment to be consigned to Western points, with the result that there has been more than the normal tonnage diverted into the Eastern markets. There is a steady call at tidewater for all good grades, and some operators are experiencing difficulty in meeting their contract obligations. Practically all of the West Virginia coals are commanding premiums, whether for prompt or deferred delivery.

The car supply has been less plentiful in the Pittsburgh district, particularly on certain divisions, and the production is being maintained with difficulty. Domestic coal is the feature of the situation there, dealers who failed to contract earlier in the season now being forced into the open market. It has been pointed out that the Pittsburgh district may develop a very competitive trade this season because of the large tonnage which the operators have left uncovered, for use in the prompt market.

The lake business in Ohio has slowed down materially, due to the large accumulation at the head of the lakes, and the short supply of vessels. In the other markets, however, all grades continue to show increased strength, particularly domestic coal, which is in excellent demand; a big rush is anticipated when the cold weather opens up. There is even less coal at Hampton Roads than last week, but large shipments are en route from the mines, so that the situation will be improved shortly. A vigorous buying movement was precipitated in the Southern market by the advent of some unexpected cool weather.

Shipments in the Middle West have slowed up somewhat, but are generally good on the whole. Buyers who failed to contract are now inclined to disregard the higher prices in their anxiety to get under cover; operators, on the other hand, prefer to hold off. The prospects for the fall business are excellent. Steam grades are a little difficult to move, although a great many mines are well sold up ahead.

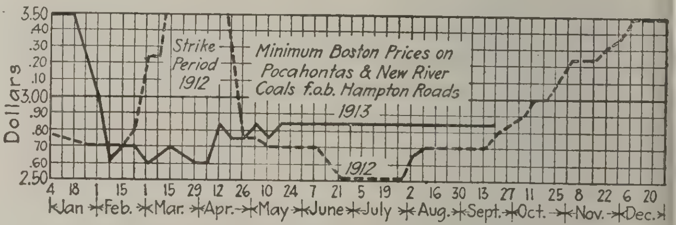
BOSTON, MASS.

There is an upward turn to Pocahontas and New River, and the demand is strong in every direction; orders being declined. Georges Creek receipts at tide very small. The Pennsylvania coals share the general firmness, and higher prices are looked for. The beginnings of a rush for anthracite.

Bituminous—Things are beginning to happen in the Southern coals. Practically every brand of Pocahontas and New River is now commanding a premium for shipment either spot or deferred, and some of the agencies are so far sold up in one direction or another that they are now declining business of any kind. The off-shore demand is notably strong, due largely to apprehensions abroad, and there are rumors, too, of labor agitation in the lower districts of West Virginia. Loading dispatch at Hampton Roads is still normal but only because shippers are rejecting tonnage except on old purchases. If the demand holds to the strength it is now assuming we shall have an active market in October; $3 f.o.b. Norfolk has been reached this week and no let-up is now in near prospect. All factors are growing shy of committing themselves and it may be we shall have an autumn "flurry."

The weather has been unfavorable to movement coastwise and the handling piers here are gradually working through the accumulation of the past fortnight. The situation in New England is therefore in comfortable shape.

Georges Creek receipts at tide continue very light, and it begins to look dubious for any heavy volume of this popular grade. The shippers are apparently confining their efforts to the clearance of large bottoms at Baltimore, to such extent, in fact, that Philadelphia and New York requisitions go begging.



The Pennsylvania coals are also showing renewed strength. Inquiries are plentiful and it is probably only a matter of days when prices will begin again to move to new levels. Contracts made last spring that have since remained dormant are now being revived and there is a steady call at tide water for all the good grades. All-rail the demand is moderate but with a strong outlook for the rest of the season.

Anthracite—All the companies are well supplied with orders. Broken and stove are getting increasingly short. From New York some of the shippers are declining orders that call for more than a third stove in the cargo. If the winter starts cold there will almost surely be a rush for hard coal of any kind. The Eastern ports that will close to navigation late in November are getting vitally interested in having cargoes come forward, and in every quarter the demand is active. The new advance in barge rates from New York will tend to throw an extra pressure on Philadelphia and developments are already being watched with more or less concern.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.50	$1.30@1.65	$1.67@1.77	
Philadelphia*	2.35@2.75	2 55@2.90	2.92@3.02	
New York*	2.65@3.00	2.85@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.90@3.00
Providence†				3.83@3.93
Boston†				2.98@4.08

NEW YORK

Soft coal tending to ease up slightly, but this is confined to the off grades. Supplies at tide rather low. Retail anthracite active and the wholesale trade is also beginning to feel the effects of the advancing season.

Bituminous—There appears to be a feeling in some quarters that the soft-coal market is a trifle easier this week. However, the good grades continue in as short supply as ever, what weakness there is being confined entirely to the off qualities or certain specialties, for which there does not happen to be any demand at the moment. The high-volatile railroad coals are particularly easy. On the other hand supplies at tidewater are generally low, so much so in some instances, as to cause some uneasiness. As a matter of fact it is noticeable that pessimistic opinions of the situation emanate principally from buyers.

The car supply is beginning to tighten up quite perceptibly, particularly on the Pennsylvania, where operations are often quite restricted at the close of the week; the situation is somewhat better on the New York Central. The heavy rains last week relieved the water famine, which was causing some restriction in operations in the Pennsylvania field. Quite a lot of labor trouble is cropping up in spots, which is making it difficult to maintain a heavy production; there are ations that the "button strikes," which have been so lent in the hard-coal region, may be spreading to the inous districts also.

will be entirely a weather market from now on. The in temperature must inevitably bring higher prices, eas if the weather continues mild quotations will remain y. At present the market has not experienced any ge and remains quotable on the following basis:

est Virginia steam, $2.60@2.65; fair grades of Pennsyl- , $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@

nthracite—The retail hard-coal trade is opening up ac- , orders coming in from all directions. The improve- has not extended to the wholesale branch as yet, how- and this continues to drag, particularly as regards in sizes. Stove coal is in short supply with orders far cess of the demand; nut is improving, the demand now ring to be about up to the production. The steam grades nue going into storage and are in quite easy supply, cularly pea and buckwheat; the advent of colder weather ause these to move more promptly.

e somewhat cooler weather already experienced is, no , having a psychological effect upon the consumers, who giving more consideration to their fuel supplies than l otherwise be the case. It is also noticeable that there endency to tune up the production in the mining regions. car supply is generally excellent, except when certain ment is specified, as, for instance, box cars. The heavy last week removed the possibility of a water famine, has been threatening for some time.

e quote the New York market as follows, with prices rately firm except on a few grades:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
t	$5.00	....	$4.95	....
	5.25	$5.15@5.25	5.20	$5.10@5.20
	5.25	5.25	5.20	5.20
ut	5.50	5.40@5.50	5.45	5.30@5.45
	3.50	3.40@3.50	3.45	3.35@3.45
heat	2.75	2.60@2.75	2.45@2.70	2.35@2.70
	2.25	2.25	1.95@2.20	1.80@2.20
	1.75	1.75	1.70	1.50@1.70

BALTIMORE, MD.

e market for the cheaper grades of soft coal showing derable weakness. Demand East and South very light. still continues best feature of market. Car supply much r.

hile the better grades of coal, which are now pretty covered by contract, are showing no signs of weakness, arket for the lower-class fuels was sagging during the The Great Lakes were still calling for large quanti- f three-quarter coal from West Virginia, but a number astern roads are refusing to allow their equipment ve westward and many operating interests were forced ip coals east that they could have obtained much bet- rices for in the West. The result was that the supply considerably in excess of the Eastern demand for spot nd sales were made of fair grade West Virginia coals d 85 and 95c. Westward these same grades were bring- bout 15c. to 20c. better.

e lower grade Pennsylvania coals were not in anything s liberal supply, and while demand was not very brisk, continued firm at $1 to $1.10. The better grades were uch in the market, and the few spot sales recorded were d $1.50. Gas slack proved the real sensation of the instead of moving backward it continued to advance. nd on every side was reported in excess of the supply, e result was that sales around $1 were recorded.

r supply was much better. Under the lightened demand uick movement the West Virginia field, which was so of cars the week before, reported plenty of equipment ovement East. The only shortage seemed to be in con- n with the heavy movement toward the lakes. Lack oor still continues a serious problem in many mining cts.

e announcement of the appointment of A. W. Calloway, Rochester & Pittsburgh Coal & Iron Co., as vice-presi- and general manager of the Davis Coal & Coke Co., is d on here as the first step on the part of the Western and Railroad to bring about a separation of its railroad oal interests.

PITTSBURGH, PENN.

oduction at full rate, with cars scarcer. Increased de- for domestic coal. Unsold capacity for delivery after shipments close. Connellsville coke prices maintained more difficulty. The production of furnace increased the merchant ovens decreased.

Bituminous—Market demand for domestic coal has materially increased. Many dealers failed to make their usual contracts last spring, with the result that there is more buying than usual at this time. Shipments are heavier on such contracts as were made. Car supply is not so good as it was, there being serious shortages now reported on some divisions. Labor supply is about the same as formerly. Production is approximately as heavy as at any time, but is maintained with more difficulty. There is not much demand for free coal outside of that for retailers. Prices are well maintained as lake shipments continue heavy, but it is understood that a number of operators curtailed their contracts in the hope of securing better prices late in the year and this may develop more active competition, putting prices to a test, which has been lacking in the past few months.

Regular prices are well maintained: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

Connellsville Coke—The market for prompt furnace coke has been somewhat irregular, there being moderate offerings, with very light demand. Prompt coke of slightly off grade has probably gone as low as $2.25, and standard grade at $2.40, but only in very limited tonnages, regular supplies being held at $2.50. No important demand is to be expected until furnaces covered for September, but not October, come into the market, when the $2.50 price maintained for several months may be under greater pressure than at any previous time. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $2.90@3; contract furnace, $2.90@3 per ton, at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Sept. 13, at 374,810 tons, an increase of 5351 tons, the furnace-oven output having increased 14,097 tons, and the merchant-oven output decreased 8746 tons. Shipments are reported at 374,911 tons, an increase of 3641 tons.

BUFFALO, N. Y.

No slacking off in demand for bituminous. Slack continues firmer than sizes, which is a very good sign. Reports from Pittsburgh state that the trade is very confident. Anthracite beginning to move. Fall demand is here.

Bituminous—The trade is quiet and firm as ever. Nobody has any surplus and it is difficult to keep up a supply, especially for filling contracts. Operators would be glad if they had no contracts, hard as it is to refuse one when offered at current prices. A local jobber reports an offer of a large contract for slack, but he is not able to decide on a price; it is the very strong condition of the slack market that creates most of the confidence.

It is said by some of the jobbers that the demand for any sort of coal is not heavy, but the operators state that they could sell much more than they are able to mine. This is not a jobbers' market in any sense, so that all reports from them must differ quite widely from the views of operators. This is, in fact, about the first time in the history of bituminous coal when it would sell itself. Cars are steadily becoming scarcer and they will not be at all plenty again for some time. There has been much difficulty all through the Allegheny Valley to obtain water sufficient for either mining or locomotive supply. There has been considerable rain there, however, during the past week, so that the situation is now quite easy.

There is no change in the bituminous quotations, unless it is possible to make them still firmer than formerly. The figures continue at $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.25 for slack, with Allegheny Valley about 20c. lower.

Coke—It seems impossible to stiffen up the coke market, after the manner of bituminous coal, though it is so much lower than it used to be. The combined efforts of consumers to break down the price appears to be still exerted. Jobbers are at a loss to find any other reason for the weakness of prices, which are based on $4.85 for best Connellsville foundry, with some jobbers quoting 10c. lower.

Anthracite—The recent cool weather revived the anthracite market decidedly, and some shippers are reporting quite an insistent demand for stove, which is running away ahead of chestnut; indications are that it will be hard for the companies to hold the advance of 25c. over the price of chestnut, made sometime ago. The consumer as a rule now finds that he can use stove, not only in place of chestnut, but in furnaces also, and this is not favorable to the higher price.

The Western trade in anthracite is picking up fast on all rail lines, and it would also be active by lake if the upper docks could handle it. As they are badly congested, the amount shipped here in that trade has been reduced. Shipments by lake for the week were only 91,000 tons, which is about the first time for the season that the amount has fallen below 100,000 tons. It practically all goes to the head of Lake Superior, Chicago and Milwaukee. Shippers look for a revival of this trade with the more liberal buying from the districts west of Lake Michigan, which is now setting in.

TOLEDO, OHIO

Some slowing up in the Lake movement because of the short supply of vessels and signs of a congestion at the upper ports. Traffic situation moderately good. General demand about normal.

The Lake loading continues fairly active at the Toledo docks although there are not quite so many boats as were loaded earlier in the season. This is due to the fact that there is not enough ore to load the boats and many are being utilized for wheat shipments instead. An unusual quantity of coal has also accumulated at the uplake docks which has caused a slight slackening of the demand.

The traffic situation is not yet at all serious. An embargo was placed on Hocking Valley shipments by the C. & O. during the past week but it is believed this is only temporary. There continues some difficulties with Northern shipments out of Toledo but not enough to cause alarm or serious inconvenience. The general demand is normal for this season of the year. Domestic coal is not especially brisk but a few cold days would work wonders with this end of the market. Steam coal is in good demand. Prices here are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.75	$2.50	$2.00	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.75	2.50	....	....
Nut	1.80	1.20	2.25	1.75	2.50	....	....
⅞ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.60	1.35	....	....	....	1.10	1.15
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Continued strength is the chief feature in the local trade. The demand for all grades is good and prices inclined to advance. Shortage of cars has been growing worse and production is curtailed to a certain degree. Lake trade active and domestic demand is strong.

The coal trade in Ohio has been active during the week and the only change is an increased strength all along the line. All grades are in demand and no weakness of any sort has been reported. The car shortage is growing worse and this has curtailed production to a certain degree. Operators, shippers and dealers say the market is in good condition and an active winter season is freely predicted.

The domestic demand is the feature of the trade. Dealers in all sections have been placing orders and asking for prompt shipment if possible. Because of the lack of cars, stocks in the hands of the dealers are not being replenished. The smaller users are placing their orders now and retailers are busy with deliveries. Steam business is also active, especially in the northern part of the state. Manufacturers are running along steadily and their requirements for fuel are about the same. Railroads are consuming a considerable tonnage trying to keep up with the freight movement. Contracts are being renewed at higher figures than last season. Many of the steam users are buying their supply in the open market

Production has been at the mercy of the car supply almost entirely. Eastern Ohio operators have been the greatest sufferers from a lack of cars and it is believed the output was only about 60 per cent. of normal in that district. In the Pomeroy Bend field the production was about 65 per cent. and the same figures prevail in other sections, excepting the Hocking Valley which reported the best car supply; the output there is estimated at 75 per cent. of the average.

Lake trade is strong and the tonnage moving to the Northwest is still large. Up to date the Toledo docks of the Hocking Valley Railroad have handled 2,095,000 tons since the opening of navigation. Docks at the upper lake ports have been kept free from congestion as the interior movement is good. Lake prices are strong in every way.

Small sizes are in good demand and prices for both nut, pea and slack and coarse slack are stronger.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75 @ 1.70	....	$1.85 @ 1.75	$1.70 @ 1.65
3-4 inch	1.60 @ 1.55	$1.30 @ 1.25	1.55 @ 1.60	1.55 @ 1.50
Nut	1.30 @ 1.20	....	1.40 @ 1.25	1.25 @ 1.20
Mine-run	1.40 @ 1.25	1.20 @ 1.15	1.30 @ 1.25	1.25 @ 1.20
Nut, pea and slack	0.70 @ 0.65	....	0.75 @ 0.70	0.70 @ 0.65
Coarse slack	0.60 @ 0.55	0.85 @ 0.75	0.65 @ 0.60	0.60 @ 0.55

HAMPTON ROADS

Movement from Hampton Roads heavy. Shortage of co still continues but situation may be relieved in few days.

The coal movement from Hampton Roads piers for th week has been heavy and while all of the suppliers have bee short, the end of the week finds very little tonnage held u waiting for cargoes. The railroad yards are about clean out and while the amount on hand at the end of last we was considered small the number of cars here now is consid erably less. However, during the last few days some larg shipments have been started from the mines and with thi coal coming forward the situation should be much improved Owing to the heavy demand on contracts there has been lit tle spot coal and such sales as have been made were only fo small quantities and at prices which the suppliers have pre ferred to keep to themselves.

Shipments in the foreign trade have been fairly good The steamship "Finchley" recently took 1550 tons for Danzig this shipment from what can be ascertained, is a sample l sold with a view of introducing West Virginia coal to th manufacturers at that port.

LOUISVILLE, KY.

Screenings heavy due to the large demand for domesti grades. Car supply good except for certain classes of equip ment. Some further contracts closed.

The colder weather of last week has disappeared, bu has been followed by a raw, damp chilliness that has no been without its effect upon the consumers, and the de mand for domestic grades is excellent. With cars in moder ately good supply, dealers are having no difficulty in meet ing the demand, and there is a heavy movement; prices ar strong and show a perceptible rising tendency.

This large call for the domestic coals has naturally re sulted in a heavy production of screenings and there seem to be a surplus of these developing; while this has been th case with the western Kentucky product for some time, i only appeared in the eastern Kentucky field during the las week. The surplus of screening now available would be mor than sufficient to cover the demand in an active market, s that with requirements light as at present, prices are no very strong. The trouble is ascribed to the conservative at titude of the larger business interests and some uncertaint regarding the crop situation.

The Louisville & Nashville R.R. "battleship" cars are stil causing a great deal of trouble, particularly in the easter Kentucky field, where the operators are being compelled t load most of their production in this type of equipment A large tonnage of the better grade domestic coal was ne gotiated for Northern delivery at $2 f.o.b. mine for 2½-in block and lump. Block is now quotable at $2.10@2.25, whil block and lump is scarce and in good demand at $1.90@2 The better grade screenings are rather heavy at 75c. wit the off qualities almost impossible to move at any price western Kentucky nut and slack is plentiful at 50c. and pe and slack difficult to sell at 25c. A few more consumer who have delayed contracting in anticipation of lower price have recently signed up at advances of from 10 to 15c. highe than last year.

NEW ORLEANS

Unseasonable coolness starts retail rush earlier than usua Talk of making this point a big base for export shipments Bunker trade heavy. Interior demand vigorous. Hondura principal export buyer.

With the coming of a cold snap that made fires com fortable in northern Louisiana last week, retail trade picke up vigorously. This has started the buying season severa weeks ahead of the average time and will do much to re lieve the congestion of orders that comes usually in Octobe

Extension of an option held on a tract of river front lan has revived the talk of making this port the base for a extensive export trade in coal. While the local agencies o the companies bringing coal here by river are reticent ther is reason to believe that plans to this effect have not take definite form.

Shipments to interior points in Louisiana and easter Texas continue to move in considerable volume. Bunke trade is heavy. Ceiba and Tela, Honduras, are the best ex port customers at present; this is due to the activity of th United Fruit Co. at these points, where extensive railroa and constructional work is in progress.

BIRMINGHAM, ALA.

Market on coal fair. Furnace and foundry coke strong Slight improvement in car supply. Pig iron firm at $11.5 for last quarter and $12 for first quarter 1914.

The demand for steam coal is only fair, with prospects of an early improvement. The cool weather of the past few days, while not materially helping the lump market, as far as orders are concerned, has brought out a number of inquiries from the late buyers, and the next few days will see a decided change for the better in this line. Blacksmith coal has ben quiet for the past sixty days, but shows a decided improvement over last week. There is little furnace coke offered in this district, on account of local consumption, but one producer sold 5000 tons to a Western smelter at a very satisfactory price. Inquiries amounting to about 15,000 tons of coke for shipment over the next 60 days are on hand, and the business will probably be placed this coming week. Foundry coke is firm at $3.75 and $4, with fairly good business.

Pig iron is firm at $11.50 for the last quarter of this year. and the producers are holding for $12 for the first quarter of next year, several sales having been made on that basis. Very little iron has been booked for the first quarter, and large sales are predicted within the next 30 days.

INDIANAPOLIS

Shipments becoming slower but fairly good on the whole. Retail prices advanced. Eastern coals in good demand.

Conditions continue to improve steadily but slowly in both the operating and selling ends. Railroads are moving the coal with fair dispatch and there should be good supplies accumulated before the crops put a heavy burden on rail transportation. The movement is not satisfactory, however, in regard to Eastern coals; where shipments were formerly made within a week or ten days, it now takes three to four weeks. Some anticipate higher prices, as a result of a car shortage.

Owing to the fact that Indiana coal cannot be stored, except outdoors, it is only now beginning to move, into consumers' bins. There is a very brisk movement of Eastern coal from retailers' yards, some of the larger companies stating that they are practically running full capacity. The month's deliveries will apparently be much above the average. Screenings are not active, though better than some time ago. Mine prices in Indiana are unchanged.

The largest retailer in the city advanced prices 25c. to 50c. a ton on Sept. 22. His lead in the past has been generally followed, but other large retailers say they see no reason for an increase at present.

The new quotations given out (which include the advance) are:

Anthracite, chestnut..........	$8.50	Hocking Valley lump.........	$4.75
Anthracite, stove and egg.....	8.25	Luhrig lump..................	4.50
Anthracite, grate.............	8.00	Luhrig washed egg...........	5.00
Pocahontas, forked lump.....	6.50	Cannel........................	6.50
Pocahontas, shoveled lump....	6.00	Linton No. 4 lump...........	3.50
Pocahontas, mine run.........	5.00	Linton No. 4 egg.............	3.50
Pocahontas, nut and slack.....	3.50	Indiana washed egg...........	3.75
Blossburg.....................	5.50	Brazil block..................	4.25
Jackson (Ohio)...............	5.25	Indianapolis lump coke.......	6.50
Kanawha lump................	4.75	Indianapolis crushed coke.....	6.50
Kanawha egg, nut............	4.75	Connellsville lump...........	7.00
Pittsburgh lump..............	4.75	Citizens' egg coke...........	6.50
Raymond lump................	4.75	Citizens' nut coke...........	6.50
Winifred lump................	4.75		

DETROIT, MICH.

Higher prices and an active fall trade predicted. Pocahontas grades very scarce. Car shortage becoming more acute.

Bituminous—Both Ohio and West Virginia operators are agreed as to the prospects for an active business this fall. One large West Virginia producer recently advised his local representative here that no further contracts must be closed unless an advance of 10c. per ton could be obtained; this makes the price $1.05, so that it will be seen that the prophecies for a stiff market in October are being justified.

Buyers are showing a tendency to disregard high prices in their anxiety to get under cover, while operators, on the other hand, are inclined to hold off. Spot coal is rather scarce, nut and slack bringing 90 to 95c. per ton, while Hocking is quoted at 75 cents. The car shortage is becoming steadily worse, particularly in West Virginia where flats and gondolas are in very short supply. Domestic coal is easing up some, all dealers appearing to be well supplied, although it is noticeable that there is very little standing on tracks.

Pocahontas, egg and lump are in particularly short supply and the price has been advanced to $2.75, while it is freely predicted that $3 will be obtained by Oct. 1. The local market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.50	....	....	$2.75	$2.50
Egg...........	1.65	....	1.50	....	....	2.75	2.20
Steam lump....	1.50	....	....	....	....	....	....
¾-in. lump......	1.25	$1.25	1.25	$1.25	$1.25	....	....
Mine-run.......	1.10	1.10	1.10	1.10	1.10	1.65	....
Slack..........	1.00	1.05	0.75	0.85	0.85	....	....

Anthracite—The cool spell has created some activity in hard coal, but prices are inclined to drag, the advance scheduled for the middle of the current month having failed to materialize.

Coke—Connellsville coke is in rather short supply at this point. There are rumors here to the effect that production is being restricted in order to advance the price which has been rather low for some time.

ST. LOUIS, MO.

Market continues to show improvement and the outlook is excellent. Many of the mines are well sold up ahead. Steam grades difficult to move.

The market is forging ahead slowly but steadily, and conditions in general are considerably better with prospects for an exceptionally good business beginning the last week in the month. Many of the Franklin and Williamson County operators have orders for one or two weeks ahead and are quoting higher prices than they expect, in order to get caught up. Standard operators, however, are still dragging along at the cost of production, and the same applies to many others in the intermediate fields.

The greatest trouble right now is the inability to move screenings and steam sizes, and this will likely continue until about the first of the year. There is more anthracite coming in than there is call for just now, but smokeless is away behind and is hard to get. There is an over-supply, at the present time, of coke and the prices have been cut to far below circular.

The market is now quotable on the following basis, f.o.b. mines:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump..............	....	....	....	$1.15
3-in. lump..............	....	....	$1.50	....
6-in. lump..............	$1.60 @ 1.85	....	1.60	1.35
Lump and egg..........	1.50 @ 1.60	$2.15	....	....
No. 1 nut..............	1.30 @ 1.60	....	....	....
Screenings..............	0.50 @ 0.60	....	....	0.25
Mine-run....	1.50	....	....	0.90
No. 1 washed nut.......	1.60 @ 1.70	....	....	....
No. 2 washed nut.......	1.20 @ 1.40	....	....	....
No. 3 washed nut.......	1.10 @ 1.15	....	....	....
No. 4 washed nut.......	1.00 @ 1.10	....	....	....
No. 5 washed nut.......	0.40 @ 0.45	....	....	....

Note—The Williamson and Franklin County Coals take a 67c. rate to St. Louis, Big Muddy 64½c., and all others 52c.

OGDEN, UTAH

Cooler weather prevailing throughout intermountain territory. Demand for lump coal increasing, causing a surplus of nut and slack. Strike of coal miners in Colorado stimulated demand for Wyoming coal in Nebraska. Utah mines suffering from severe car shortage.

The past week presented several conditions that stimulated the demand for coal, the principal one being cooler weather throughout the territory. Threshing has begun in several localities and the demand for coal in this trade has been brisk. The mines are receiving plenty of lump orders, sufficient to keep them running full time. As most of these have been placed late, the trade in general is demanding immediate shipment, and the operators are having some trouble to comply with all requests.

The increased demand for lump has increased the surplus of nut and slack coal, and at present quite a tonnage is drawing demurrage at the mines; however present indications are that the nut coal will all move before Oct. 1. The cool weather of the past ten days will delay beet harvesting and the sugar factories will not start their campaign until about Oct. 1. This will delay slack and steam coal shipments until Sept. 25, at which time the surplus of slack should be moved.

Negotiations between the Colorado operators and miners do not appear to be progressing satisfactorily and a suspension of mining operations in Colorado seems inevitable. This condition has caused large buyers in Nebraska to commence looking elsewhere for coal and the Wyoming mines are attractive prospects. In case of a strike, Rock Springs coal will be in demand to the East.

While the Wyoming producers are receiving plenty of cars, with an occassional shortage of box cars, the Utah mines are unable to work more than three days each week on account of the inability of the Denver & Rio Grande to supply equipment. The situation is very serious with no indication of relief. This is a good example of the rapid development of Utah; a plain case where the industries tributary to a railroad have advanced and developed faster than the road.

The increased demand for coal has not effected the price and quotations are as follows: Lump, $2.75; egg nut, $2.50; nut, $2.25; mine run, $1.85; slack, $1.

PORTLAND, ORE.

Owing to high freight rates there is practically no Australian coal in this market, and none likely to arrive now. Anthracite high priced and in little demand. Beaver Hill mine at Coos Bay again producing.

Australian coal has practically disappeared from the local market, owing to the fact that freight rates across the Pacific are too high to warrant importations. Not a cargo has arrived here since last spring and there are no vessels en route or loading at the Australian coal-shipping points for this port. Several cargoes are being shipped to San Francisco, however. All the Australian coal here in dealers' hands amounts to only about 1000 tons, and most of this has been contracted for.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a statement of the coal and coke tonnage over the road during July of the current year, in short tons:

	Coal				Coke			
	Tons		Per cent.		Tons		Per Cent.	
	1913	1912	1913	1912	1913	1912	1913	1912
Tidewater	238,638	288,693	17	21	......	......	...	...
East	191,791	164,748	14	12	8,476	11,566	28	58
West	866,872	931,885	62	66	11,870	6,528	40	33
Total	1,297,301	1,385,326	...	...	20,346	18,094	...	...
From Connections								
Bituminous	93,402	15,541	7	1	......	......	...	...
Anthracite	1,571	789	0	0	......	......	...	...
Coke	....	....	...	...	9,599	1,882	32	9
Grand Totals	1,392,274	1,401,656	100	100	29,945	19,976	100	100

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during June and the first six months of this year in comparison to last year, in short tons:

	June		Six Months	
Anthracite	1912	1913	1912	1913
Baltimore & Ohio[1]	102,270	93,211	703,422	758,699
Chesapeake & Ohio[2]	1,673	1,794	16,479	8,775
Erie[3]	700,534	741,319	3,293,054	4,205,048
Pennsylvania[1] [3]	883,326	776,237	4,572,269	5,418,231
Virginian[2] [1]	....	223	20	709
Total 5 roads	1,687,803	1,612,784	8,585,244	10,391,462
Bituminous				
Baltimore & Ohio[1]	2,732,735	3,212,728	16,748,062	17,555,910
Buffalo, Roch. & P.[1] [2]	631,613	794,687	3,952,453	4,561,113
Buffalo & Susq.[1] [2]	118,660	149,139	717,029	903,535
Chesapeake & Ohio[2]	1,550,418	1,605,063	8,916,951	7,980,768
Erie[3]	15,837	11,034	158,246	274,252
Hunt. & Br'd T. Mt[1] [2]	64,230	211,271	639,195	785,938
New York Central	492,388	677,267	3,926,504	4,468,852
Norfolk & Western[1] [2]	1,989,305	2,061,911	11,066,363	11,431,452
Pennsylvania[1] [3]	3,562,845	4,189,969	22,519,781	24,282,419
Pitts. & Lake Erie[1] [2]	1,083,281	1,078,121	5,026,778	6,301,713
Pitts. Shaw. & North.[1] [2]	133,719	201,798	933,883	1,324,848
Virginian[1] [2]	256,070	304,030	1,752,278	2,201,033
Western Maryland	222,232	247,354	1,469,137	1,501,966
Total 13 roads	12,853,333	14,744,372	77,826,660	83,573,799
Coke				
Baltimore & Ohio[1]	424,009	386,920	2,334,295	2,108,330
Buffalo, Roch. & P[1] [2]	50,088	41,771	233,489	296,925
Buffalo & Susq.[1] [2]	24,549	25,151	121,746	155,422
Chesapeake & Ohio[1]	20,811	30,015	125,911	180,538
New York Central	3,980	6,242	40,760	35,627
Norfolk & Western[1] [2]	100,597	123,941	742,212	840,642
Pitts. & Lake Erie[1] [2]	498,824	555,207	3,034,543	3,625,350
Pennsylvania[1] [3]	1,033,381	1,161,521	6,374,293	7,386,908
Pitts. Shaw. & North.[1] [2]	....	....	5,155	9,383
Western Maryland	4,778	4,582	34,975	40,093
Total 10 roads	2,161,017	2,335,350	13,047,379	14,679,218

Coal and Coke, 13 Roads

January	16,421,839	18,936,646
February	17,787,331	17,546,496
March	19,483,025	17,631,345
April	13,429,367	16,850,690
May	15,635,568	18,986,796
June	16,702,153	18,692,506
July	16,635,448	....
August	18,396,247	....
September	17,432,358	....
October	18,712,657	....
November	17,815,767	....
December	17,929,632	....
Total, 12 months	206,381,392	

[1] Includes coal from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note.—Southern Railway handled 329,730 short tons during May and 1,733,636 short tons during the 5 months ended May.

FOREIGN MARKETS

GREAT BRITAIN

Sept. 12—For anything approaching early shipment nearly all classes of large and small coals are in plentiful supply, and values rule on the easy side; but for forward, sellers are steadily holding to their ideas.

Quotations are approximately as follows:

Best Welsh steam	$4.80@4.92	Best Monmouthshires	$4.02@4.14
Best seconds	4.50@4.68	Seconds	3.90@3.96
Seconds	4.26@4.44	Best Cardiff smalls	2.40@2.52
Best dry coals	4.32@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

British Exports—The following is a comparative statement of British exports for August and the first eight months of the last three years, in long tons:

	August		8 Months		
	1912	1913	1911	1912	1913
Anthracite	255,260	231,590	1,544,885	1,533,475	1,934,680
Steam	4,688,550	4,197,809	30,445,732	28,370,605	35,288,362
Gas	1,044,002	962,574	6,825,566	6,791,847	7,587,554
Household	189,420	137,375	974,102	991,688	1,160,811
Other sorts	280,443	289,814	2,040,755	1,985,249	2,349,201
Total	6,457,675	5,819,162	41,831,040	39,672,864	48,320,608
Coke	108,948	113,423	617,294	583,034	712,698
Manufactured fuel	163,030	140,278	1,117,783	990,258	1,363,324
Grand total	6,729,653	6,072,863	43,566,117	41,246,156	50,396,630
Bunker coal	1,850,346	1,749,847	....	11,608,744	13,720,560

BRITISH INDIA

The output of coal in British India during 1912 shows a total production last year of 14,044,368 tons, which is nearly 2,000,000 tons in excess of the production recorded in the previous output, namely, 12,048,726 in 1911 and 12,149,020 tons in 1908. The actual output by provinces during 1912 was, in tons, as follows: Bengal, 4,306,129; Bihar and Orissa, 9,123,437; Punjab, 38,409; Assam, 296,615; Baluchistan 45,732; Central Provinces, 233,996; Northwestern Provinces, 50.

CHINA

Vice Consul G. F. Bickford notes increasing coal exports from the Manchurian port of Newchwang. Shipments in July reached 49,648 tons, and bunker coals 5650 tons. The increase is mostly to the Japanese Government steel works at Wakamatsu, which took 15,875 tons, while 15,500 tons went to Shanghai.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Sept. 20:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	85½	85½	85½	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	34½	32½	33	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com.	55	53	55	53½	47¾
Island Creek Coal Pref.	86	84	86	85	80
Pittsburgh Coal	21¼	20	21	24⅜	14½
Pittsburgh Coal Pref.	88¼	86	88	95	73
Pond Creek	22	21	22	23¾	16½
Reading	170½	168⅞	168⅞	170½	151⅜
Reading 1st Pref.	84	84	84	92½	84
Reading 2nd Pref.	92	90	91½	95	84
Virginia Iron, Coal & Coke	45	44	45	54	37½

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	93½	98	95¼	95¼	93½	99⅛
Colo. F. & I. gen. 6s	103	106	107½	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83¾	Sale	83⅝	83¾	77½	85
Cons. Ind. Coal Me. 1st 5s	76	78	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	.	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	85	85⅞	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77½	79	78½	Aug. '13	73	80½
Tenn. Coal gen. 5s	98½	99	99	99	98½	103
Birm. Div. 1st consol. 6s	101⅜	102	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s	100⅝	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	103¼	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92	92⅞	92	Aug. '13	92	98

MINE SAFETY NUMBER

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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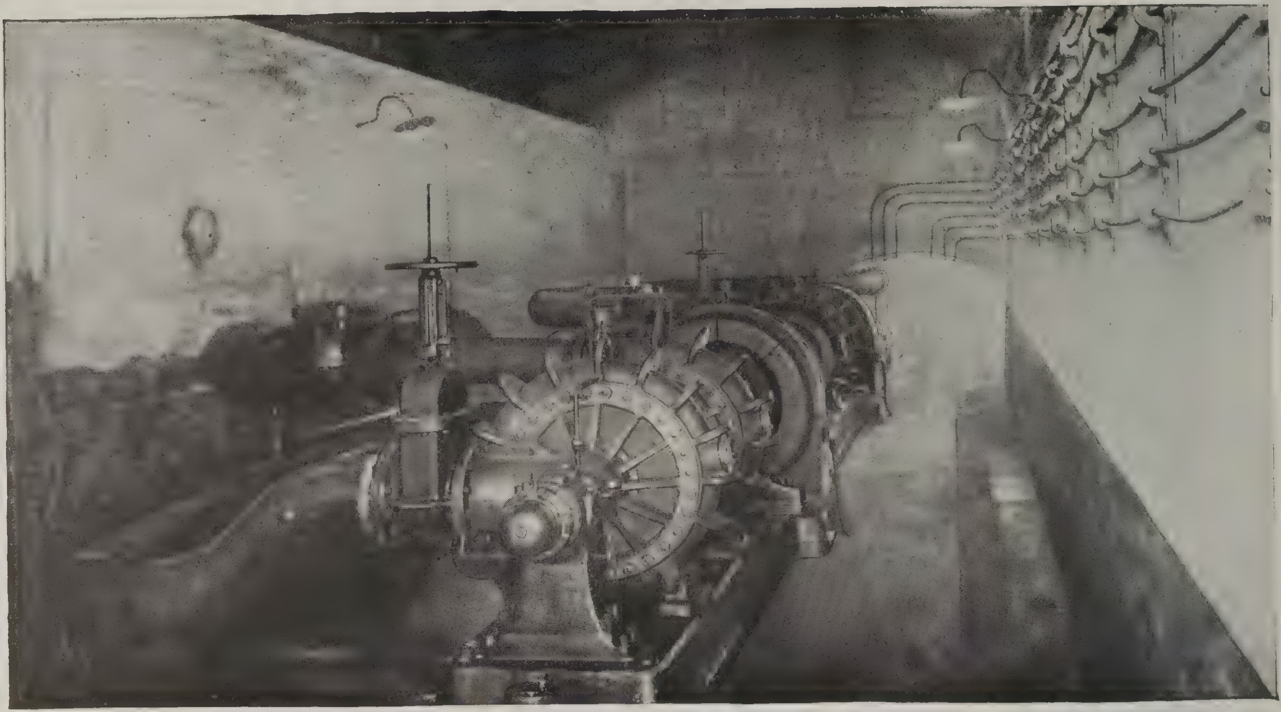

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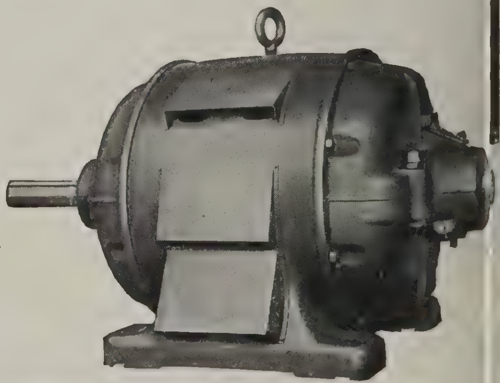

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FLOYD W. PARSONS, *Editor.*

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*THE AMERICAN MINE SAFETY ASSOCIATION'S SESSION: *Pages* 491-496

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The Weekly Ad-Talk Page

The Advertiser's Creed

By Berton Braley

I BELIEVE in the goods I am selling
Because I have tried them, and know;
I believe in the facts I am telling
Because I am certain they're so;
I believe in the faith of the buyer,
I believe in the honor of men,
I believe if I'm SQUARE, they'll desire
To deal with yours truly again!

I BELIEVE I am wise in proclaiming
The fact that I'm out for the trade,
I believe there is wisdom in naming
The merits of goods I have made.
I believe that vim, vigor and push'll
Pay mighty good profits to me
So my light isn't under a bushel
But up where the people can see!

I BELIEVE in good copy with "kick" in
For lifting my business ahead,
For making a buyer's pulse quicken
With proof I'm a live one—not dead!
I believe more in joy than in sorrow,
In sunshine much more than in gloom,
I believe in Today and Tomorrow,
For Yesterday's gone to the tomb!

I BELIEVE in the work I am doing,
I believe in the paper I use,
I believe in the end I'm pursuing,
I believe that the hustler can't lose,
I believe in the art of the printer,
The ads that are bringing me pelf,
And always, through summer and winter,
I stoutly believe in Myself!

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COAL AGE

Vol. 4 NEW YORK, OCTOBER 4, 1913 No. 14

Safety First

By Berton Braley

Written expressly for Coal Age

Too long we've dared the firedamp's breath
And chanced the dusty air,
Too long we've sent good men to death
Through lack of thought and care;
Too long our sense of caution slept,
We blindly drove ahead
While children wailed and women wept
In sorrow for their dead.

Master and Man must share the blame
For all those blunders past,
For many a holocaust of flame
And many a deadly blast;
But we have come, at last, to see
How carelessness was cursed,
And from old haste and greed set free
We think of "Safety first!"

For men are worth far more than coal,
And carelessness is waste,
And we have paid a fearful toll
For heedlessness and haste,
Where once we thought that life was cheap,
We know that life is dear,
And more and more we strive to keep
The way to safety clear.

So we have trained our rescue corps
To serve in time of need,
To help and save—but, what is more,
We're learning to take heed,
To face no risk we need not take
Lest death about us burst,
And always, everywhere, to make
Our motto "Safety first!"

IDEAS AND SUGGESTIONS

Payday Drinking

By a West Virginia Superintendent

"The fellow that drinks liquor is a damn fool." The speaker was a man of about fifty, and a glance at his condition showed that the declaration was a personal allusion. He was in his usual "pickled" state after payday, and, with a little thought, he continued, partly to himself, and partly to the payroll clerk who had refused credit, "I am a prohibitionist and have been for years; I vote against liquor and I talk against liquor, and I try to stop the making and exhaust the supply." All of which was literally true, especially his attempts to drink it all up. He was a hard worker and a hard drinker.

Another type was a small, mild man who worked every day and was good for a double shift any time he was needed. He seldom came about the office, but his wife was a constant visitor, taking up his wages in "scrip" as fast as his time could be turned in. She was one of that raw-boned, vixenish sort, every inch a shrew. About once a year Bill got drunk, not as any particular celebration, but he seemed to be able to stand his domestic life only about so long. On these rare occasions he did not land with a whoop, but usually picked up a barrel-stave and quietly walked in the back door, and the family came out the front, not stopping to look back but sailing up the street, bent on putting distance between themselves and Bill. Then Bill would sit on the front porch and tell the neighbors that it was "damn strange thing if a feller couldn't be boss of his house once in a while." That was all the harm there was in Bill, and after it was over he went back to work, submitting to the old order of things.

Carl the Carpenter

Carl was a carpenter, a silent man who chewed his "Mail Pouch" and served the company. He mended the tipple screens and fixed water lines and was general handy man. His drinking was of the periodic type, only he "saw things," and the neighbors usually had to come in and sit on his arms and legs for a day or so till the doctor could bring him around.

Fred's booze turned his mind to fistic triumphs. His payday drunk generally ended in "woes," "redness, or rather blackness of eyes," and "wounds without cause."

Frank became a millionaire, and his month's pay became largess to be scattered in small change to the birds. And so we might follow on through all the American types of payday drunks, singing, laughing, swearing, crying, fighting, preaching and soliloquizing. Passing on to the foreign quarter, we might dwell on the "sheep drunk," "monkey drunk," "lion drunk," "hog drunk," and not exhaust the possibilities of payday.

If we wished to go into historic drunkenness, Hebrew literature presents us with Noah, overcome by wine and exposing his nakedness; Lot, "made drunk" by his daughters to commit incest and rear up a race from destroyed Sodom; while pagan annals even invent a god to preside over Bacchanalian revels, and Christians sing, "We've reached the land of corn and wine." Our boasted Anglo-Saxon nation had its birth in the land of Beowulf where the "mead-hall" was the nation's council chamber, and laws were made at the great tables around which brute heroes drank from foaming horns and shouted their boasts amid the flow of strong drink.

Temperance an Issue in Ages Past

We have also the traditional temperance movements, the Jewish Nazarites, the Wise Man crying, "Vanity of vanities," and there is not so much difference after all in the solemn wail, "At last it biteth like a serpent and stingeth like an adder," and the blunt self-accusation of the old booze-hoister, "a man that drinks liquor is a damn fool"; yet modern civilization, seeking other worlds to conquer, has again tackled the problem. With our national and international figures turning to grape juice, lemonade and buttermilk, there may be possibilities, but when a mere mine superintendent begins to talk about cutting out the "wet," and running a Y. M. C. A. mine, he is bucking the game with a fair amount of nerve.

A great point has been made between the way a "gentleman" drinks and the manner in which a laborer takes it on. But is there a difference? When the various types around a mine take their spree, everyone knows it and their social standing is affected according to the current standards of their neighbors and, perhaps, the company. When those higher up, at their banquets, clubs and social sessions, become incapacitated, possibly the spectacle is less public, but we will venture that nearly every man on the job can tell you all about it, the only unfortunate part of it being that they are apt to exaggerate the facts rather than minimize the incident, and, if it is a question of drinking on duty, the higher up an official is, the more nearly he is on duty all the time.

The trouble is, the old doctrine of "the king can do no sin" exists just about as tenaciously as the racial custom of drink. It is all right for everyone to "slop it up" but the other fellow. However, the whole problem in the coal business is an industrial one, and we might as well face it in this way. We need not affirm or deny that it has a moral or an ethical side, the question is narrowed down to a glaring sin against industrial efficiency. The fact that our mines try to operate five or six days out of every month at a shameful loss, is a disgrace not to be lightly passed over.

Instead of wasting time devising petty schemes for harassing the men who lay off after payday, or of forcing them to work in a besotted condition, or of driving them out of town, it is a matter worthy of the best brains of the coal industry to see how they can begin to "revise downward." Public opinion can put out of the business any custom or practice. When drunkenness in the public eye becomes an offense against public opinion, as diciated by the best and most powerful forces of society, it will be indulged in only by the degenerates, as is the worst of our present-day drug habits.

See that Drinking Is Unpopular

Americans try to get things by short cuts. If everyone in West Virginia had wanted what they voted for, the vote would have been unnecessary, for each person could have disapproved of drinking in a way that would have abolished drunkenness. However, public opinion seems to be sometimes formed by a well enforced law. That is, the law breaker is unpopular for being found out. Now that both state and federal laws are pending to put West Virginia in an absolutely "dry condition" it is up to the powers that be to make drinking in that state exceedingly unpopular.

If the public, and the coal companies could unite in their campaign against booze, they could get rid of it, only it would hurry things up a bit if the movement started with those higher up. Of course, every effort helps get society ready for the change, but it must be shaped into an industrial policy if anything large is to come of it. The airship will not succeed Noah's ark in a day. When we are babbling temperance at the mines we are jabbing at something racial, nobody knows how old, but it is generally admitted that the liquor problem is the next important matter to be settled.

We will not deny that a recent writer for the Coal Age drove 15 families of drunkards away from his mine, for some of them, if not all, have come here to live. We are glad that he can report a complete change of life among what are left, and also that his conditions are such that he can afford to pick his men, but unfortunately most of us have to be contented with less success and endure what seems impossible to change.

The reason we are constrained to bear the ills we have rather than to fly to others we know not of, is that if 50 per cent. of our men lay off five days out of every month, the loss in output is only about one-tenth, while if we "fire" one-tenth of the population bodily on account of drunkenness, we have lost our tenth and have not made a clean sweep either.

Another difficulty in starting a campaign with the slogan, "Clean out the drunks," is that by the time these fellows are fired a few times they will perhaps get wise enough to make the next fellow a good bunch of men. Then who will be the loser?

Still, 10 per cent. is worth trying for. Let's see, Monday, Tuesday and Wednesday after payday are the drunks' holidays. Who will be the first to cut out Wednesday, or will we set Tuesday for the limit of a drunk and put the blocks to the fellow who is "too much sick" on Tuesday? Possibly, after all, the thing can be revised both upward and downward. How about all this highbrow stuff concerning labor efficiency when the operator is losing 10 and the miner 20 per cent. on account of the payday drunk?

Curing this ill is a man's size job if anyone wants to go to it, and it is not altogether a job for the W. C. T. U. Coal mining seems to be about the only industry in the world where a fellow is allowed to lose money for his employer two or three days every two weeks and then go back to work as if nothing had happened.

If the policy makers of the big coal syndicates are not sufficiently interested in this problem to take the initiative, the little reformer is placed in the light of Shakespeare's Iago, who, urging Roderigo to help himself to what the gods had prepared, said, "Zounds! Sir, you are one of those that will not serve God even if the Devil bid you."

⁂

Quit Worrying

By Arthur Feehan*

Worry digs more graves in a month than any sexton ever dug in a life time. Every time you worry, you are frittering away your health—you are spoiling your chances—you are making yourself a fidgety old duffer.

Worry never solved a problem. It has never yet helped a man up from the sick bed or smoothed out the cares of his business or the wrinkles on his brow. It has not soothed the pain of disappointment. If you don't kill that habit of worrying, it will kill you; and that's a poor finish to the grand adventure of life.

Whenever you start worrying, remember what it means to you—so much needless waste of nervous force, so much happiness thrown away, so much less faith in yourself.

There is only one cure for worrying. The cure is based on the following principle: What made you frown yesterday will make you smile tomorrow. All you have to do is to look at every trouble from the standpoint of the future. Smile at it today, instead of tomorrow.

If you look back at your worries, you will be amazed to find what silly little trifles can upset you. Think over your experience last week. Wasn't it something like this? Monday—Worried because Brown didn't seem the good old pal he used to be. You thought he was curt, snobbishly curt, with you. It worried you into thinking he wanted to drop you after all these years of comradeship; because, as you bitterly reflected, he was prospering a bit faster than you.

Worrying—yes, it was very disquieting, wasn't it? At any rate it was until Tuesday. Then you met Brown again. Dear old Brown—the same as ever—one of the very best! You saw at once what a fool you had made of yourself by worrying over nothing. How true the old saying—"Worry makes a mountain of misery out of a molehill of misfortune."

On Monday, too, you felt dreadfully down on your luck because you thought your work wasn't as good as it used to be. You felt sure you saw the sack coming. There was a rasp in the boss' voice that slashed at your nerves terribly. You saw yourself out of work, loafing You felt as if your skin didn't fit and as if everybody hated you. Sheer nonsense, wasn't it? Of course, it was. And yet you let it worry you for hours last Monday. Don't let yourself be fooled in that way again.

Look a worry fairly and squarely in the face, and it will slink from you like any other cowardly thing.

⁂

Experience has shown that the maintenance and effectiveness of a first-aid corps depend largely upon the superintendent and mine foreman, and that aside from the strictly humane features of the work, the effect of such an organization is to encourage a more friendly feeling between the employer and mployee, and a better understanding between the foreman and miners. The superintendents and foremen should be urged to give their best efforts to these organizations.

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*Marianna, Penn.

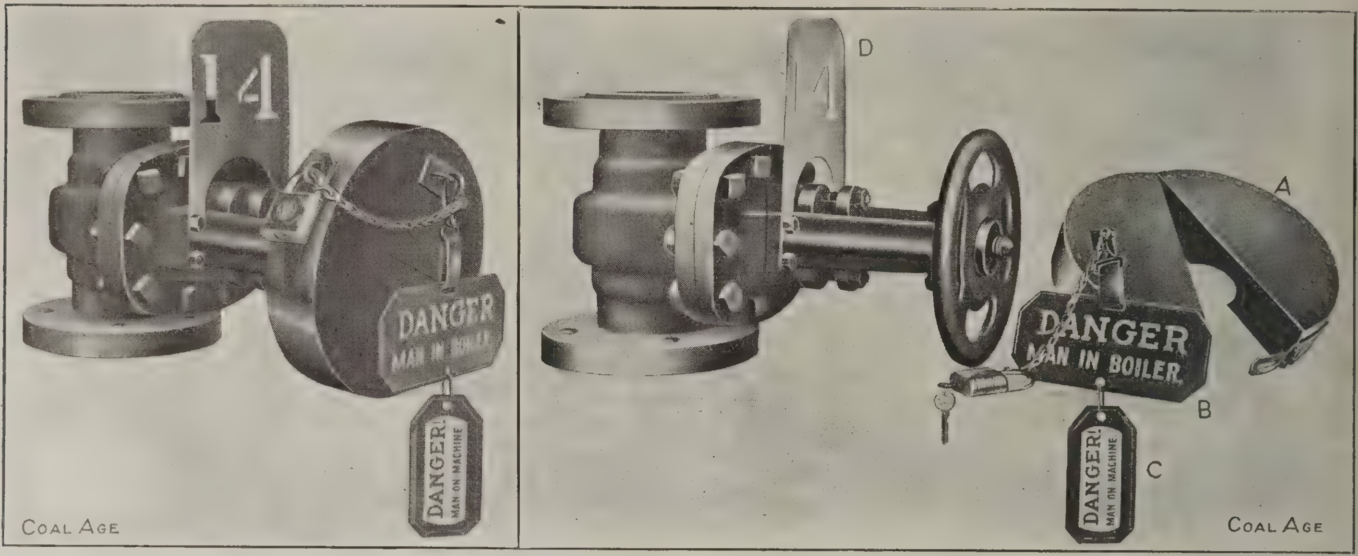
Preventing Accidents from Machines

By Frank H. Kneeland

SYNOPSIS—Descriptions and illustrations of some safety devices which have proved their merits in actual use at power plants, substations and shops.

⁂

About the mines the percentage of men who meet death through machinery or mechanical devices is small, compared with the number who are annually killed by falls of roof and slate. Men are nevertheless killed, crippled and injured in no inconsiderable number, through what might well be termed "mechanical accidents." Such occurrences should therefore be forestalled by every means that human foresight can devise.



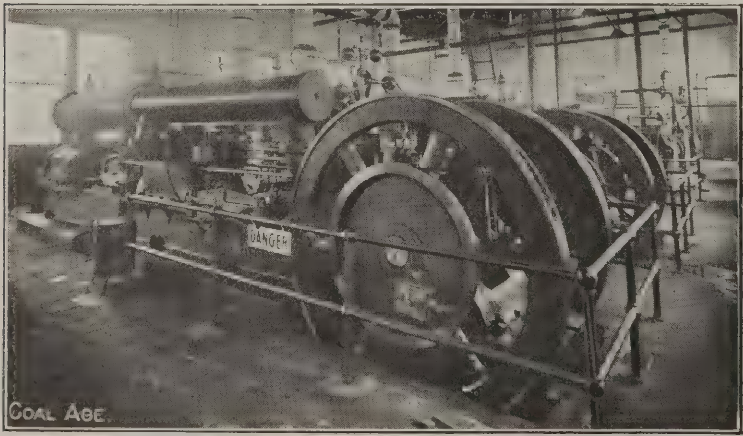
A Safety Device for Valve Handwheels

When one or more men repair or inspect a boiler one of these handwheel cases is placed and locked upon each of the valves connecting this boiler with others, with the feed line or the blow-off line, and the man entering the boiler pockets the keys. These cases are removed only upon the completion of the work and then by the man who has been within the drums or settings.

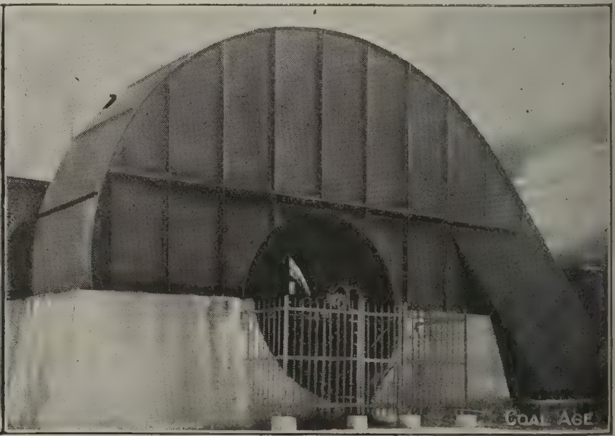
We illustrate upon this and succeeding pages some safety devices, the utility of which is at once manifest. These photographs have been kindly furnished us by the Bureau of Safety, Relief, Sanitation and Welfare of the United States Steel Corporation, Mr. C. L. Close, manager. All of the devices shown are not at present in use at coal mines. They are, however, without exception, applicable to coal-mining power plants, sub-stations and repair shops.

It will be readily understood that industrial safety does not necessarily mean that injury to life and limb shall be made impossible. There is a difference between making a machine safe and making it proof against suicidal carelessness. The fundamental object which the inventors of these various safety devices had in mind was to render accidents out of the question. This is not possible, however, as the human equation is always present and can not be depended upon.

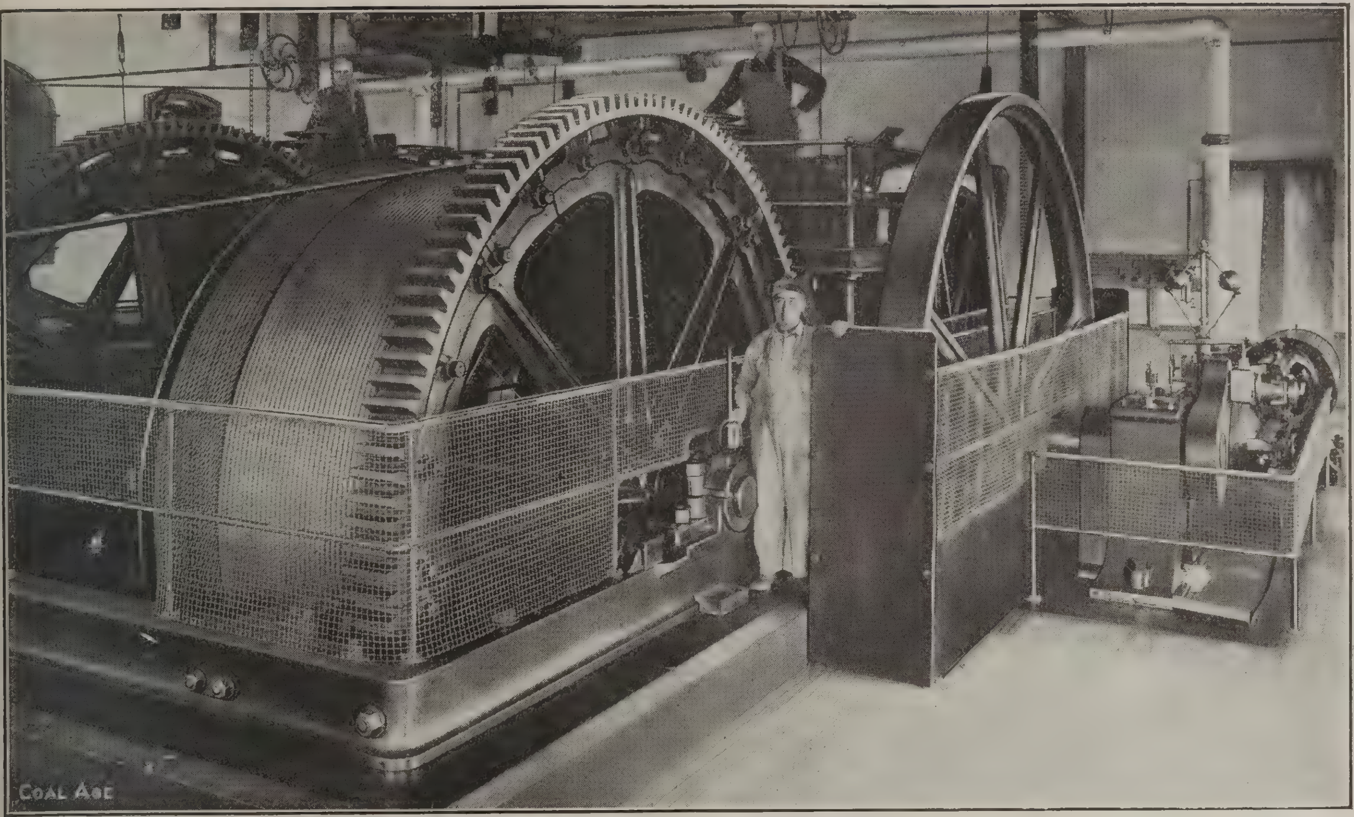
The accidents to which the workmen in power houses, sub-stations or repair shops are chiefly liable are varied, but in general will come under one or more of the following five headings: (A) Coming in contact with moving parts of machines or with live conductors. (B) Falling from platforms, ladders or other elevated positions. (C) Fire and spontaneous combustion. (D) Being struck by flying parts of broken machinery or material. (E) Mis-



In a Compressor Plant. Note Railing, Danger Sign and Waste Can



A Railing around the Eye of a Ventilating Fan



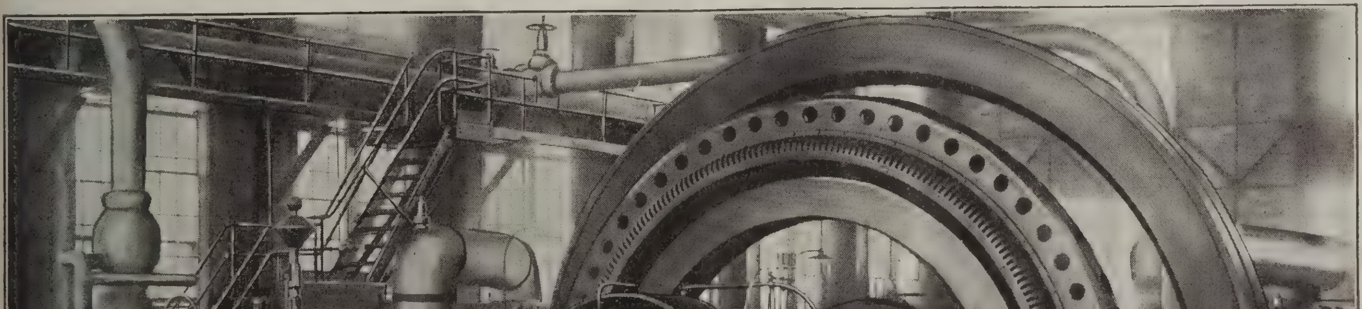
A Well Guarded Mine Hoist

Two men are here seen upon the operating platform. Under ordinary circumstances only one man is at the levers. When men are being hoisted or lowered, however, a supernumerary engineer is provided so that should any misfortune befall the regular hoistman the other engine driver may immediately gain control of the machine. Two sets of control levers are provided for this purpose.

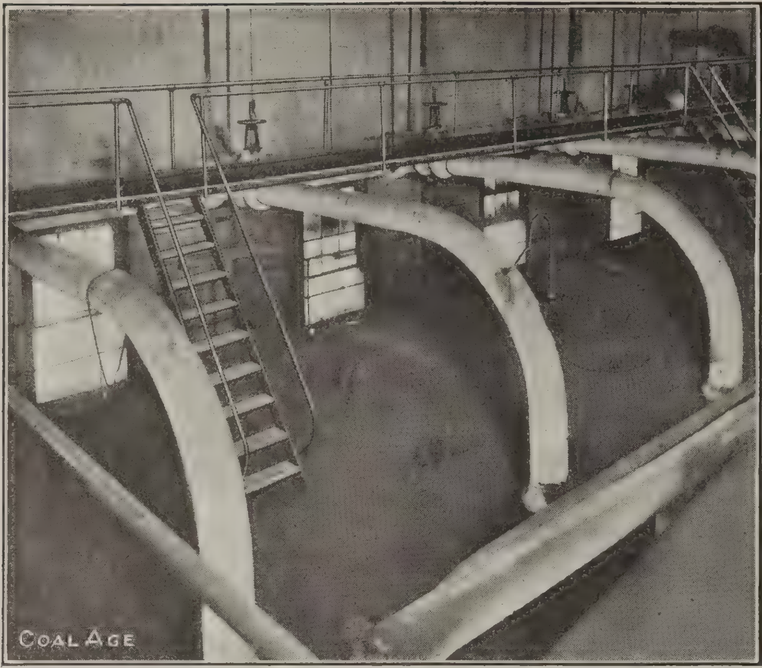
manipulation of levers, valves, switches, or other hand-operated controlling devices.

The means to be employed in guarding against accidents of the above kinds are as divers as the accidents themselves. Coming in contact with moving parts or live conductors is perhaps more fruitful of disastrous results than any other one source of danger. In general this can be avoided by suitably inclosing the moving parts or conductors or by isolating the machine with proper hand rails. Means of preventing falls and protection against fire are well known, while the most common devices for providing against injury from flying pieces of broken machinery are safety collars on emery wheels and gage-glass guards on boilers. Preventing mismanipulation of valves and switches has long been a difficult problem. We illustrate, however, two extremely simple and efficient devices to guard against this contingency.

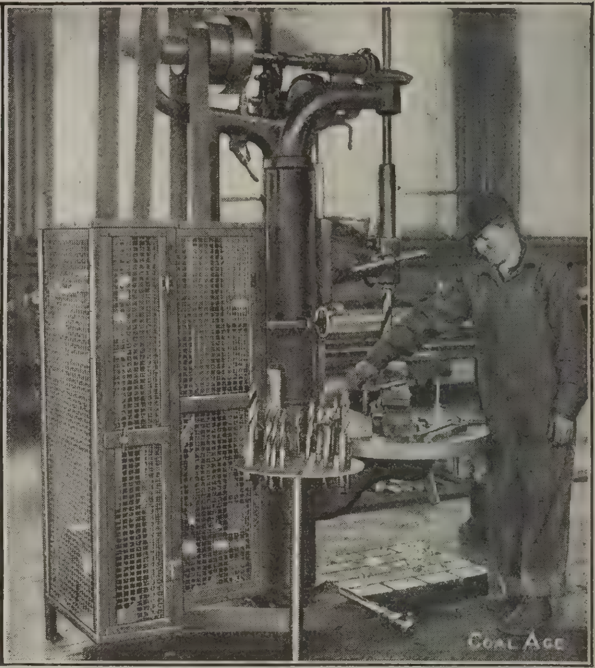
Many makers of mining machinery in order to lessen manufacturing expense as much as possible, have in the past habitually built engines, pumps, lathes, drill presses, etc., without any guarding whatever over gears, belts



Guards around a Generator. Note Platform along Steam Header and Stairway Leading to It



View above Boilers. Note Platform along Steam Header and Stairway Leading Thereto

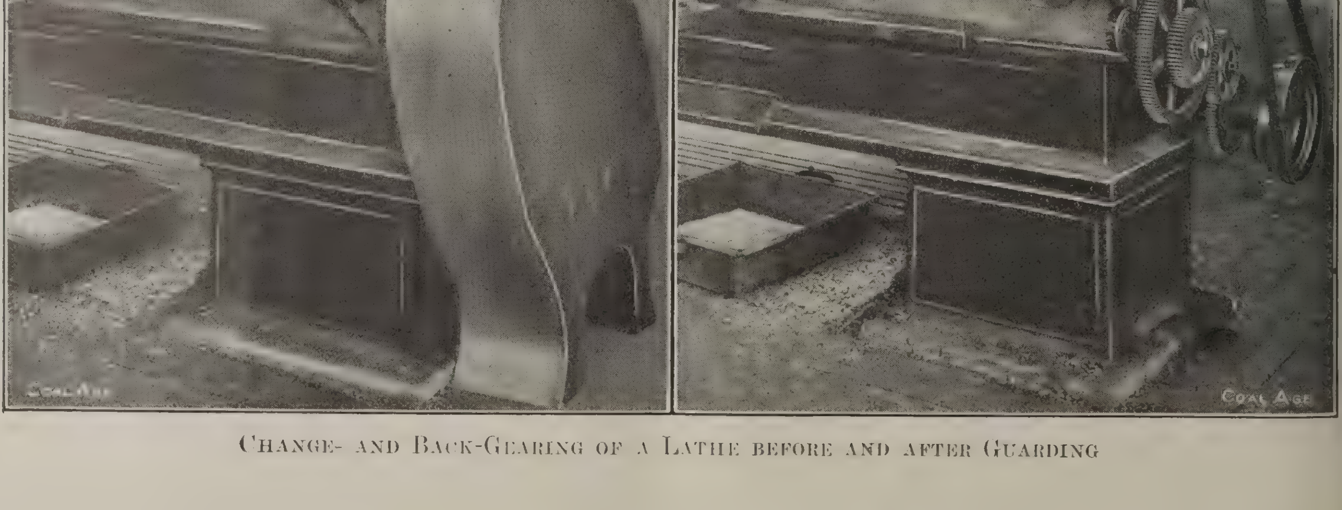


An Efficient Method of Inclosing the Belts of a Drill Press

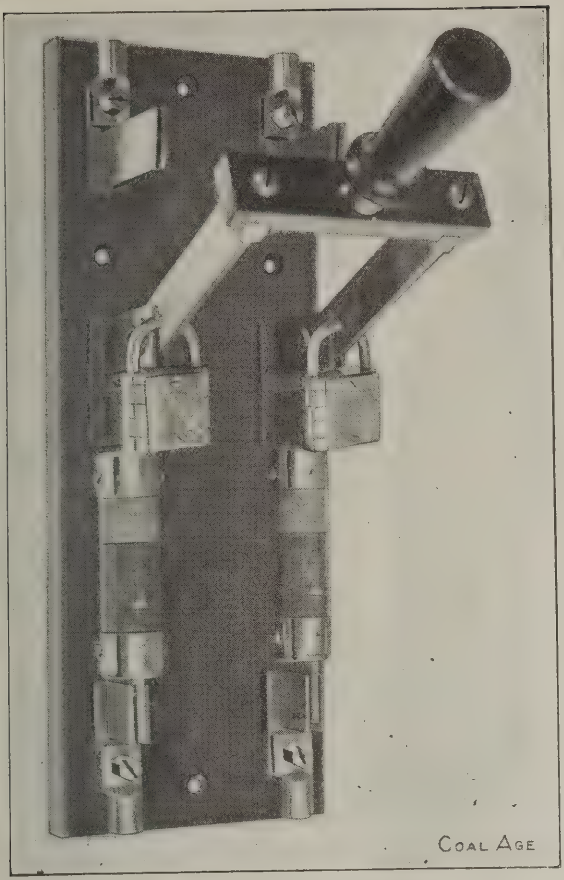
or other dangerous moving parts. Recently, however, many users of these machines have specified, when making purchases, something like the following; "No protruding keys or set screws are to be employed. All gears, cams, pulleys, belts, chains, sprockets, eccentrics, or other dangerous parts moved or operated by power shall be so guarded or otherwise inclosed as to effectively prevent accidents to an attendant or other person arising from contact, intentional or otherwise, with these parts, and at the same time allow easy and unobstruced access to all parts of the machine for inspection or renewal." The builder is perhaps of all men, the best fitted to guard the dangerous points in his machine. Such specifications as the above are therefore worthy of careful consideration by all purchasers of such equipment.

It is well also to provide a place in the regular printed title for drawings and tracings to show when and by whom that particular drawing has been checked for safety devices. This plan has been in use for some years by the various subsidiaries of the Steel Corporation, and has been found extremely fruitful of good results.

It is utterly futile to cover a machine with guards and expect them alone to afford immunity from accident. To be truly effective, safety devices of all kinds must be reinforced by discipline and morale. It is only



Change- and Back-Gearing of a Lathe before and after Guarding

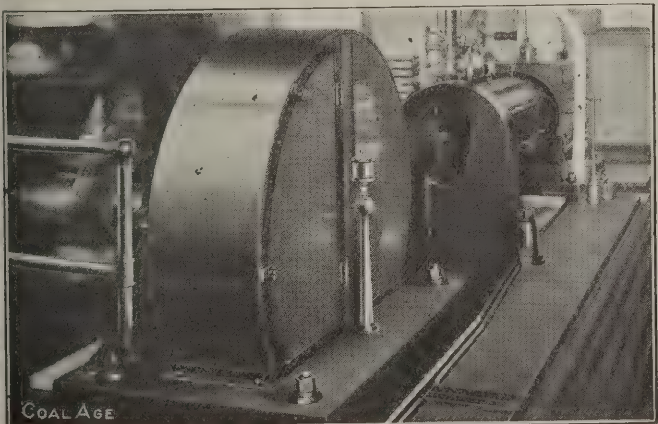


A SWITCH LOCKED OPEN

When work is to be done upon an electric line the switch is locked open. The above picture shows that two men are at work upon the circuit controlled by this switch. When their work is finished and each has removed the padlock bearing his name the switch can be closed, but not before.

when employed in conjunction with these moral qualities that any system of guarding, be it ever so perfect or elaborate, becomes in the highest sense effective. Proper education and habitual care among men whose employment carries them into dangerous places will do vastly more to eradicate accident than any number of handrails or danger signals.

In the last analysis, after all possible means of forestalling mishaps have been exhausted, the safety of the worker comes down to the worker himself. In the vast majority of cases, at least, his immunity from injury to life and limb depends upon his ability to *think* safety just as he thinks horsepower or tons of coal.



AN EFFECTIVE GUARD OVER AN ENGINE CRANK

Fatal Accidents in Dortmund District, Germany

The following table, showing the number of fatal accidents in the largest coal-mining district of Germany, is interesting for comparison with the records of the United States. In 1912, 3.15 men per thousand employed were killed at United States mines. The Dortmund record shows 2.91 It is interesting to see that the United States death rate per 1000 is 1.53 from falls of roof and coal whereas the Dortmund rate is 1.094. These are the causes of death which have shown themselves the most difficult to reduce by legislation or operating care and are those most largely dependent on the ability and prudence of the miners themselves, and above all on local conditions. So the American showing for more preventible causes is by no means bad, because all other accidents than falls of roof and coal give us a death rate of 1.62 and the Dortmund district a rate of 1.816.

FATAL ACCIDENTS IN THE DORTMUND DISTRICT OF GERMANY IN 1911 AND 1912*

Men Employed	1911	1912
Average daily force		
Underground	271,488	279,713
Above ground	81,067	81,438
Total average daily force	352,555	361,151

			Per 1000 men	
Accidents Underground	1911	1912	1911	1912
By breaking in of rock masses (falls of stone, coal, etc.)	277	306	1.020	1.094
In shafts leading underground				
During permitted hoisting	19	16	0.070	0.057
During forbidden hoisting	2	0	0.007	0.000
During passage otherwise	0	1	0.000	0.004
During work in or about the shaft	41	37	0.151	0.132
Otherwise	9	2	0.033	0.007
Total	71	56	0.262	0.200
In blind shafts and headings with haulage inclined upward or downward				
Due to wrecks, etc	76	81	0.280	0.290
Due to haulage or clutch mechanism or a car	68	86	0.250	0.307
Due to other causes	22	22	0.081	0.079
Total	166	189	0.611	0.676
In haulage through approximately level headings				
With mechanical haulage	16	28	0.059	0.100
With animal haulage	19	21	0.070	0.075
With hand haulage	12	12	0.044	0.043
Total	47	61	0.173	0.218
By explosions				
Of mine gases or dust	27	188	0.099	0.672
Of gases from mine fires	0	0	0.000	0.000
Total	27	188	0.099	0.672
By bad or dead air				
From gases from mine fires without explosion	4	2	0.015	0.007
From mine gases without explosion	3	2	0.011	0.007
From gases from blasting or otherwise	6	3	0.022	0.011
Total	13	7	0.048	0.025
In blasting	22	30	0.081	0.107
By machinery	3	5	0.011	0.018
In other ways	68	83	0.250	0.297
Total underground accidents	694	925	2.556	3.307
Accidents above Ground				
By machines or mechanical appliances	16	27	0.197	0.332
By railway cars or locomotives	24	35	0.296	0.430
In other ways	52	64	0.641	0.786
Total	92	126	1.135	1.547
Grand total	786	1051	2.229	2.910

There were 21 fatal hoisting accidents in shafts leading under ground in 1911 (or 0.077 per thousand employed) and 17 in 1912 (or 0.061 per thousand employed).

* From "Glückauf," July 12, 1913.

It will be noted that this German district has a large number of surface accidents: 1.547 per thousand employed. The figure for the United States is only 0.25. Looking over the figures, there is little reason for a citizen of this country to feel troubled that Germany shows us a trifling lead, when he duly considers the polyglot and inexperienced personnel with which our mines are filled and that to the accidents which our miners alone control should be ascribed our slightly higher death rate.

Mine-Safety Precautions in Utah

By A. C. Watts*

The "safety-first" idea in Utah is not the result of the agitation of recent years along these lines, but has been a subject foremost in the minds of the operators for many years.

The "first-aid" movements, the activity of the government along the lines of rescue cars and the improvement of various oxygen helmets and other rescuing devices, has lent impetus to the movement and stirred up all those interested in the welfare of the mine workers.

We now find several rescue cars in the West, while helmets with supplies of oxygen and first-aid appliances are in general use. There are also trained men in the use of oxygen helmets and rescuing machines in every camp, while "Safety-First" mottoes are placed in conspicuous places at all collieries. In fact, a more general spirit of care pervades the entire industry.

The government rescue car for this district was taken away some time ago. Owing to the scattered locations of our coal mines and the difficulty of getting together we do not have the frequent meetings and contests along first-aid lines that is possible in the thickly populated East, but the spirit is here just the same.

Shot and Roof Inspectors

"Prevention" is the motto of the operators here. The Utah Fuel Co., the oldest in the field, has had shot and roof inspectors in its mines, in addition to the regular gas inspectors, for years, and employs two general underground inspectors whose duty it is to continually travel through its properties and inspect them as to the safety.

For years, the Utah Fuel Co. has employed sprinkling (even before it became a state requirement) of the dust, and in two of the mines, of which the dust is especially explosive, the electric shot-firing system, by which all shooting down of the coal and rock is done from the outside after all men and animals are out of the mines, is used.

These extra precautions of safety are employed solely because of interest in the welfare of the mine worker, for they mean an additional cost to the operator.

A Simple Safety Measure

A simple precaution that is used, and one that entails but slight expense and no inconvenience, is the shutting off of electric current in trolley lines when men are getting into man trips. A sectional switch at the parting is all that is needed. When miners are getting into cars with their picks and drills, there is always danger of some one hitting the trolley wire and a serious accident may result if the wire is "alive."

The regulations as to use and care of explosives are strict, and the shot and roof inspectors continually instruct men in the proper placing of shots and care of their working places. On these men, in a large measure, is placed the responsibility of reducing the fatalities from falls of roof and coal, for it is from these causes that most accidents occur. We also try to protect men from machinery. The mines are electrically lighted and great care is taken to prevent accumulations of inflammable materials in mines.

Fire protection is had mainly from the sprinkling systems which permit water under pressure to be taken to all open places in the mines.

Altogether Utah has the better welfare of its mine workers close at heart, and expense is not spared to bring it about. "Safety first" seems to be the by-word on all sides in the coal mines of this state.

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*Chief engineer, Utah Fuel Co., Salt Lake City, Utah.

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Mine-Rescue Work in Great Britain

Special Correspondence

The recent disastrous explosions in Scotland and England have again brought before the British public the question of rescue work in mines. In this connection one of the most important problems confronting mining men is the immediate effect on an individual of the various gases constituting polluted mine atmospheres.

The standard of air purity set up by the Mines Act of 1911 is that the air must not contain less than 19 per cent. of oxygen, and not more than 1¼ per cent. of carbon dioxide. Under normal conditions it has been shown that the percentage of oxygen in mine air gradually falls, and the carbon dioxide gradually increases as the air circulates through the mine. This, of course, is due to the consumption of oxygen and the production of carbon dioxide by the breathing of men and horses and the burning of lamps. Another important cause is the partial oxidization of some of the carbon and hydrogen in the composition of the coal.

Investigation has shown that the mine air may vary considerably from that at the surface, even though no inflammable poisonous gases flow in from the coal or adjacent strata. The following is an average analysis of the mine air in the return at several British mines: Oxygen, 20.16; carbon dioxide, 0.37; firedamp, 0.42; nitrogen, 79.25.

When the Situation Underground Is Abnormal

When conditions in a mine are abnormal, that is, when combustion takes place on a fairly large scale, the pollution of the air goes on at an alarming rate. As an example of such a case, attention is called to the report of Dr. Haldane relating to the Snaefell mine in the Isle of Man, where 19 lives were lost by a comparatively small underground fire. The analysis of the air was as follows: Oxygen, 15.48; carbon dioxide, 4.22; carbon monoxide, 1.07; hydrogen, 0.48; nitrogen 78.75.

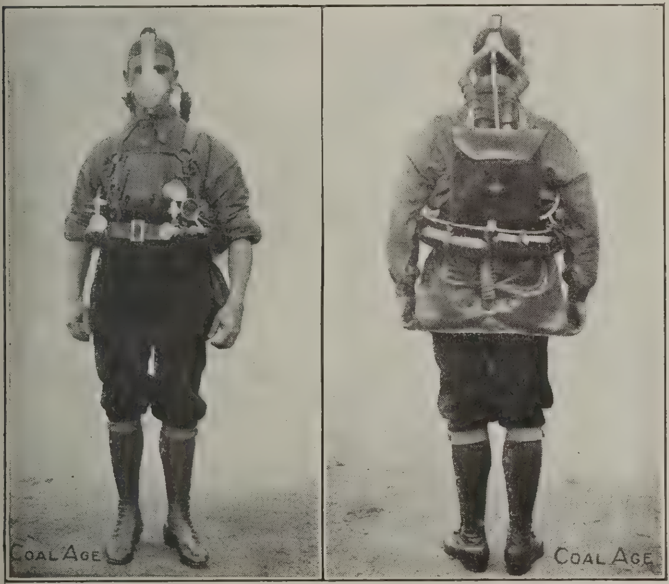
The total capacity of the workings in this case was about 1,000,000 cu.ft., and it was shown that the combustion of 125 cu.ft. of timber would have polluted the whole of the air in the mine to the extent shown by the foregoing analysis.

The effect of a reduction of oxygen percentage on an individual in mines near the sea level is similar to that produced by the reduction of atmospheric pressure on hill climbers at high altitudes. British authorities maintain that the oxygen may fall to 15 per cent. without producing any apparent effect on the individual. If no exertion is being undertaken, the individual may continue to breathe an atmosphere with only 10 per cent. of oxygen. The limit is reached at a little under 7 per cent., when unconsciousness takes place. A light is extinguished at 17 per cent. of oxygen, so that even although a flame will not burn, a man may exist for some time before the dangerous percentages are reached.

Effects of Carbon Monoxide

The effects of carbon monoxide are confined to closer limits. It combines with the haemoglobin in the blood three hundred times faster than oxygen does, and forms a comparatively stable compound. Thus the haemoglobin loses its capacity as an oxygen carrier to the tissues, and death occurs from lack of oxygen. The same British investigators above mentioned, claim that if 0.08 per cent. of carbon monoxide is present, the blood of an individual breathing such air for two or three hours becomes 50 per cent. saturated with the compound containing the carbon monoxide. They say that anything above 0.05 per cent. will produce unpleasant symptoms, and anything above 0.15 per cent. is distinctly dangerous.

Since carbon monoxide may arise from explosions of firedamp or coal dust and from underground fires, no mine can be regarded as free from risk. Hence, the necessity arises for providing a breathing apparatus to render the wearer independent of the mine air when undertaking rescue work or the recovery of the mine.



Views of Weg Apparatus Used in Recent Cadder Disaster

British practice tends towards the establishment of central rescue stations in preference to the idea of each company working as an independent unit. A number of stations have been established in Scotland and England, and recent mine acts have gone so far as to expressly stipulate the style and equipment of such central stations. One of the most modern rescue plants is the Fife Station in Scotland, which serves and is in direct telephonic communication with 91 collieries employing 26,000 men. The equipment consists of twenty sets of improved Weg apparatus; six sets of smoke helmets with bellows and pipe connection; two sets of pulmotor apparatus; twenty electric lamps of the Float type; twenty storage cylinders, each of 120 cu.ft. capacity; one recharging pump electrically driven; one motor car; a complete stock of ambulance apparatus, packed; a reserve of 1560 cu.ft. of oxygen, and small cylinders kept charged, and a minimum stock of 800 lb. of caustic.

The experimental gallery at the Fife Station is constructed to represent as closely as possible a wrecked roadway underground. It is formed around the three sides of a central drill hall, and has a total length of 134 ft. and a width of 8 ft. The gallery can be filled with flue gases from a furnace by means of a fan, so that the atmosphere can be made totally irrespirable. The training of the men proceeds by easy stages, until finally they are permitted to do heavy manual labor for two hours in the smoke gallery. This work consists of weight-lifting, building brick stoppings and generally doing work as closely as possible imitating underground operations. As high as 302,000 ft.lb. of measured work has been accomplished by one man in the gallery in 1 hr. and 26 minutes.

No Water Here

A West Virginia newspaper reports the formation of a new company with the following objects: "To acquire coal and mineral lands and develop all the substances and fluids therein, quarry stone, cut timber, manufacture earth, clay and other products, develop salt, natural gas, oil, etc., and refine same for heat, light and other purposes; construct and own pipelines; refine petroleum, and do a general mercantile business. The authorized capital stock is $500 all subscribed and $100 paid."

Contemplation of this firm's field of endeavor and its capitalization prompted the following effusion:

In this age of frenzied finance
It may cause no mental shock
When we read of high inflation
Or of irrigated stock.

But a firm in West Virginia
Puts inflation quick to rout
And the things they can't accomplish
Are a mystery, no doubt,

For the things they're organized for
And the things they aim to do
Far surpass the mean conceptions
Of such folks as me or you.

They will first acquire coal rights
Whereso'er such rights abound,
Use all substances and fluids
That within the earth are found,

Quarry stone and get out lumber,
Manufacture earth and clay,
And a thousand other products
That are needed every day;

And they're goin' to build some pipelines
And they'll own 'em, too, you bet,
And they'll force petroleum through 'em
Till they make their old pump sweat;

And the salt they will develop,
Gas and oil and maybe peat—
They will make these latter products
Furnish light as well as heat.

When it comes to refinition
They will do it up in style,
And they also think of starting
In a business mercantile.

And they'll mine the coal deposits
From the earth in mighty chunks
On a capitalization
Of a small five hundred plunks!

If the stocks of corporations
Through the country far and wide
Show remarkable resemblance
To the ocean's mighty tide,

If such stocks show irrigation
Unmistakable, alarming,
This new firm in West Virginia
Is assuredly "dry farming."

—By F. H. Kneeland.

First-Aid Meet at Knoxville, Tenn.

Editorial Correspondence

SYNOPSIS—The meet at Knoxville, Tenn., was well managed and shows how rapidly first-aid has spread in the Southern States, largely due to the exertions of the Bureau of Mines. Reference is made to the advance in technique and training which is now manifest everywhere.

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The Society of Tennessee Mine Foremen, the U. S. Bureau of Mines, and the American Red Cross held a most successful first-aid meet at Knoxville, Tenn., Saturday, Sept. 20, the expenses of which were largely footed by the Appalachian Coal Operators' Association, a few powder companies and several merchandising concerns of the city in which the meet was held.

Size of Mats

The meeting was preceded by drizzling rain, and the prizes were presented in a somewhat heavy downpour. The men exercised on Johnson's race track, which has excellent draining qualities, otherwise the mats of brattice cloth would have been insufficient for the protection of the subjects. As it was, in event No. 2, where a man was supposed to have fallen with his abdomen over a wire, the mat proved too small, for he could only be placed where the wire had been laid or in the mud of the track. The mats should be at least 12 ft. long if such an event is to be exhibited.

The track was laid out with the lime lines in nine and three foot strips alternately, the teams being restricted to the larger spaces, and the judges using the three-foot lanes between competing teams. In all, 24 teams were entered and 21 actually attended.

The demerit list used at this meet, and which we printed in our issue of Sept. 6, was not as we then thought and tentatively suggested a product of the activity of the American Mine Safety Association, but was compiled by Jas. W. Paul, in charge of the mine-rescue work of the Bureau, and Major R. U. Patterson of the Medical corps of the U. S. Army, detailed to have charge of the first-aid industrial work of the United States, and others. It is to be found embodied in Miners' Circular 15, entitled "Rules of Mine Rescue and First-Aid Field Contests." The rules also will be found in our issue of Sept. 6 and in Circular 15.

A Bleeding Palm

After a parade, the first-aid events followed:

One-Man Event—Machine boy while running fell and cut vertical gash on knee cap; punctured palm of right hand with machine bit; bright red blood. Treat and carry 50 ft.

It was understood by most of the teams that the bright red blood was due to the puncturing of the palm of the hand, but some put a tourniquet on the leg, as if the gash of the knee-cap had severed an artery. Most of the contestants put that instrument on the upper part of the arm so as to compress the brachial artery and did not place it around the wrist as is to be preferred.

In early training most of the first-aid instructors were doubtful of the ability and willingness of the men to receive instruction. They questioned, whether they would give the requisite time and necessary care to the study of first-aid. They also doubted whether it was well to trespass too much on the province of the surgeon, both because such a course was in itself wrong and because it was likely to lead to a certain degree of professional resentment. Consequently they did not advocate the use of the tourniquet around the wrist because by a simple instruction they could show a first-aid man how to control the blood flow in the whole arm from finger-tip to biceps and restrain it effectually.

But they did invariably point out that extreme compression of the brachial artery might result in the loss of the arm if the victim's bleeding were prevented after this manner for two or three hours. On the other hand, when the constriction is made at the wrist, only the hand is liable to be lost.

More Skillful Instruction Needed

First-aid is in its transition stages, and it is perhaps as well to state here and now that judging is going to demand more perfect technique from the first-aid man than is to be found in the abridged text book on first-aid, published by the American Red Cross. The book still serves useful purposes as a guide for beginners and amateurs, but unfortunately the judges, even when appointed by the Red Cross, have not been ready to regard the suggestions of the text-book as the ultimate first-aid technique and the American Mine Safety Association has not declared other technique mandatory, so that first-aid men depending on textbooks or lay training, however official, are liable to lose the highest awards at present-day meets. It is much to be regretted that the A. M. S. A. has met twice, and done so little to declare what a first-aid man should know and should do.

We have frequently noted that the judges are disposed to demerit on what they believe to be correct principles, rather than on the question of the nearness with which the first-aid men have complied with instruction given them. The tests have ceased to be examinations of teams, and have become rather tests of the relative merits of the training doctors. It is discouraging to a working man, who has diligently absorbed the teaching of his master in the art to find that he is demerited for the misjudgments of his teacher, or because his instructor did not know that the judges had decided that the first-aid movement had made such advances that a more perfect technique was permissible. We trust that the A. M. S. A. will shortly grant to every contestant, a clear knowledge of the measure by which his attainments in first-aid will be meted.

Resuscitation Case

The second event was as follows:

Two-Men Event—Miner found lying face down, unconscious, on a live electric wire, abdomen badly burned. Rescue, and give treatment.

It is probable that this man after being rescued from the wire should have been resuscitated by the Sylvester method, because it is not well to use for the recovery of the patient a system which involves the parts burned. It is one of those rare cases in which the Schaefer method is perhaps inadvisable. One team did favor it, however, and administered it wrongly, the operator placing his hands on the under part of the subject in a position more suited to the lifting of the patient, than to the compression of his floating ribs. In this way the action was rendered largely ineffectual and most injurious to the burns of the patient.

In most cases the deflating or systole action in the lungs was obtained by pressure on the chest and not by pressing the doubled arms of the patient on the lower ribs and rubbing them down his sides. The chest-pressure method does not develop the full deflating powers of the Sylvester method and may be regarded as comparatively ineffective, but it serves to save the patient from injury to the abdomen, when that part of the body is burned.

In fact, the competing claims of the Sylvester and Schaefer methods in case of abdominal injury is, we think, a matter for the due consideration of the American Mine Safety Association and for the investigation of the Bureau of Mines. Almost the only merit of the Sylvester method, which it seems to us, is retained with mere chest pressures, is the inflating or diastole action caused by the lifting of the arms. Seeing that the Sylvester action is at its best, a less efficient method than the Schaefer, and granting further that the Schaefer method is not so much an action on the front as on the sides of the abdomen, would it not be better to risk doing some superficial injury to the patient than to run the greater risk of allowing him to die by an inefficient method of resuscitation?

There were a few men who adopted the plan of holding the victim by the wrists in the Sylvester treatment. No harm is done by this manner of grasping the patient, but it does not give any better results than are obtained when the victim is held below the elbows. The operative is saved much unnecessary motion and is drawn up closer to the abdomen of the patient, thus he himself is longer becoming exhausted and relief is not so often needed.

Shock From Burns

Three-Man Event—Head, face, neck, arms and hands badly burned from gas ignition. Treat same.

The victim was in nearly every case caused to sit up by the operating teams in this event. It is dangerous to raise a man into such a position for if he has not already received a shock from his burns; he is liable to receive a secondary shock. The effort of pumping blood to the head is increased when in a standing or sitting position and is minimum only when the patient is recumbent.

In nearly every case picric acid gauze or a simulated equivalent was used, but in some cases plain gauze was substituted. We understand, however, that by the agreement with the judges beforehand, this plain gauze was to be supposed to be impregnated with carron oil or other medicament.

The fourth and fifth events were:

Team Event—Injured spine or broken back; left hand cut on back and bleeding; carry 50 ft.

Team Event—Miner caught between loaded car and side of gangway, right shoulder blade broken; left arm broken 6 in. above elbow, left foot crushed; lacerated right cheek. Improvise a stretcher and carry 50 ft.

In these events nothing of particular interest was noted. The assumption was made as usual in such cases that the miner was lying on his back after the injury was received. We do not know how often this is true, but we suppose but rarely. We have a habit of staging these accidents as we will, without any regard to the true underground facts. Naturally men who are taught to treat spinal injuries with the subject lying on his back will turn the victim over when they find him lying otherwise. The thought of the effect of that roll almost makes the eyes close with horror.

The judges carefully examined the action of the teams, but were not so particular about the condition of the bandages. There were three teams or less to each judge so that reasonably accurate judgment of the manner of operation could be assured. Moreover, all the judges were medical men. Some judges asked several questions of the captains and some examined the bandaging with much care, but this was not so necessary as it is in meets where there are fewer judges as the manner of bandaging can be examined while under execution. None of the judges were acquainted with the teams they examined and the judges were rotated after each event, so that as far as possible, perfect fairness in judgment was secured.

Company	Events					Average of five events	Average of full team events
	1	2	3	4	5		
Roane Iron Co., Rockwood, Tenn.	95	75	98	98	91	91.4	94.5
Minersville C. Co., Pless, Tenn.	88	83	91	92	90	88.8	91
Black Diamond C. Co. Coal Ck. Tenn.	90	90	95	98	80	90.6	89
Knoxville I. Co., Briceville, Tenn.	93	92	89	100	89	92.6	94.5
Piedmont C. Co., Oliver Sprgs., Tenn.	86	88	90	93	96	90.6	94.5
Standard Jellico C. Co., Clairfield, Tenn.	95	96	90	85	95	92.2	90
Westbourne C. Co., Westbourne, Tenn.	100	100	86	93	96	95	94.5
Tenn. C.I.& R.R. Co., Whlewell, Tenn.	90	90	80	91	78	85.8	84.5
Wisconsin Steel Co., Benham, Ky.	94	100	90	88	68	88	78
Stonega C. & C. Co., Imboden, Va.	95	90	95	88	85	90.6	86.5
Wisconsin Steel Co., Benham, Ky.	90	100	95	79	78	88.4	78.5
Continental C. Corp., Pineville, Ky.	95	90	81	85	77	85.6	81
Stonega C. & C. Co., Big Stone Gap, Ky.	87	100	89	88	96	92	92
Wisconsin Steel Co., Benham, Ky.	82	91	85	83	86	85.4	84.5
Stearns C. Co., Stearns, Ky.	88	91	98	83	100	92	91.5
Roane Iron Co., Rockwood, Tenn.	91	90	84	86	92	88.6	89
Ducktown Copper Co., Ducktown, Tenn.	90	95	85	96	92	91.6	94
Jellico C. Mfg. Co., Mountain Ash, Ky.	95	100	95	85	92	93.4	88.5
Tenn. C. Co., Briceville, Tenn.	100	98	90	100	90	95.6	95
Coal Creek C. Co., Coal Creek, Tenn.	96	100	86	71	79	86.4	75
Continental C. Corp., Pineville, Ky.	80	94	81	89	83	85.4	86

The Demonstration of the Bureau of Mines

A charge of permissible explosive, equal in deflective force to one-half pound of 40 per cent. nitroglycerine dynamite and tamped with one pound of clay, was fired in the steel gallery in the presence of coal dust. There was a large outburst of dust but no flame.

D. T. Blakey, a mechanical engineer, with the Link-Belt Machinery Co., in a breathing apparatus, then entered a glasscase carrying a canary and a pigeon. The box was charged with carbon monoxide, supposed to comprise 0.1 per cent. of its whole content. The canary was a long time feeling the effects and probably died finally only because it was held in the entering current of gas. The pigeon was but little affected. Whether the box leaked or the gas not being prepared by a chemist, was insufficient, cannot be asserted. However, the minds of the visitors were concentrated on canaries and rescue work and the psychologic result was attained without any one experiencing undesirable after-effects.

A charge of F. F. F. black powder of equal disruptive effect to the permissible explosive, fired before in the explosion galley was then placed in the cannon and tamped with a pound of dry clay. It was fired in the presence of coal dust and made much flame and a considerable report.

Speeches were then made by T. A. Wright, President of the National Conservation Exposition, Miss Boardman of the American Red Cross, and W. B. Wilson, Secretary of Labor. Mr. Wilson has shown himself a man of integrity. His advance is due to that characteristic and not to his fund of information and nearly all the remarks he made needed truth to give them force. Seeing Mr. Wilson is a specialist in mining, we can scarcely see how he can form an accurate conception of other industries when he has not mastered the facts of the business in which he was only lately employed.

Prizes and Prize Winners

After the speech-making the prizes were distributed. It must be explained that no team receiving a prize for general average excellence in the meet could receive any further recognition for its merit in the one-, two- and three-men events or in those in which the full teams participated.

The grand prize was won by the Tennessee Coal Co. It consisted of a silver cup provided by the Provident Life & Accident Co., of Chattanooga, Tenn., $25 in cash presented by the Atlas Powder Co., Knoxville, Tenn., six gold medals from the American Mine Safety Association and five bronze medals from the American Red Cross.

The second grand prize was awarded to the Westbourne Coal Co., and consisted of a breathing apparatus presented by the Draeger Oxygen Equipment Co., $25 donated by the Ingersoll-Sargent Drill Co., six silver medals from the A. M. S. A. and first-aid certificates from the A. R. C.

The third grand prize went to the Jellico Coal Mining Co., of Mountain Ash, Ky., and consisted of an ambulance hamper donated by Siebe-Gorman Co., Chicago, Ill., $10 donated by the Pennsylvania Crusher Co., of Philadelphia, Penn., six bronze medals presented by the A. M. S. A. and first-aid certificates presented by the A. R. C.

The Tennessee Grand Prize was awarded to the best team from the state regardless of the receipt of any other prize. Hence, two teams which had already received the open grand prizes also gained the Tennessee awards. Thus the Tennessee Coal Co. as first prize was rewarded with a silver cup presented by the Southern Coal Operators' Association, and $25 donated by the A. S. Cameron Steam Pump Co., of New York City.

As the Roane Iron Co., the Knoxville Iron Co. and the Piedmont Coal Co. tied for first place in the team events with 94½ points, the prize intended for the winning team consisting of a complete mining course in the International Correspondence Schools, two years' subscription to the "Colliery Engineer" and a copy of the Coal and Metal Miners' Pocket Book were divided among the winners.

The second prize in team events was awarded to the Ducktown Copper Co. and consisted of a short mining course in the I. C. S., a year's subscription to the "Colliery Engineer" and a copy of the Pocket Book.

The third prize of $15 presented by the Miners' Field Day Committee, of Knoxville, Tenn., and six steel tapes donated by the Lufkin Rule Co., of Saginaw, Mich., was awarded to the Stonega Coal & Coke Co., of Big Stone Gap, Ky.

The first prize for the one-man event went to the Coal Creek Coal Co., Coal Creek, Tenn., the prize being a gold watch presented by Walsh & Weidner Boiler Co., Chatanooga, Tenn. The second prize of a gold chain, donated by the Link-Belt Co., of Chicago, was drawn by the Stonega Coal & Coke Co., there being three teams having equal percentages; the teams of Standard Jellico Coal Co., and the Continental Coal Corporation, William Taulber, captain, being the two which were defeated by the drawing of lots. The third prize went to the Wisconsin Steel Co., T. K. Johnson, captain. It consisted of $5 presented by the Miners' Field Day Committee.

The two-man event was won by the Wisconsin Steel Co., L. D. Smith, captain, with a perfect score. The team received $15 presented by the Ohio Brass Co., Mansfield, Ohio. The second prize went to Baker No. 2 team of the Continental Coal Corporation and consisted of $10 presented by Leschen Sons Rope Co., of St. Louis, Mo. Two teams were equally entitled to third place, the Wisconsin Steel Co., A. Patterson, captain, and the Stearns Coal Co.; on drawing lots the first team secured the prize.

The first prize for the three-men event was given to the Black Diamond Coal Co., and consisted of $10 donated by the Ohio Brass Co., of Mansfield, Ohio, and $5 presented by the Miners' Field Day Committee. The second prize for that event went to the Minersville Coal Co. and consisted of three Thermos bottles presented by the Milwaukee Locomotive Co. The third prize was awarded to the Roane Iron Co., W. T. Richards, captain, and consisted of three electric flash lights.

"Coal Age" gave five gold watches to the captains of the teams making the best scores in the five events. The men receiving the prizes were H. R. Smith, of the Tennessee Coal Co., R. Rigsby, Westbourne Coal Co., J. M. Wood, Knoxville Iron Co., L. R. Eager, Standard Jellico Coal Co. and S. Marsh, of the Jellico Coal Mining Co.

Much credit for the success of the meeting is due to H. M. Wilson, D. T. Blakey, E. F. Buffat, G. B. Sutton and H. M. Ashmore, who all gave much time and attention to the promotion of the meet.

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H. C. Frick Coke Co. Meet

The meet of the H. C. Frick Coke Co. was held on Thursday at 2:30 p.m., Sept. 25, 1913, at the Trotter mine, near Connellsville, Penn.

The events were as follows:

One-man event: Compound fracture of jaw on the left side. Bleeding bright red blood in spurts and a small cut over right eye.

Two-men event: Treat a man unconscious from electric shock demonstrating both the Schaefer and Sylvester methods of artificial respiration, two minutes each.

Nine Teams of H. C. Frick Coke Co.

From left to right, Coalbrook, Davidson, Adelaide, Trotter, Leisenring No. 1, Leisenring No. 3, Juniata, Bitner and Broadford teams.

Leisenring No. 3 Team

Bandaging a fractured jaw. Dr. Parker, medical director of team, in foreground.

Three-men event: Dislocated left shoulder and right foot crushed half way to knee.

Full-team event: Fracture or dislocation of spine. Compound fracture of right forearm 4 in. above wrist. Attend, place on stretcher and carry 50 ft.

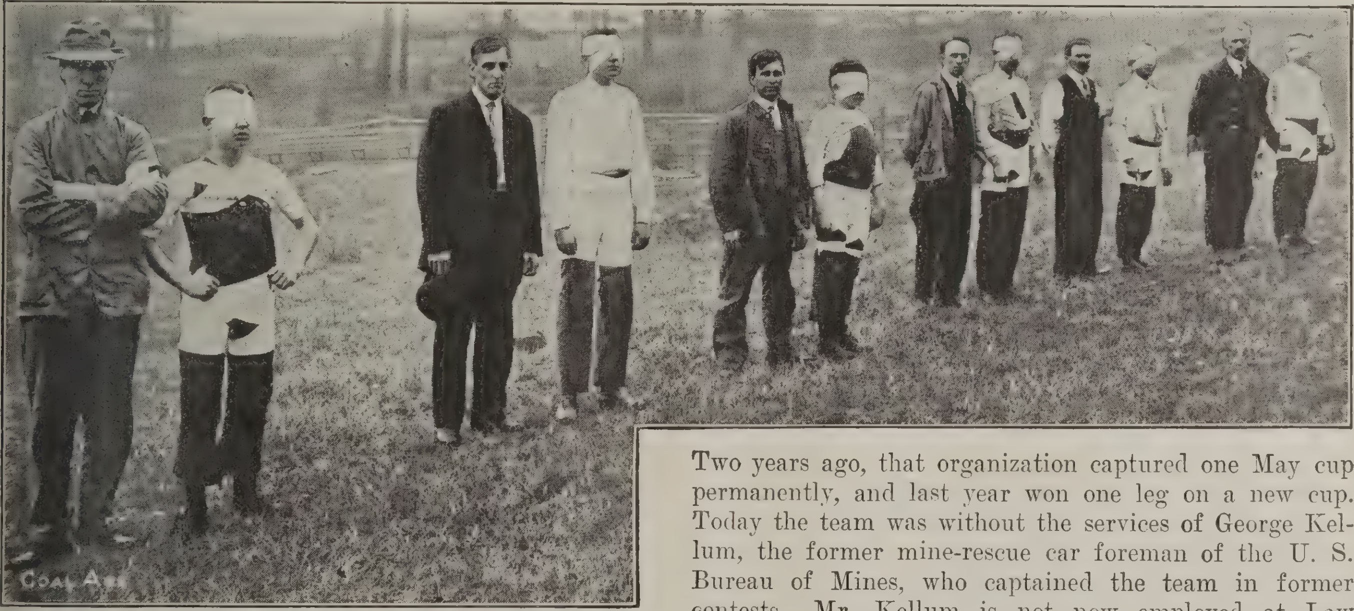
The following teams took part, receiving the stated percentages:

Coalbrook	97¾	Bitner	96½
Juniata	97½	No. 1 Leisenring	95½
Davison	97¼	Broadford & Valley	95¼
Adelaide	96¾	No. 3 Leisenring	93⅝
Trotter	96¾		

The First-Aid Meet of the Hillside and Pennsylvania Companies

Special Correspondence

Under threatening skies, which limited the attendance but in no way diminished the enthusiasm, the eighth annual first-aid contests of the Pennsylvania and Hillside Coal & Iron Co. were held Sept. 20 at Valley View Park, Inkerman, Penn. Twelve teams, two from each district of the Erie system, competed in the contest, which was for a year's possession of the handsome silver loving cup, donated by Captain W. A. May, president of the companies. The competition was keen, and the averages resulting, showed that the improvement in first-aid work in this region is bringing its devotees close to perfection. Seldom have better exhibitions of skill in caring for the injured, been seen at Valley View since the coal companies took an interest in the relief work.



Individual Contest

Bandaging both eyes, both shoulders and both groins.

Establishing a general average of $98\frac{3}{5}$, in a remarkable exhibition, the team from the Fernwood Slope, Butler Colliery, North Pittston District, captured the first prize. Old Forge Colliery, Avoca District, was second with 96 per cent. The other teams finished as follows:

No. 5 Shaft, No. 6 Colliery, $95\frac{1}{5}$.
Law Shaft, Avoca District, 95.
Erie Colliery Outside, Mayfield District, 92.
No. 1 Colliery, Dunmore District, $91\frac{1}{5}$.
No. 5 Shaft, Dunmore District, 90.
No. 6 Breaker, South Pittston District, 90.
Erie Shaft, Mayfield District, 89.
No. 1 shaft, No. 9 Colliery, $87\frac{1}{5}$.
No. 2 Shaft, Forest City District, $85\frac{1}{5}$.
Forest City Colliery, Forest City District, 82.

The Captain May contest consisted of five events, presenting hypothetical cases of injuries common to the miner, and calling for the services of from one man to five in treating the different cases. One of the interesting innovations of the day was the individual contest, instituted this year. As an incentive for individual effort, the companies offered three valuable prizes in this event, a Howard gold watch, gold cuff links, and a gold handled umbrella. The number of competitors was limited to one man from each district, the entrant being the man who had made the best showing in the district contests. The standing of the men in this individual contest was as follows:

Luther Heal, North Pittston District, 93.
John O'Malley, Mayfield District, 85.
William Creedon, Avoca District, 80.
William Davis, South Pittston District, 75.
William Bulger, Dunmore District, 65.
Del. Burdick, Forest City District, 65.

The May cup events were preliminary to the general contests, conducted under the auspices of the American Red Cross at Valley View, Sept. 27. The high teams in these events represented the companies on the following Saturday when teams from the Temple Coal & Iron Co., Scranton Coal Co., Jermyn Coal Co., and many other companies in this region, took part.

Two consecutive victories by the same team give permanent possession of the May cup. Law Shaft team, of the Avoca District, has had a monopoly on the trophy. Two years ago, that organization captured one May cup permanently, and last year won one leg on a new cup. Today the team was without the services of George Kellum, the former mine-rescue car foreman of the U. S. Bureau of Mines, who captained the team in former contests. Mr. Kellum is not now employed at Law Shaft.

The contest was in charge of Dr. F. F. Arndt, general director of the primary relief work of the Pennsylvania and Hillside companies, whose able systematizing of the contests greatly expedited the progress of the events. The other officers were: Judges, Drs. F. J. Bishop, Edgar Sturge, B. B. Wormser, of Scranton; director, F. H. Coughlin, secretary to Capt. May; H. T. McMillan, inspector of the North Pittston District; W. P. Jennings, superintendent of the South Pittston District; F. D. Conover, recorder; Edgar Weichel, timer.

The events were begun at about 10:30 a.m., and two took place before the noon recess, when lunch was served to the visitors and entrants. The events were as follows:

First event, 10 minutes—Two men working on separate subjects; one subject has an incised wound 3 in. long on back of head, running crosswise near bony prominence, and a wound on back of left shoulder near the summit. Second subject has a fractured right jaw, with an incised wound across front of chin, and the thumb and index finger of right hand crushed.

Second event, two men, 10 minutes—A man is found in a portion of the mines filled with bad air, unconscious, but heart is beating. Show as rapidly as possible how you would care for such a case. Distance to good air, 25 yd. Show two methods of artificial respiration with one or both arms broken.

Third event, three men, 15 minutes—Incised wound of right wrist, 3 in. above hand, cutting both arteries. Left elbow dislocated, forearm flexed at a right angle to arm. Dress burn on face, using a triangular bandage.

Fourth event, four men, 15 minutes—Dislocation of left hip backward. Show all the places on the body where tourniquets can be used to control hemorrhage. Show how you would control severe hemorrhage from the palm of the hand. If there is any difference in the method of applying tourniquet to arm and leg, show what it is.

Fifth event, full team, 20 minutes—Fracture of right arm and forearm. Compound fracture of left thigh at middle. Broken back. After dressing, load on stretcher, carry 100 ft., return and unload.

Event for special prizes, one man, 15 minutes, practical work—Bandage both eyes, apply roller bandage to both shoulders and both groins. Questions and demonstration—Point out location of different important arteries. Show how you would control bleeding from them by hand and tourniquet.

Fernwood Slope, Winners of Hillside-Pennsylvania Contest, with Officials

In the rear are the officials in charge of the meet.

Among the prominent mining men present were: Capt. W. A. May,; Mine Inspector S. J. Jennings, Eighth Anthracite District; Inspector H. T. McMillan; H. E. Yewens, superintendent of the Forest City District; J. W. Reed, superintendent of the Avoca District; David Girvan, superintendent of the South Pittston District; C. H. Frederick, auditor; F. H Wright, secretary and treasurer.

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Mine-Rescue Automobile

Special Correspondence

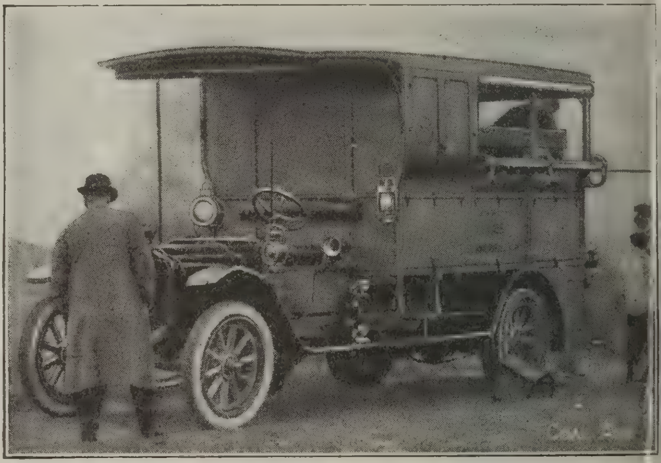
The first mine-rescue automobile car built in the United States, as far as we know, was recently delivered to the United States Bureau of Mines, at Pittsburgh, Penn., and after being given thorough and severe tests will be forwarded to the Birmingham, Ala., station of the Bureau of Mines. Whether or not a similar car will be stationed at Pittsburgh, will be determined later.

The car was made by the White Co., of Cleveland, Ohio, upon a competitive bid. It is a 40-hp. machine, and has made a trial run through a rugged country at a speed of 33 miles an hour, although possibly 35 to 40 miles per hour might be attained under the most favorable conditions. While built on a regular 3000-lb. chassis, the body, however, is of special design to meet the requirements of the service for which it was built. Besides the regular twin lights, a special 8-in. swivel gas headlight has been added so that it will be possible to throw a light a distance of several hundred feet ahead or alongside, and when stationed at the scene of an accident, this special equipment can be made to serve the part of a strong searchlight. Besides a gong, similar to that on a police-patrol automobile, this machine is equipped with a siren horn. Through the city, the car will carry the "yellow" automobile flag, as well as the "Stars and Stripes."

The car contains two standard fire extinguishers ready for instant use, and these are of the same type that are to be found on a municipal firetruck. The body of the car is so designed that it will carry a crew of 12 men, including the driver, although it is just possible that only 10 men may be retained for that purpose. Under the seats, and along the side of the body of the car, are five special compartments, in which helmets will be placed. Both doors and seats are movable.

Additional equipment consists of two pulmotors and six Linde Oxygen tanks. A telephone box and set is furnished and is equipped with several hundred feet of wire. There are also 50 regenerator potash cartridges and a life-line reel. Stretchers are lashed to the side of the car as shown in the photograph. One tent, covering a space 12x21 ft., with a 5-ft. partition, is an important part of the equipment. This tent will be pitched as soon as the automobile arrives at the scene of an accident, and will be used as a general headquarters.

One special feature of the car is an oxygen pump, working at 150 lb. above atmospheric pressure; this is driven by the car motor. There is also a complete equipment of sledges, axes, hammers, bars and the like; also 100 ft. of 1-in. and 100 ft. of 2-in. hose with nozzles and reducer attachments.



The Bureau of Mines Rescue Automobile

This car has pneumatic front tires, 36x4½, while the rear tires are solid dual-cushion. It is to be used to travel moderate distances, from 25 up to 100 miles.

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Interesting Articles in Our Next Issue

Lack of space in this issue has compelled us to hold over several interesting and valuable articles dealing with the subject of "Safety in coal mines." One of these articles which we will print next week was written by F. W. Whiteside, chief engineer of the Victor-American Fuel Co. Mr. Whiteside tells of the many safety provisions of Western coal corporations, paying particular attention to the precautions inaugurated by his own company. Another article will deal with "Shot Firing and Watering Systems in Utah Mines." A third article will discuss the problem of "Preparing and Burning Anthracite Culm."

American Mine Safety Association's Session

Editorial Correspondence

SYNOPSIS—The American Mine Safety Association held an interesting meet and created much sentiment in favor of safety. It also completed its organization but did little toward fixing standards. The most notable event at the meet was Dr. McHenry's method of splinting a broken back. The mine explosion established the return or inward draft in a most spectacular manner and proved the efficacy of stone-dust barriers in isolating explosions.

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The American Mine Safety Association held what might be termed its second annual session on Sept. 22 to 24. At the first meeting the body received neither a name nor a constitution, but a large amount of business was done. In fact it commenced to work before it really began to exist, while at this second meeting it established its existence and did but little effective administrative work. However, it held a most successful first-aid meet and put new life into the safety movement. As the chairman rightly declared, the program was so full of events and so much organizational work had to be done, that there was little time left for deliberation and discussion is, we think, the main reason for which the association was created.

Doctors Do Not Go on Record.

It is much to be regretted that the doctors have not made more rulings as to first-aid methods, because the matter is extremely urgent. We believe that first-aid men should have a book of first-aid principles as ample and complete as a Materia Medica, to quote Dr. A. F. Knœfel. This book would serve to make first-aid meets fair to all contestants. No game from checkers to baseball is without its rules. When serious disputes arise, in such well organized and regulated pastimes, they are seldom about the *laws* which govern the game. All the stress and strife centers around the relation of the rules to the actions of the players. As in such games, so also in first-aid contests, the judges should not umpire the question of right treatment, they should solely decide whether the contestments have performed that course of procedure which has been prescribed. Like a court jury, first-aid judges should only decide questions of fact, the supreme A. M. S. A. should adjudicate beforehand all questions of law.

Seeing that nothing was done in this direction; despite all the enthusiasm, good-fellowship and promise of better things yet to come, we were somewhat disappointed in the showing and can only console ourselves with the thought that in time the end will be accomplished, no matter how long it is delayed. Dr. Knœfel urged in committee that due consideration be taken by that body, so that no half-digested schemes be recommended to the public.

The Demerit List.

We had hoped that the discounts or demerits in first-aid contests would have been amended, seeing that the old schedule was not used in the meet held by the very institution by which it was adopted and promulgated. The new demerit list seems at least worthy of careful consideration and might have been adopted temporarily, subject to later revision.

This report of the meeting may seem inverted as it does not follow the order of events, but we wish to emphasize the paramount place of the medical profession in the A. M. S. A. It was that surgeons might be drawn into conference that we advocated the formation of the body in an editorial on July 13, 1912, before the conference was called.

In the morning of Sept. 22, a meeting of the Executive Committee was held in the Fort Pitt hotel. The doctors also met and went over the forthcoming contest. It was decided to use the same events in the first-aid meet as were chosen at Knoxville, Tenn., and Major R. U. Patterson announced, we understand, to the assembled doctors the difficulties occurring at the Tennessee meet and asked how they would decide these matters of debate.

In the afternoon after some delay, the mine-rescue and first-aid contest was held in the Arsenal Park to the east of Butler Street, some distance from any of the Arsenal buildings, and from those loaned by the War Department to the Bureaus of Mines and of Standards. The field, while not large, was level and well fitted for its purpose and somewhat elaborately prepared for the meet. Thirty-five first-aid teams were entered in the contest and nearly all were on hand. One team came from West Virginia (that of the Consolidation Coal Co.) and one from Terre Haute, Ind. (that of the Vandalia Coal Co.). All the others were Pennsylvania teams.

The events being the same as those at Knoxville, reference to the article on that meet will give the necessary information. Doctors were appointed, each one to judge three teams or less, and so the examination was as adequate as could be reasonably desired. Many of the judges questioned the captains of teams and examined the bandaging with care, and a disposition to criticize the work openly made some bad feelings, it is true, but did no little good.

Some Errors in Treatment

In the second event where a man is lying over an electric wire, some of the teams passed strips under the upper and lower parts of his body and lifted him by these. However, as performed, this took four men and the event was listed for two.

In the third event, most of the victims were treated lying at full length. One team sat the patient up and the doctor who had trained these men and one of his colleagues urged that, when recumbent, a victim could not be properly dressed for such burns as were described in the program, and that in similar cases of burning, men had persisted in sitting up. The judges had unanimously agreed that to avoid secondary shock, the patient should be treated on his back. In the opinion of Major R. U. Patterson, not only was it possible to dress a patient for such injuries in that position, but even if he insisted on sitting, he should be induced to remain on his back. It is certain that because some victims will not do what is best for them is not a reason for treating a subject as if he were such a rebellious patient.

A NEW SPINAL TREATMENT

The dressing of the injured spine in the fourth event, developed a new method of operation. Dr. R. F. McHenry had taught the Penn.-Mary Coal Co.'s team a new method of bandaging and splinting, and had moreover decided to imagine the patient as lying prone (on his face) and not supine (on his back). This last point was well made.

After preparing the bed suitably on which the injured could be laid, he was lifted into place by taking hold on his clothing. We do not recall having seen at any meet such a perfect operation of this raising-and-lowering feat. There was nothing new in it, but the slow synchronism of the movements brought the minimum strain on the patient.

It is true, one authority did criticize the lifting of the victim, saying that the boards should have been slipped under him. That may be possible on a level field, or on a street, but in the mines, the chances are against the victim being found lying on anything resembling a level surface on which this could be done. He would be more likely to be doubled over a pile of coal or a rail. In this case, either the splint would have to be bent to conform with this curvature, or he would have to be bent into the line of the splint, which is contrary to resolution 18 of the Mine Rescue and First-Aid Conference. If such careful men as those of the Penn-Mary team be found to handle him when thus lying in an imperfectly recumbent position, his lot would be as fortunate as could be desired for a man in such a terrible predicament.

In dressing the victim, picks were placed under each arm, so that the eyes of the iron heads of the picks served to relax the tension of the brachial muscles and the handles lay between the arms and the body of the victim. These picks were secured to the arms by bandages and both were attached to the framework below by bandaging. Another pick was placed so that the eye of the head of the tool gave support to the ischium at the pubic arch and so saved the spine from the muscular tensions of the lower limbs. Of course, this pick was also secured firmly to the legs and the framework.

THE NEED OF A CLINIC

The manner of dressing and splinting this injury evidently pleased the judge, for the Penn-Mary team received the full percentage 100, and the comments were all favorable except that which we have repeated. We think, however, that entirely new technique such as this, is quite out of place in a contest, and the only reason for its introduction was that no clinic is provided at which to demonstrate such new methods.

Eventually, we believe that a clinic will be held after the regular meet, and doctors present will present new methods and will receive medals of appreciation after these methods have been discussed and adopted by the A. M. S. A. The introduction of such a system without any warning before a judge, who is required to render a prompt decision, is hardly fair to him. Nor is due justice done to the fertile brain of the surgeon developing the new device or method.

The public is watching what might be compared to a 20- to 50-ring circus, and so is not able to see the fine points thus unexpectedly presented. Meanwhile, the most competent persons to judge of the problem, to wit, the medical men, are busy demeriting other teams or watching their own men at a sufficient distance to prevent accusation of collusion. Thus neither the experts nor the public gain any advantage from such an unscheduled exhibition. We hope that the A. M. S. A. will consider Dr. R. F. McHenry's dressing and approve, reject or amend it.

SEPTIC TREATMENT

One team was severely criticized for handling the wound on the left foot in the fifth event. Undoubtedly, such carelessness and septic treatment is censurable at a meet and would be more so under actual conditions. However, it is not likely that in practice a man would deliberately grasp a limb by the wounded part unless ignorantly he might hope to staunch the blood flow thereby. This is a septic action which is not likely to occur in actual practice for the distaste for blood inherent in us all makes us lean toward aseptic treatment.

Yet in meets, the strangest dramatic errors are made. We noticed at another contest a man remove a victim with every precaution from an imaginary electric wire and then we saw three members of that same team line up on that same wire almost clicking their heels on it, in the mechanical perfection of drill. In the mine, they would not have made such an error, nor would this first-aid man of whom we have just been speaking have laid his bare hand on the bleeding surface of a crushed foot.

THE JUDGES

The judging was done largely by army officers and was extremely thorough, there being a judge who was unacquainted with the contestants to every three teams. The judges freely made criticisms, pointing out where some men were smothering in bandages without a hole for breathing, and others had their arms wound tight, when all the bandaging needed was such as to keep the air from the burns. Such judging will tend to make the men all earn 100 per cent. in future meets, unless entirely new problems are presented. The opposition to contests in some quarters, the equality of the contestants, the uncertainty in judging, are all tending to make contests give way to exhibitions. When the uncertainty is removed by the promulgation of detailed methods of action by the A. M. S. A., the equality of the contestants will be still more marked and scores of 100 will be increasingly common. It is interesting to note that the Penn-Mary Coal Co.'s team in five events, judged by five separate judges, received absolutely no demerits.

After four years of exceptional service with the A. R. C., Major Lynch returned to his post with the regular army. Major Patterson has succeeded him and by his professional talent, diplomacy and friendliness, has given everyone assurances that for the four years during which he will occupy the office, the industrial first-aid work of the Red Cross will make rapid progress.

MINE-RESCUE CONTEST, A NEW FEATURE

The mine-rescue contest, first exhibited at this meet, is a feature which has not been understood by the public generally, but it is likely to be as popular and useful as exhibitions of first-aid. The rules promulgated in miners' circular 15, and in the program, are as follows:

1. Each crew shall consist of five men, one of whom shall be the captain. Each man shall be provided with a breathing apparatus, safety and electric lamp, and each crew shall carry a canary bird in a cage to the base of operations.

2. After the men have put on the apparatus, the captain shall command them by signals given by a gong or horn.

3. Before putting on the apparatus the pulse and respiration of each man shall be taken by a surgeon. The apparatus shall be placed at a point convenient to each man, and upon command of the captain each man shall first examine his apparatus, make such tests as will convince him that the apparatus is in proper working order, and put it on without assistance.

4. The captain shall inspect each apparatus, noting the number of each apparatus worn and the reading of the oxygen pressure gage. Rescuer No. 1 shall inspect the apparatus worn by the captain.

5. The team, with its captain, the latter wearing apparatus, shall appear before the judges, who shall be men trained and experienced in the use of breathing apparatus and lamps. The judges shall make rigid inspection of each apparatus and discount for any improper connection or adjustment of the apparatus, lamp or accouterment.

6. Each crew shall then be required to trot 100 yd., then immediately enter an air-tight cage containing strong formaldehyde fumes and remain 10 minutes. As the men come out of the cage their condition shall be ascertained by a surgeon to determine the pulse and respiration of each man; and if the pulse or respiration of any man is abnormal, he shall be dropped from the crew and the crew shall be penalized by heavy discount. (The weakness of a member of a crew would, of course, prevent the crew from participating in the subsequent rescue work unless a substitute should be added who successfully underwent the same test.)

Pittsburgh Coal Co.'s Team. Winners of Mine-Rescue Contest

7. If during the recovery work consecutive members of a crew become separated beyond an interval of 2 yd., a penalty will be applied.

8. Failure to stop at intervals of 300 ft. for periods of one minute for resting will be penalized.

9. For not having a full charge of oxygen and a fresh charge of chemical at the time the apparatus is first put on a penalty will be applied. The committee may arbitrarily designate a supply of oxygen sufficient for one hour as a full charge.

10. For failure on the part of any member to comply with the commands of the captain a penalty will be applied.

11. A fireboss will be stationed at the entrance to the mine who will examine the safety lamps carried by the rescue crew.

12. A recorder designated by the judges will check each member of the crews as he goes in and comes out of the mine, taking his name and giving him a check as he enters and replacing on the board the check as he comes out.

The teams were supposed to find two men who had barricaded themselves in fresh air, and who were still living. They were required to remove them through noxious gases and take them to the surface and give them treatment for burns, shock, thirst and hunger.

Seven teams were entered for this contest, all of them from Pennsylvania. Holding such a competition is a new idea which, we believe, should be credited to the bureau. As none of the participants were experienced in the drill or in the problems actually presented, those who exercised first were under somewhat of a disadvantage.

The threatening rain, unseasonable cold and raw wind, made the day undesirable and there were only about 1000 spectators, though many times that number might well have been expected had the conditions been less wintry.

At 8 p.m., a reception was held in the English room of the Fort Pitt hotel, at which several speeches were made, and the prizes awarded. William B. Wilson, the Secretary of Labor, had been called home by sickness in his family and so could not be present. I. Jones, the Mayor of Pittsburgh, J. I. Parker, chief clerk of the Department of the Interior, Van H. Manning, assistant to the director of the Bureau of Mines, Major R. U. Patterson, in charge of the first-aid industrial work of the American Red Cross, J. P. Reese, vice-president of the A. M. S. A., and W. Green, secretary-treasurer of the United Mine Workers of America spoke at length. The latter made an excellent speech, in which he urged the erection of suitable buildings for the work of the Bureau and commended the efforts the government was putting forth to safeguard the miner.

Prizes for First Aid

The prizes were presented by H. M. Wilson and were as follows:

First Prize—Six silver medals donated by the American Red Cross; six silver medals presented by the American Mine Safety Association: challenge cup presented by the "Colliery Engineer." Won by the Penn-Mary Coal Co., Heilwood, Penn. Score 100.

Second Prize—$18 cash donated by the Mannesmann Light Co.; six bronze medals donated by the A. M. S. A. Won by Penn. Gas Coal Co. (team 17), Irwin, Penn. Score 97⅖.

Third Prize—$12 cash donated by the Mannesmann Light Co. Won by Cambria Steel Co., Johnstown, Penn. Score 97+. (This team, and that receiving the fourth prize tied, and a tie contest was held, which the Cambria team won.)

Fourth Prize—One first-aid cabinet donated by Johnson & Johnson. Won by the Jamison Coal & Coke Co. (team 34), Greensburg, Penn. Score 97.

Fifth Prize—A first-aid cabinet donated by Bauer & Black. Won by Penn. Gas Coal Co. (team 16), Irwin, Penn. Score, 96⅕.

Sixth Prize—One first-aid instruction outfit donated by Johnson & Johnson. Won by Oliver & Snyder Steel Co., Oliver, Penn. Score, 95⅕.

Seventh Prize—One stretcher donated by Frick & Lindsay. Won by Consolidation Coal Co., Fairmont, W. Va. Score 94⅘.

Eighth Prize—One tabloid first-aid box donated by Burroughs, Welcome & Co. Won by the Jamison Coal & Coke Co. (team 10), Greensburg, Penn. Score 94⅗.

Ninth Prize—One year's subscription to the "Coal & Coke Operator." Won by Westmoreland Coal & Coke Co. (team 31), Irwin, Penn. Score 94⅗.

Tenth Prize—Six months' subscription to "Coal & Coke Operator." Won by Vandalia Coal Co., Terre Haute, Ind. Score, 94⅕.

Eleventh Prize—$5 cash donated by "Coal Age." Won by Tunnel Coaling Co., Gallitzin, Penn. Score 94.

Special Resuscitation Prize—One silver challenge cup donated by S. F. Hayward & Co. Won by the Penn.-Mary Coal Co., Heilwood, Penn.

Grand Prize to team making best appearance on field in efficiency, training and drill, regardless of points scored. A silver cup donated by the "Coal Trade Bulletin." Won by the Oliver & Snyder Steel Co., Oliver, Penn.

Prizes for Mine-Rescue Work

In the mine-rescue contest, the results were as follows:

First Prize—Five bronze medals donated by the American Mine Safety Association. A challenge cup donated by the "Colliery Engineer" to become the property of the team which secures the highest score in all events for two consecutive meets. Won by the Pittsburgh Coal Co. Score 95.

Second Prize—Five Ceag electric hand-lamps on a chandelier donated by the Mannesmann Light Co. Won by Pittsburgh-Buffalo Co. Score 93.

Third Prize—One Draeger oxygen inhalator donated by the Draeger Oxygen Apparatus Co., also one year's subscription donated by the "Black Diamond" to the team scoring the sixth highest number of points in all events. Won by H. C. Frick Coke Co. Score 85.

Fourth Prize—One electric mine lamp donated by the Hirsch Electric Mine Lamp Co. to captain of team. $12 cash donated by the American Mine Safety Association for equal division among other four members of team. Won by Jamison Coal & Coke Co. Score 83.

Fifth Prize—$15 cash donated by the Mannesmann Light Co. Won by Ellsworth Collieries Co., Ellsworth, Penn. Score 75.

At the close of the prize giving, several moving pictures were shown of the Fourth of July parade at Gary, W. Va., followed by some excellent mine views, taken at and in the U. S. Coal & Coke Co.'s mines at the same place.

ORGANIZATION

On the morning of the next day, the association met for its opening session, the principal business being to take action on the new constitution.

Some unimportant changes were made; Art. 6, Sec. 1, being made to read in part: "The annual meeting of the association shall be held not later than September of each year," and the last clause in Art. 8 was modified to run: "Each local section may adopt such by-laws as it may find expedient, subject to the approval of the executive committee."

Section 3 of the by-laws now reads: "Only such persons shall be enrolled in the National Service Corps as can produce a certificate of competency in the particular corps work concerned, issued by an organization approved by the committee appointed by the association or by an examiner of that committee." Section 5 was changed so that dues are payable on the first day of the annual meeting, instead of on the first day of September. The nominating committee and other standing committees were appointed.

THE ANTECEDENT CONDITIONS OF THE EXPLOSION

In the afternoon there was an experimental explosion at the Bruceton mine. The main entry and its parallel heading have been driven till both of them are 1303 ft. in the hill, as measured along the main entry from its portal. At the end of the main heading a cannon was placed facing the entrance. This was loaded with 4 lb. of F. F. F. black powder and was stemmed with 8 in. of clay tamping. The hole was 2¼ in. in diameter and 22 in. long in all. In front of this cannon was placed, in a manner and at a level most conducive to an explosion, a platform loaded with 50 lb. of coal dust.

At the corner of the rib, where the inby side of the last crosscut meets the left side of the main entry, a cannon was set on a line dividing the angle between entry and crosscut. It was charged and tamped like the cannon at the end of the entry and the same kind of platform, with an equal amount of coal dust, stood in front of it to insure an explosion, but as it did not go off for some reason, all the effects produced can be ascribed to the cannon in the end of the entry.

It is needless to detail the length of heading charged with coal dust, as that is made amply clear by the shaded area in the illustration. It is necessary only to state that the charge on side shelving and floor was 2 lb. per lineal foot of heading both in the entry and airway. The stone dusting in the Garforth barrier, located in the airway, was heavier, 4 lb. per lineal foot. The Taffanel barrier was in all 60 ft. long and consisted of 10 boards 20 in wide, loaded with dust made by grinding the roof shales of the Bruceton mine. These boards were loaded to capacity.

AN EXTREMELY VIOLENT EXPLOSION

The explosion was a severe one, the cloud of dust escaping from the portal was not accompanied by flame, but could hardly have been more spectacular. The "British Coal-Dust" manometer at substation 150, registered a pressure of 55 lb. per sq.in. That at 550 measured 120 lb., the highest figure obtained in experiments at the Bruceton mine. At a point 750 ft. from the entrance, the pressure was only 12 lb. It is important to remember that this pressure is measured at right angles to the direction of the explosion and much higher pressure might well be anticipated in the direct line of its motion.

The reinforced-concrete stopping, situated 650 ft. from the portal, was cracked, giving two vertical crevices, which measured ⅛ in. across. Near the Taffanel barrier the shelving was torn down and two posts measuring 8 in. by 8 in. by 6 ft., which were recessed and held in place by ¾-in. square irons, were ripped from their places and thrown out of the mine, along the rock dump, and over the ravine to the side of the opposing hill.

WHAT USE IS A MERE BARRIER?

No one present observing the terrible effects of the explosion could feel much confidence in a barrier, however successful in suppressing combustion, and G. S. Rice stated beforehand that a barrier might put out the flame, but that the gases generated by combustion before the barrier was reached made any such protection inadequate. The rescue men carrying a canary met the waste products forced out by the fan and immediately returned, being unable to see in the dense smoke. The canary died immediately and an application of pure oxygen failed to revive it.

THE EXPLOSION AT THE BRUCETON EXPERIMENTAL MINE

Though there was no flame the cloud of smoke and dust amply proved the force of the explosion.

Behind the Taffanel barrier was only 803 ft. of heading, but the force which threw the timbers across the run showed that barriers in a mine would not make the workings safe. Nothing but the continuity provided by the Garforth system can be regarded as furnishing perfect security and then only if perseveringly extended as the headings are driven forward.

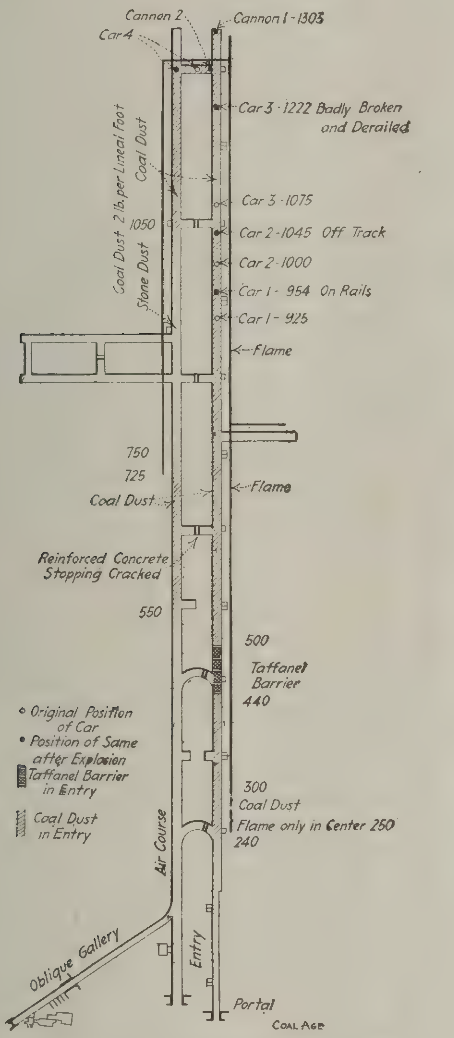
FORCE AND ORIGIN

To those who judge that an explosion is to be traced to the point where the violence is most marked, it will be interesting to note that with one exception the shelving was only torn down where the explosion ended, near the Taffanel barrier. The shelving was unbroken in the crosscut and the air course. In the main entry, as stated, it was ripped down near the barrier and it was also torn down as will be later seen by the side of a flying car.

The extent of flame is measured by tufts of guncotton, held in place by stiff wires. Every 25 ft. one of these stands stiffly from the roof and one stands out from he rib. Of course, the flame may strike one of these or both or neither. Hence it is not entirely safe to conclude that the flame ended where the guncottons ceased to be burned. On the other hand, it seems without inquiry that the cottons may be burned by hot particles of dust, even without flame.

The Flame Died after It Passed the Barrier

However, judging by the indications furnished by these tufts of guncotton, the flame in the main entry traveled past the Taffanel barrier 115 ft., and so completely filled the heading that two guncottons were burned at that distance. At 190 ft. outby from the barrier, at substation 250, the guncotton was consumed, but neither the cotton at the side nor the current breaker was burned. Beyond this point, the guncottons were either blown away or were intact. The Taffanel barrier at last had done its work, not by a descending shower, but by mixing with the coal-dust cloud and quenching it on its way. The flame did not die for lack of fuel, for there was coal dust in plenty where it was extinguished.



Plan of Experimental Mine

The extent of the flame, following the explosion of Sept. 23, 1913, is indicated by the black lines adjacent to the headings where the flame traveled.

The Garforth stone-dusting was also effectual, the small carbonaceous percentage in the dust not showing an objectionable action here or in the Taffanel barrier. In the air course the flame apparently went to 725, or 25 ft. beyond the stone-dust zone, the greater effectiveness of the barrier being probably due to its greater length.

How the Three Cars Were Blown Inward

Perhaps the most interesting feature was the action of four mine cars filled with stone dust, which were left to withstand the force of the explosion. So far from being expelled from the mine, three went inward. Of course, experts have known of this action long ago, but such convincing, measurable evidence has perhaps never before been presented.

Three cars stood on the track in the main entry, one 925, one 1000 and one 1075 ft. from the portal. After the explosion the outby car was on the rails at 954 having moved 29 ft., the next car was off the track against the rib at 1045 having moved 45 ft., the third car had scraped off the shelving from 1075 to 1222. The sides of the car were broken and the load discharged. The car was found diagonally across entry.

This return draught was not juggling with empty cars. Each car on the track before the experiment was loaded full and rounded up with about 2 tons of fine dirt. The cars themselves weighed about 1500 lb., light. It will be noted that the cars furthest from the initial point of explosion traveled the least distance and were least injured; thus the return current was least forcible at points where the explosion was most violent. The platform on which dust was spread opposite the cannon at the crosscut was also drawn to the end of the main entry. On the other hand, a car in the crosscut near the cannon, which did not go off, was driven *with* the explosion and struck violently against the air course opposite the crosscut, and half the fine dirt was thrown out.

Judging an Explosion by Indications

All of which shows that it is a difficult matter to judge the direction (the mathematicians would rather term it "sense") of an explosion from the movements which it causes.

"Clearly" the expert of fifteen years ago, or even of today, would say, "the explosion started near the Taffanel barrier, for it was most violent at that point. There posts were thrown outward and cars driven inward. Note, he would add that the platform went to the end of the heading and the car in the crosscut being round the turn was blown to the air course." Hardly any but those who actually know the antecedents of the explosion would today venture to focus it in the cannon at the end of the entry, the point toward which nearly all loose objects approached and where least damage was done.

The Post-Explosion Vacuum Theory

The theory that the draft inward occurs *after* the explosion hardly seems tenable. For the car (at 925), which stood where the explosive wave was most nearly at detonating speed, was least disturbed. Had it met the full blast going outward, surely we should have found it in the valley, empty and dismantled instead of further in the mine than before the explosion and uninjured and with its load still intact.

Seeing that the explosion traveled in both directions and that the shot was fired in a blind heading, it is not of much importance in which sense the current moved. It entered, however, at the main entry and the air supplied every minute was 8000 cu.ft., giving a velocity of roughly

150 ft. per min. This has been determined from careful measurements when the fan was making the same number of revolutions as at the time of the explosion.

The explosion went up the blind entry on the right to within 25 ft. of the face, though there was no coal dust in this entry, nor was it protected with any stone dust. The two left butt entries free of dust of any kind were hardly penetrated by the flame, but in the second of these, the guncotton 25 ft. from the entry was partly burned.

View of the Steel Gallery at Bruceton Mine

This photograph was taken from the end of the oblique gallery, and shows on the left the fan house and the side passage leading thereto. In the rear are the barricade of earth and concrete, the engine and boiler houses, dust mill and stable.

The "British Coal-Dust" samplers failed to be effective. The sampling bottles prepared by the bureau partly succeeded. Apparently, bottles 1 and 3 of the series received the gas from the explosion, but bottle 2 failed. These bottles are all close together in the heading. The explosion breaks the head of the first bottle, the mine air is admitted and a wax plug is automatically inserted almost immediately. The other bottles in turn are caused to be broken by clockwork and they are sealed by the outside pressure forcing wax into the head of the sampler.

Some Follies and More Business

In the evening a smoker was held with songs, stogies, steins, speeches and "stunts." G. A. Burrell, the chemist for gas investigations, was master of ceremonies, and revealed an unsuspected satirical side. He roasted in verse many of the Bureau of Mines men, and did not forget to show up with some good judgment the failings of others, who had to defend their reputations, if they could, with a speech.

On Sept. 24, the business session commenced somewhat late, committee meetings having delayed its convening. Nearly every committee merely recorded proggress. Questions which had been submitted as to first-aid methods were not discussed in committee, and no report was made on them. Consequently the work was more or less perfunctory except the election.

H. M. Wilson, First President

It was decided, and, we think, with no little justice, that H. M. Wilson, who has served as chairman, who built up the organization, who has labored unceasingly for its development, and whose original ideas it clearly reflects, should be elected its first president. He refused to serve another year as he thought someone not with the bureau would better serve to place the organization on an independent footing. So H. M. Wilson was elected president for the balance of the present business year. His tenure of office lasted almost 15 min., after which he was followed by J. R. Reese, general superintendent, Chicago & North-Western Railway Coal Properties, Gillespie, Ill.

The following were elected as vice-presidents:

Dr. A. F. Knœfel, surgeon, Vandalia Coal Co., Linton, Ind.
J. A. Fletcher, general superintendent, Cherokee-Pittsburgh Coal & Mining Co., Frontenac, Kan.
J. Wells, Newport, Mo.

The executive committee is as follows:

Dr. W. S. Rountree, chief surgeon, Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.
E. H. Weitzel, general manager coal mines, Colorado Fuel & Iron Co., Pueblo, Colo.
R. A. Phillips, general manager, coal department, Delaware, Lackawanna & Western R.R., Scranton, Penn.
Dr. G. H. Halberstadt, chief surgeon, Philadelphia & Reading Coal & Iron Co., Pottsville, Penn.
F. W. Sperr, professor of civil and mining engineering, Michigan College of Mines, Ann Arbor, Mich.
W. H. Aldridge, managing director, Inspiration Consolidated Copper Co., 14 Wall St., New York City.

The meeting decided not to commit itself on the question, "One day's rest in seven for the promotion of greater safety," on the ground apparently that it would interfere with existing contracts. We are sorry a stand was not taken on this subject.

A first-aid round table luncheon was held at noon, the genial Dr. A. F. Knœfel presiding. Doctor McHenry spoke at some length on the fact that a physician should take care of the sick not only by prescribing medicine, but by insisting that proper care be taken of patients and he should guard the healthy by demanding sanitary conditions at the school and around the homes and stores. He said that at the Penn-Mary mines, men who did not obey sanitary laws, who did not care properly for the sick, and who thus showed themselves undesirables, were discharged, regardless of their value as workmen.

The afternoon was occupied by a visit to the Bureau of Mines and the Museum of Safety of the U. S. Steel Corporation.

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According to the new English coal mines act, a place shall not be deemed in a fit state for working if the air contains less than 19 per cent. oxygen or more than 1¼ per cent. carbon dioxide. The percentage of inflammable gas must not exceed 0.25 per cent. in an intake airway.

The Meet of the Susquehanna Interests

By R. Dawson Hall

SYNOPSIS—At the Shamokin first-aid meet of the Susquehanna Coal Co., some instructive events illustrated how to rescue a man who has fallen into water in a low place full of noxious gases and how to bandage and care for a victim who has had an arm torn from the socket. Notes are added on the prone-pressure method.

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The first-aid teams of the Susquehanna Coal Co., the Mineral Railroad & Mining Co., the Summit Branch Mining Co., and the Lytle Coal Co., held a common meet at Edgewood Park, Shamokin, Penn., on Sept. 13, 1913.

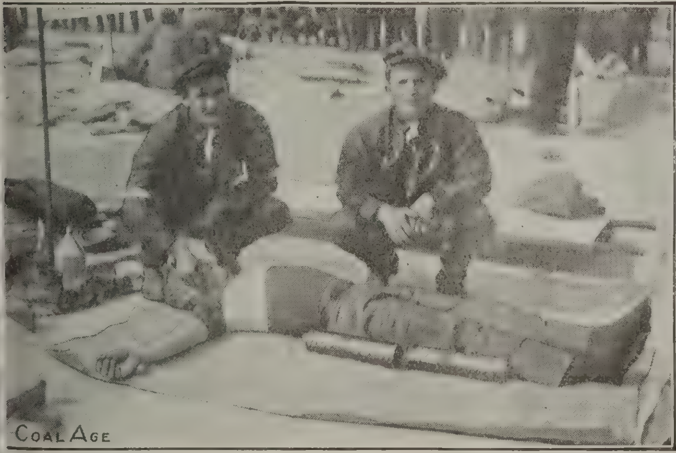
The Meet of the Susquehanna Interests in Edgewood Park

The photograph was taken in the afternoon and represents the final contests when only 14 teams competed.

Thus, Nanticoke No. 5 colliery, had four teams represented, known as Outside, No. 4 slope, No. 2 slope and Stearns. J. Wadzinski represented No. 2 slope in the one-man event, and was pitted against three other contestants representing the other sections of Nanticoke No. 5 colliery. Being victor in that contest, he was selected to meet the winners, similarly chosen from the teams of other collieries. This final contest, like those of the other events, took place in the afternoon, and the winner of this second contest was G. Esher, one of the outside men at Hickory Ridge colliery, who bested the representative of the inside men of that mine in the elimination contests. J. Wadzinski, however, won the second prize for the one-man event.

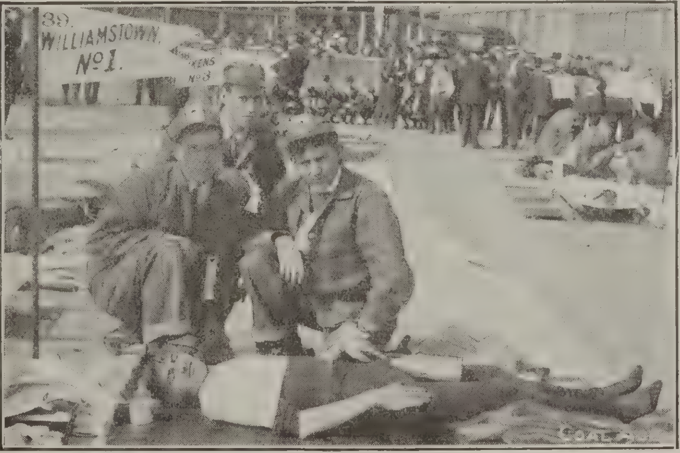
Similarly, J. Butchko and J. Schrama, of Nanticoke No. 5 colliery, No. 4 slope, were successful in carrying off the honors for their teams in the two-man event, as against their competitors of the other three sections of the same workings. In the afternoon they were pitted against the best men at the other thirteen collieries and were successful in getting first prize.

It is in this way that the teams were chosen for the final contest in both the three-man and full-team events. Each team stood on its merits. If it showed skill in the one-man event, it was allowed to contest the honor in the finals; the lack of skill in other events did not act as a bar.



Pennsylvania Colliery, Nos. 1 and 5 Slopes

The subject is supposed to have had his arm torn from he socket. This arm is stretched out at full length. The ıan at the head is compressing the artery which runs along he collar bone.



Williamstown No. 1 Summit Branch Mining Co.

Same event as in adjacent illustration. The compress shows plainly over the shoulder. The team has placed the arm, which is supposed to be torn out, along the side of the subject.

hree large trainloads of participants and guests from hree different directions arrived in the early morning at hamokin.

How the Elimination Contests Were Conducted

The forenoon was occupied by the elimination contests, y which the contesting teams were reduced from 43 to 4. Several teams representing sections of each colliery ere engaged in the elimination trials, but as a result of ıese first contests representative teams were chosen from ıch colliery to represent that mine in the afternoon ontest.

Dr. S. M. Maurer, of the Susquehanna Coal Co. (Shaft Post-Office Division), and of the Mineral Railroad & Mining Co., Dr. G. M. Stites, of the Summit Branch Mining Co., Dr. B. C. Guldin, of the Lytle Coal Co., and Dr. J. H. Hughes, of the Susquehanna Coal Co. (Nanticoke and Glen Lyon divisions), were the judges in the elimination contests.

The Winning Teams

The victors in the final trials were:

One-Man Event—1st prize, G. Esher, Hickory Ridge colliery, outside; 2d prize, J. Wadzinski, Nanticoke No. 5 colliery, No. 2 shaft.

Two-Man Event—1st prize, J. Butehko and J. Schrama, Nanticoke No. 5 colliery, No. 4 slope; 2d prize, J. Williams and J. Eister, Luke Fidler colliery, outside.

Three-Man Event—1st prize, J. A. Buggy, J. Morlock and J. Hine, Cameron colliery, outside; 2d prize, W. Matthews, R. Kantner, Andrew Sadusky, Pennsylvania colliery, Nos. 1 and 5 slopes.

Full-Team Event—1st price, W. Horn, captain, A. Parker, G. Morse, G. Lessig, M. Rafferty, H. Straub, subject, Scott colliery, outside; 2d prize, W. Matthews, captain, R. Kantner, A. Sadusky, A. Zigray, F. Feifer and J. Burt, subject.

The judges of the final contests were Drs. T. B. Rogers, of Pottsville, Penn., D. H. Lake, of Kingston, Penn., J. W. Geist, of Wilkes-Barre, Penn. They made a thorough investigation of all the victims, noting with great care how each was bandaged. Each judge made his own marking, and the team was given the average of those three separate scores. The captain in each case was asked how the work was done, and very definite, clear and complete were the replies given.

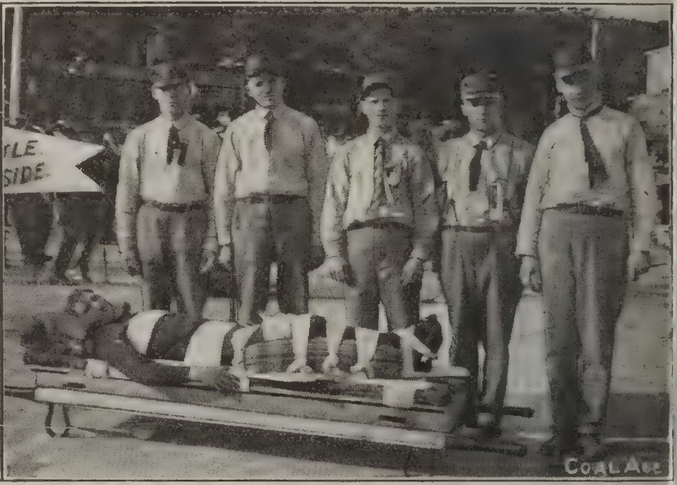
Rescue and Resuscitation

The first or one-man event was as follows:

An explosion of gas has occurred, a man is found unconscious lying face down in a ditch ;the place in which he is found is only 3 ft. high; rescue and carry 10 ft. Perform artificial respiration by Sylvester method; dress simple fracture of jaw and wound of right temple, time limit 15 minutes.

The Prone-Pressure Method

The head is placed on one side, resting on the hand. The hands are placed on the sides over floating ribs. In this case the demonstrator is not using his weight for compression.



Lytle Inside Colliery—Lytle Coal Co.

Subject dressed for dislocation of right hip. The team does not attempt to reduce dislocation, but retains it in place by folded blankets and bandages, as it is found.

The teams all adopted Dr. M. J. Shields' method of turning the victim on his back and tying the hands together. The rescuer then passed his head through the hands of the victim with his back to the victim's chest. Then squirming around, he worked the victim onto his back and crawled with him the required 10 ft. Of course, if the distance of travel were only 10 ft., neither Dr. Shields' system nor this modification would be necessary, but it is natural to suppose that a longer distance was in contemplation, and the space was reduced only because of the exigencies of the meet.

It is true that if a man has any water in his lungs, it is not well to carry him with his mouth upward, more than a few feet. He should be rolled over, in this event, so as to drain all the water out of his mouth and lungs. On arriving with his subject at the required place, the contestant placed him over his knees and endeavored in a more perfect way to relieve his lungs of all liquid secretions.

The Sylvester method seemed quite generally performed by pressure on the chest instead of by thrusting the elbows into the ribs, after the method commonly taught. The explosion of gas probably did not affect the abdomen; in fact, the burning may well be assumed not to have been severe, or the prone-pressure method would have been ordered. Consequently, there does not seem any reason for the teams avoiding the side-swiping pressure action, recommended by many authorities and replacing that method by direct compression of the chest.

An Arm Torn Out of the Socket

The second or two-man event was as follows:

A man has his right arm caught in machinery, tearing it completely off and out of the socket at the shoulder joint. Control hemorrhage, dress wound. State to judges what was your first method of stopping bleeding and your final method. State also your final disposition of the injured man. Time limit, 10 minutes.

Passing along the upper edge of the clavicle, or collar bone, runs the subclavian artery, well protected from injury, but a difficult artery to reach in case it is desired to stop it from bleeding. For a long distance it is covered by the sterno-mastoid muscle and cannot be readily reached. But in a depression, markedly visible in lean persons, the subclavian artery can be forced down onto the first rib and thus caused to cease flowing. The artery changes its name beyond this point and is known as the axillary artery until it reaches the arm, where it is renamed the brachial artery.

When the arm is torn out of the socket, this artery is torn apart, and as it carries a large flow of blood, its severing subjects the victim to immediate risk of death. The first action of the first-aid man is to press on the subclavian artery with his thumb at the point stated, and then take a stick wrapped with something soft and press firmly on the artery so as to pinch it between the stick and the upper side of the first rib.

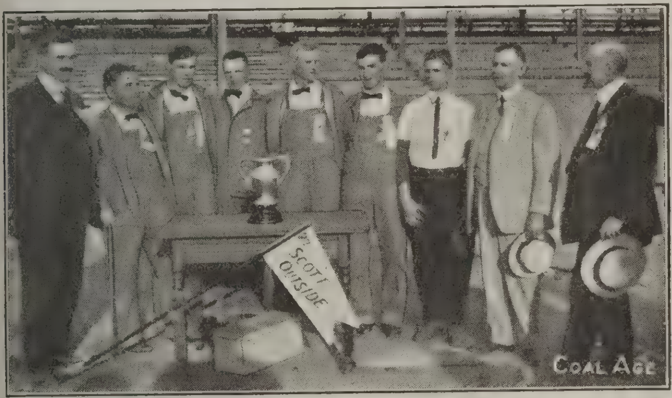
One of the teams arranged for continued pressure by passing a bandage over the pressing body, down between the legs of the patient. Whether this was approved by the judges did not appear.

Additional Precautions

After the patient was thus provided for, the team was supposed to fill the vacuity where the arm had been torn out, with gauze and put a compress over it, preferably a hemispherical ball, but in practice anything which might be available, to secure everything in place by a bandage passing from side to side of the subject and to tighten the bandage with a Spanish windlass. Of course, shock was to be cared for, hot-water bottles being used to that end.

It will be noted in the illustrations that the arm not being torn from the subject, the compress and bandage were put by some below the arm in the armpit. Some put it on the shoulder, and the bandaging then showed its purpose better, though it could not be said that it was any more correct. Note how the Williamstown No. 1 team put a water bottle at the base of the spine—a good place to stimulate the whole nervous system.

The teams had been taught to reply to inquiries that it was not safe to move a subject whose arm had been torn out at the socket. They were told it was the duty of those rendering first-aid to send immediately for a doctor to tie the artery, and meanwhile keep the patient from bleeding to death by continued pressure on the subclavian artery, supplemented by the action of the compress, which would prevent such blood from escaping as might not be held back by direct pressure on the artery.



THE WINNING TEAM—SCOTT COLLIERY OUTSIDE

From left to right, R. Stroup, outside foreman; W. Horn, captain; A. Parker, G. Morse, G. Lessig, M. Rafferty; H. Straub, subject; W. R. Reinhardt, superintendent; J. M. Maurer, medical director.

The third, or three-man event, was as follows:

> Rescue a man from electric contact, carry 10 ft., perform artificial respiration by the prone method. Treat burns of right arm and forehead, and a compound fracture of third and fourth ribs of right side. Time limit, 15 minutes.

The prone-pressure method is shown in the illustration. It is interesting to note that all the first-aid men have been instructed to release their hold on the floating ribs suddenly, so that the quick outward movement of the chest will make a more marked current flow in toward the lungs and thus sweep away any obstructions.

The fourth and full-team event was:

> Laceration of the middle-third of right thigh; dislocation of right hip; dislocation of spinal column. Handle by four bearers, carrying subject in front of reviewing stand, passing over obstruction and return to station.

Much credit should be given C. K. Gloman for his excellent work in supervising the arrangements for the meet. After the cup was presented, speeches were made by R. A. Quinn, the vice-president and Morris Williams, the president of the companies. It was announced that the companies had formed a safety committee and would make every effort to reduce accidents, and desired suggestions from their employees.

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The Situation in Colorado

It has been variously estimated that from 50 to 90 per cent. of the miners in the southern Colorado coal field laid down their tools, Sept. 23, in response to the strike call issued by the United Mine Workers of America. Officials of the various mining companies claim that only about one-half their men went on strike, while the officials of the miners' union say that fully nine-tenths of the mine workers are out.

A few of the smaller mines are being worked practically full force, while many of the larger operations are at least seriously handicapped, if not practically closed down. It is impossible to say how long conditions will remain as they are, or what the changes will be.

The miners early began a general exodus from company houses and took up their quarters in tented camps. The mining companies have also made provision for the comfort and safety of the men at work.

On Sept. 25 three negro strikebreakers were mobbed by miners at Ludlow. With one exception, the identity of these men, as well as their fate, is unknown. Aside from this, and one or two other minor outbreaks of mob violence, the entire mining region is comparatively quiet. It is hoped and believed that it will be unnecessary to call out the state militia, although that organization is held in readiness for immediate service.

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First-Aid Meet of the Navigation Co.

By E. H. Suender*

The Lehigh Coal & Navigation Co. held its First Annual Field Day and First-Aid Contest at Lakeside, Aug. 30, 1913; it was attended by 550 employees, including a number of invited guests. A special train of eight passenger cars left Lansford at 8 a.m., accompanied by a band of 26 pieces. The invited employees included first-aid men, mine-rescue men, all of the department heads, foremen, assistant foremen and loader bosses.

The First-Aid Contest

There were 20 teams in the first-aid contest, composed of five men each, including the subject. The teams represented the various operations, both inside and outside. Great credit is due to the company's first-aid physician, Dr. J. H. Young, and his assistant, J. L. Simons, fire inspector of the Lehigh Coal & Navigation Co., for the showing made by the contestants. The following shows the average of the various teams:

Team	Colliery	Captain	Per Cent.
No. 1	No. 8 slope	T. J. Evans	98.8
2	Lansford (outside)	Alex Gibson	98.4
3	Springdale	Thos. Whildin	96.8
4	No. 11 shaft	Jas. Tiler	96.8
5	No. 9 shaft	Dan Moser	96.4
6	No. 8 shaft	John Boyle	96.4
7	No. 10 shaft	Alex Jones	96.0
8	Hauto washery and Summit	Thos. Reese	95.2
9	Coal Dale (outside)	Wm. Calahan	95.2
10	No. 6 shaft	Fred Fetzer	94.8
11	No. 14 shaft	Oscar Beltz	94.8
12	Nesquehoning (outside)	Wm. Adams	94.8
13	No. 4 shaft	Robt. Sinyard	93.6
14	No. 5 shaft	Sam Hollenback	93.6
15	Foster's Tunnel	Thomas Thomas	93.6
16	Greenwood (outside)	Thos. Mitchell	92.8
17	No. 2 shaft	John Priestly	92.8
18	Electrical	Harold Ramsey	92.8
19	Lansford shops	Dan Jones	92.0
20	No. 3 slope	John Lewis	92.0

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*Lansford, Penn.

First Annual Outing, Lehigh Coal & Naviga

The judging staff of the first-aid contest included Dr. E. H. Kistler, Lansford; Dr. E. E. Shifferstein, superintendent Coal Dale State Hospital; Dr. W. H. Clewell, Summit Hill; Dr. W. H. Kasten, Lansford, and Dr. M. H. Neumuller, Lansford. The time keeping was in charge of Mining Engineer W. B. Richards.

Awarding of Prizes

First Prize of $25 in gold and a silver medal for each member was won by No. 5 Slope team composed of the following:

Thomas J. Evans, **Captain,**
John Rimbach,
Evan Phillips,
Arthur Jeffries,
John Neznamy, Patient.

Second Prize of $15 in gold was won by Lansford (outside) team composed of the following:

Alex. Gibson, **Captain,**
Earnest Hugel,
Howard Lesher,
Grant Blyler,
Joseph O'Donnell, Patient.

Third Prize of $10 in gold was won by Springdale team composed of the following:

Thomas Whildin, **Captain,**
John Pasco,
John Haughton,
James Monroe,
David Griffiths.

Athletic Contests

The company has created a healthy spirit of rivalry among its employees by stimulating interest in athletic contests. Vice-President Ludlow has presented a large silver cup which will be competed for at each annual outing, until same is won by one district for three times,

Iining Department, Lakeside, Penn., Aug. 30, 1913

when cup will become the property of that district. The districts are:

- No. 1 Headquarters (general office, shops, store, storage yard, etc.).
- No. 2 Nesquehoning.
- No. 3 Lansford.
- No. 4 Coal Dale.
- No. 5 Greenwood.

Details of the results were as follows:

50-Yd. Swim—1st, C. Lutzcavage; 2d, A. G. Morlach; 3d, D. C. Helms.

300-Yd. Single-Oar Boat Race—1st, H. H. Houser; 2d, G. Roads; 3d, J. Priestly.

100-Yd. Swim—1st, Lutzcavage; 2d, E. M. McDermott; 3d, A. Luschman.

400-Yd. Double-Oar Boat Race—1st, H. Houser; 2d, E. Suender; 3d, G. G. Gardner.

Standing Broad Jump—1st, E. H. Thomas; 2d, W. James.

Running Broad Jump—1st, E. H. Suender, 16 ft. 9 in.; 2d, J. McHugh; 3d, D. Thomas.

Putting 16-Lb. Shot—1st, E. Brennan, 32 ft.; 2d, J. Melley; 3d, J. Davis.

Throwing Baseball—1st, Joseph Cunning, 267 ft. 8 in.; 2d, E. McDermott; 3d, T. Dermott.

100-Yd. Dash—W. James, 10$\frac{3}{5}$ seconds; 2d, S. Gluck; 3d, A. Mertz.

50-Yd. Dash (all entrants over 200 lb.)—1st, J. Denis; 2d, W. Miller; 3d, G. Thomas.

50-Yd. Race—1st, P. Bauer; 2d, G. Rose; 3d, J. Sweeney.

100-Yd. Three-Legged Race—1st, G. Rose and J. Tate; 2d, D. Griffith and A. Pascoe; 3d, M. Morgan and P. Boner.

220-Yd. Dash—1st, W. James; 2d, C. Mertz; 3d, N. McCullion.

50-Yd. Dash (entrants over 50 years old)—1st, M. O. Morgan; 2d, A. Haughton; 3d, P. O'Donnell.

Tug of War—Won by Coal Dale.

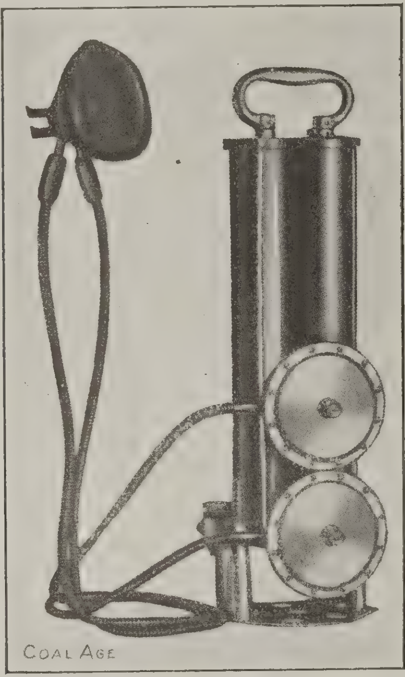
Total Points—Headquarters, 43; Coal Dale, 33; Lansford, 32; Greenwood, 20, and Nesquehoning, 11.

Baseball—The Lansford shop team captured the baseball game from the Lansford District by a narrow margin of 3 to 1. It was a hotly contested game throughout, the score standing one to one at the beginning of the ninth.

A New Resuscitation Apparatus

Heretofore most devices for resuscitation have been automatic in operation. A supply of oxygen is contained in a cartridge or cylinder under high pressure, and serves not only to furnish the wherewithal for breathing to the patient, but also by virtue of its pressure it operates the machine itself.

The Life Saving Devices Co., of Chicago, has recently placed upon the market a resuscitation device called the "Lungmotor" which does not depend upon the action of any compressed gas for operation. Furthermore, this device makes use of atmospheric air, or any desired mixture of atmospheric air and pure oxygen. Being operated by hand, the rapidity of forced breathing is at all times under control of the operator.



LUNGMOTOR WITH MOUTHPIECE

The instrument consists essentially of a double-chamber pump, connected by flexible tubing to a mouthpiece, fitting over the patient's face. A suitable governing device is also provided so that the pressure upon the lungs cannot be raised above a safe amount. Adjustment can be immediately made to the capacity of the lungs of the person being treated. Thus a new-born child and a large adult could be resuscitated by the same machine.

The air pump proper is composed of two cylinders, each provided with a piston and piston rod. The reciprocating parts in each working barrel move simultaneously, being connected at their upper ends by a common handle. One cylinder thus pumps air into the lungs while the other on the return stroke removes it therefrom. A simple device permits of the substitution of a tracheal tube for the ordinary soft-rubber face piece.

AN OXYGEN GENERATOR IS PROVIDED

As an auxiliary to this Lungmotor pump, an oxygen generator is provided and connected thereto with suitable flexible piping. In this generator, oxygen is made by the union of water with an oxygen powder which, for convenience, is put up in 7½-oz. tins, each furnishing approximately 8 gals. of chemically pure oxygen, which is ordinarily enough for about 2½ hours' use in treating asphyxiation.

Both the Sylvester and the Schaefer method of resuscitation leave much to be desired and both are admittedly inferior to mechanical means. In operation the device above described closely approximates natural breathing and furnishes only the proper amount of air, avoiding all danger of too much pressure or overinflation of the lungs.

One great advantage of this new apparatus is its lightness and the ease with which it may be transported from place to place. The pump and oxygen generator, packed complete in a carrying case, together weigh approximately only 30 lb. Another advantage, which under certain circumstances may be of primary importance, is the fact that resuscitation by this machine is not dependent upon a supply of ready prepared oxygen. Fresh air is always available, and under most circumstances will answer every resuscitational need.

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Itinerary of Federal Mine-Rescue Cars

Evansville Car No. 3—Itinerary No. 1—Revised September 24, 1913

		1913	
At	Companies	Arrive	Leave
Shelburn, Ind.	Monon Coal Co., Alliance Coal Co., Peabody Coal Co., Brazil Block Coal Co., Gregory Coal Co.	Sept. 29	Oct. 11
Terre Haute, Ind.	Vandalia Coal Co., United Fourth Vein, Big Vein Coal Co., Monon Coal Co., etc.	Oct. 13	Oct. 18
Clinton, Ind.	Shirley Hill Coal Co., Brazil Block Coal Co., Oak Hill Coal Co., Clinton Coal Co., Bunsen Coal Co., etc.	Oct. 20	Oct. 25
Jasonville, Ind.	Green Valley Coal Co., Monon Coal Co., Letsinger Coal Co., United Fourth Vein	Oct. 27	Nov. 1
Linton, Ind.	Vandalia Coal Co., United Fourth Vein	Nov. 3	Nov. 15
Bicknell, Ind.	Bicknell Coal Co., Freeman Coal Co., Linn Coal Co., Tecumseh Coal & M. Co.	Nov. 17	Nov. 26

Pittsburgh Car No. 6—Itinerary No. 1—Revised September 10, 1913

		1913	
At	Companies	Arrive	Leave
Fairmont, W. Va. (Special Siding)	Consolidation Coal Co., Jamison Coal & Coke Co., Hutchinson Coal Co., New Central Coal Co., Madeira-Hill-Clark Coal Co., Virginia & Pittsburgh C. & C. Co., Winchester & Virginia C. & C. Co., Federal Coal & Coke Co., Four States Coal & Coke Co., Virginia-Maryland Coal Corp., Elkins Coal & Coke Co	Sept. 29	Dec. 30

Mine Rescue Car No. 7—Itinerary No. 1—Revised September 24, 1913

		1913	
At	Companies	Arrive	Leave
Inman, Virginia	Virginia Iron, Coal & Coke Co.	Sept. 29	Oct. 4
Oak Hill, W. Va.	Fayette County Fair Association.	Oct. 6	Oct. 11
Stone, Ky., Peg, Ky., Hardy, Ky., McVeigh, Ky.	Pond Creek Coal Co.	Oct. 13	Oct. 25
Gary, W. Va., Elbert, W. Va., Anawalt, W. Va.	United States Coal & Coke Co.	Oct. 27	Nov. 8
Jenkin Jones, W. Va., Pocahontas, Va., Switchback, W. Va.	Pocahontas Consolidated Collieries Co.	Nov. 10	Nov. 29
Olmstead, W. Va.	Houston Coal & Coke Co., Lake Superior Coal Co.	Dec. 1	Dec. 6
Vivian, W. Va.	Tidewater Coal & Coke Co., Bottom Creek Coal & Coke Co.	Dec. 8	Dec. 13
Eckman, W. Va.	Shawnee Coal & Coke Co., Houston Coal & Coke Co., Eureka Coal & Coke Co.	Dec. 15	Dec. 20
Powhatan, W. Va.	Powhatan Coal & Coke Co., Lynchburg Coal & Coke Co.	Dec. 22	Dec. 27

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The next issue of "Coal Age" will contain a full description of "The Muckle Cup Contest" (American Red Cross Meet), held at Valley View Park, Inkerman, Penn., Sept. 27. This number will also show a photograph of the third annual outing of the Lehigh Valley Coal Co. Social Association, held at Hazle Park, Penn., in August. A further article will deal with "Safety Precautions of the Consolidation Coal Co. of West Virginia."

EDITORIALS

It is poor economy to reduce the speed of the mine ventilating fan during the night hours and on holidays when the mine is idle. This practice has been the direct cause of many serious and fatal accidents.

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The good results said to have been obtained by the systematic division of labor in mines, a plan inaugurated some time ago, by one of the largest coal-mining companies in Montana; and the system of close supervision of miners, during working hours—a plan recently adopted by the Lehigh Valley Coal Co., operating in the northern anthracite district of Pennsylvania, are hopeful indications that the death rate in coal mining for 1913 will be much reduced.

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Is it a fact, as has been suggested, that there is among a large class of miners a certain "uncanny" feeling, in respect to the presence of the safety lamp in the mine; and does this create an antipathy for the lamp, on the part of mine workers, that deters some operators from introducing the lamp into their mines when their best judgment dictates that safeties should be used? To answer this question in the affirmative would be to bow in submission to a recognized superstition, on the part of mine workers, that is a relic of the past.

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Driving It Home

The marked success which has attended the efforts of the H. C. Frick Coke Co. and the various other mining organizations subsidiary to the United States Steel Corporation in conducting their "Safety-first" campaign, has been due largely to the fact that they have brought home to the miners themselves a realization that they, and they particularly, are responsible for accidents. The mine worker is made to feel that, after his employer has spent vast sums for accident prevention, the occurrence of any mishap, be it ever so trivial, is a disgrace not only to the company, but to him, and to him personally.

It has been said, and truthfully, that habit is stronger that nature. A soldier never knows the manual of arms until, through continuous drill and practice, the various gun-movements have become purely and solely a matter of routine, requiring no mental effort whatever. A miner is never secure from preventable accidents until he has contracted the "safety habit," until the exercise of caution and forethought has become as much a part of his day's work as the manipulation of drill, pick or shovel.

In order to keep the thought of safety continuously before the men, many ingenious methods are adopted. The lead pencils furnished the various company employees, bear the legend "Get the Safety Habit" or some similar admonition. The matches sold at the commissary will perhaps bear upon the box the red danger signal, and the words "Safety-first," possibly also the company's monogram. The cigars which the superintendent occasionally confers upon some worthy employee or friend are encircled with "Boost for Safety" bands, and the pay envelope in which each worker receives his semimonthly stipend, is adorned with some pointed admonition, concerning dangerous practices, such as riding on trips, etc. Furthermore every scrap of official paper that leaves the office, regardless of whether it is a notice that Sam Smith has been appointed stable boss, or a check to John Doe for $1000, will have "Safety the First Consideration" printed conspicuously across its face.

These are perhaps insignificant details and cannot compare either in importance or results with the appointment and maintainance of work's committees from the miners themselves. They are, nevertheless, minutiae in the practice of a great humanitarian idea, and serve to drive home to the person into whose hands such articles as have been mentioned above may come, that with those who make coal-getting their occupation, tonnage may be important, but safety should be paramount.

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The Federal Bureau of Mines

About a year ago we asked Doctor Holmes, director of the Federal Bureau of Mines, to investigate the possible electrification of the mine air by a current of high potential, conducted into the mine for lighting and power purposes. Doctor Holmes promised to have the matter taken up, at their experimental station, and thoroughly investigated to ascertain if it were possible for a dangerous condition of mine air to develop, owing to stray electrical currents; or if a possible electrical condition could develop in the air that would favor and assist the ignition of gas or dust or otherwise endanger the mine.

This is an important matter and has been recently emphasized by evidence that points to the possibility of a still further influence of high-potential currents in causing the premature explosion of powder, in blasting coal in the mine. A suggestive feature, in this connection, is the fact that many unexplained accidents have occurred in well equipped uptodate mines, using currents of high potential. While it is impossible, as yet, to more than speculate on the possible influence of electrical mine equipment to increase the danger in mines, the question is one demanding immediate and intelligent investigation, for which the Federal Bureau of Mines is equipped and which is its special work and province.

Without seeming to unjustly criticize the work the Bureau of Mines is doing, at the present time, attention may properly be drawn to some of the matters published by the bureau that are, to say the least, misleading to a large class of mining men. In this connection, we would refer, briefly, to Technical Paper No. 43, just issued by the bureau. The paper is entitled, "The Influence of Inert Gases on Inflammable Mixtures." Its author,

J. K. Clement, has produced an interesting and, in some respects, valuable paper. The purpose of the paper and the ground desired to be covered by the investigation is clearly outlined in the preface by George S. Rice. The information made available by the experiments of Mr. Clement undoubtedly has a value that will be appreciated by men who are able to apply the results, in a proper manner, to the solution of mining problems. To a large class of practical mining men, however, there are statements in the paper that are not only misleading but as yet unwarranted, in respect to their application to general mining conditions.

To make clear our position in this regard, we would assert a firm belief and confidence in the value of experimental study; but great caution is needed in setting forth the suggested application to the practice of mining, of the positive and unquestioned determinations in the laboratory.

The paper to which we refer describes the methods used and the results obtained in determining the explosive limits of mixtures of four out of the five important mine gases; namely, methane, oxygen, carbon dioxide and nitrogen. The purpose was to make clear the influence of the extinctive gases, carbon dioxide and nitrogen, on the explosion of varying percentages of methane, in the presence of varying percentages of oxygen. There are two points in the paper to which we wish to draw attention, not for the purpose of criticism so much as to lead to the elucidation of points that have an important practical bearing.

The instruments used in the experiments in the laboratory, were a comparatively small Hempel pipette, having an electric-spark igniter; and a larger steel vessel in which the explosion of the gaseous mixture was effected by the electric arc of a 220-volt current. The steel cylinder used was provided with an opening for the release of the pressure developed in the explosion, the opening being covered by a paraffined-paper diaphragm. In reference to these experiments, two points are worthy of notice, in respect to applying the results too widely, in mining practice: (1) the character of the source of ignition, and (2) the limited confines of the explosion chamber. The effect of these factors can only be judged intelligently by the physicist possessing a broad, practical experience.

The points to which we call attention, and in respect to which we advise caution are the defined limits of explosion for the several gaseous mixtures; and the statement found at the top of p. 17 of the paper, to the effect that "No distinction could be drawn between limits of burning and limits of explosion."

Every practical mining man knows that gas burns in the mine workings; or, in other words, is inflammable when no explosion takes place. The small confines of the laboratory experiments would not represent truthfully mining conditions, in this regard. There is unquestionably a limit of explosion and, beyond this, a limit of inflammability of gaseous mixtures, in mining practice.

Referring, again, to the first point, we desire to recall the well established fact that an explosive mixture of methane and air, at its maximum explosive point, becomes inexplosive by the addition of one-seventh of its volume of carbon dioxide. Making the addition of this proportion of carbon dioxide to a mixture of methane and normal air, at its maximum explosive point, gives the following gaseous mixture: Methane, 8.28 per cent.; oxygen, 16.59 per cent.; nitrogen, 62.63 per cent.; and carbon dioxide, 12.50 per cent.

Now, plotting the coördinates of methane and carbon dioxide, according to the percentages in this mixture and, as stated on p. 21 of the paper, using the diagram, Fig. 3, p. 11, for this purpose, the intersection of the coördinates falls very near the center of the explosive area indicated for a 16-per-cent. oxygen content. This result is plainly at variance with the teaching of the paper, as we understand it. An explanation of this seeming discrepancy between the teaching of the paper and well established facts in mining practice should be given.

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A New Aspect to Trust Busting

For many years there has been a decided inclination on the part of the people to wage unceasing war upon all trusts. With the man who earned his bread by the sweat of his face, the conviction was strong that all aggregations of capital controlled by highly centralized managements were public malefactors, and consequently only fit for dismemberment.

Politicians and demagogues who are ever alert to trim their sails to the varying currents of public approval, have carefully promulgated and fostered the idea that there is only one good trust, and that is a dead one.

In the recent past, however, a new note has been sounded by the voters of the land, and one to which legislators may well hearken and pay heed. As an act entirely of their own free will and accord, several thousand employees of the H. C. Frick Coke Co. petitioned Congress to prevent the dissolution of the United States Steel Corporation. And following the example of the Frick employees, it is expected that those of many other constituent and subsidiary companies of the "Steel Trust" will present similar petitions.

There are few, if any, so-called "trusts" the stocks of which are as widely and as thoroughly disseminated among their employees as are those of the Steel Corporation. Its dissolution would not, therefore, affect merely the vast accumulations of a small group of extremely wealthy money owners, but would endanger the meagre capital and cripple the earning power of the savings of thousands and thousands of honest hardworking mill hands and miners, whose holdings of stock represent the net earnings of long years of toil, economy and thrift.

In forcing this dissolution suit the government has touched thousands of voters in a spot where all men are not only vulnerable but sensitive—the pocketbook. More and more as years go by the poor man is seeing the wisdom of investing his earnings in securities, which yield at least a reasonable rate of interest. And, when a vast number of voters become capitalists, what politician or ring, Legislature or Congress can threaten the earning power of their savings with impunity?

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At the present time we are attempting to solve our troublesome mining problems by the enactment of repressive legislation. The policy of former periods was one whereby invention was used to surmount difficulties. The electric spark is not more dangerous today than the naked flame was a century ago. Can't the electrical profession produce a Sir Humphrey Davy to solve the problem of electricity in gaseous mines?

The Philadelphia & Reading Coal & Iron Co. Meet

Special Correspondence

The ninth annual first-aid contest of the Philadelphia & Reading Coal & Iron Co. was held at Edgewood Park, near Shamokin, Sept. 20. To show the importance of the meeting and the emphasis placed on first-aid work by the company it should be stated that G. F. Baer, president of the Philadelphia & Reading Coal & Iron Co., was present to signalize the event. It was pronounced by all present to have been the most successful ever held by the company.

The big event of the day, the final contest for full teams, was won by the Outside team of the Draper colliery of the Shenandoah Division with a percentage of 97 points, while the Henry Clay team was a close second with a percentage of 95. Eight other teams participated in the final event.

It had been originally planned to hold the meet in Lakeside Park at East Mahanoy Junction, where former contests have been held by the company. Every arrangement was made for the moving of special trains to that point, carrying the first-aid teams and the employees of the various collieries, but early in the morning General Manager W. J. Richards, learning that shelter, in case of rain, could not be secured at Lakeside, gave orders that the contests should be held at Edgewood Park.

The orders were carried out in the short time available, but one of the five special trains carrying the crowds went to Lakeside and on its arrival was forwarded immediately to Shamokin.

A commissary train carrying a company caterer, chefs and waiters to the number of a couple of a hundred, together with their equipment, was rushed to Edgewood Park and at noon served a most tempting lunch. This part of the day's program came immediately after the close of the elimination contests.

The Standing of the Teams

There was much interest and considerable rivalry manifested in the final contest. The problem was considered a difficult one, but all the teams competing made fairly good percentages. The problem in the final contest was: Dress foot, leg, thigh and hip, using spiral reverse for leg and thigh and the spica for hip. Bandages 10½ inches.

The following is a list of the contesting teams with the percentages they obtained:

Teams	Percentages	Teams	Percentages
Draper, outside	97	Alaska	90
Henry Clay, inside	95	Good Springs	89
Otto colliery	94	Turkey Run, inside	85
Tunnel Ridge, inside	93	Knickerbocker, inside	85
Bast, outside	90	Schuylkill Haven, storage yard	84

Drs. J. B. Rogers, of Pottsville, F. C. Fegley, of Fairmount, and E. F. Bickel, of Shamokin, acted as the judges and as soon as they announced their decision President Baer addressed the large audience and presented the pennant to the Draper team, which won first honors. He referred to his recent tour of Europe and to the first-aid work he had seen there and stated that he was more pleased with the work of the P. & R. C. & I. Co.'s teams than with any that he had ever seen. He closed by making a plea for continued loyalty to the company on the part of the men in its employ.

Pennants were then presented to the district winners by President Baer's daughter, Mrs. Smith, of Pottsville, Misses Helen and Loraine Richards, daughters of General Manager Richards, of Pottsville; Miss Clara Deckert, Miss Louise Smyth, Dr. George Halberstadt and G. H. Hoover. Field and water sports which had been planned were not carried out, owing to the lateness of the hour at which the final first-aid contest was completed.

The contests were held on the baseball field immediately in front of the grand stand in which a capacity crowd was seated. There were 76 first-aid teams to participate in the elimination contests in the morning. These teams represent 40 collieries which are distributed throughout Schuylkill and Northumberland Counties and at which more than 25,000 men are employed.

Original Problems

The various corps from each district were allowed to draw one of ten problems submitted by officials of the company. These were worked out and the winners of the various districts were the competitors in the afternoon when the final event took place.

The ten problems were:

Rescue from electrical contact and administer artificial respiration by the Schaefer and Sylvester methods. Also use the oxygen tank and pulmotor. Time allowance, 10 minutes.

Handlings by one, two and three men and on litter. Cross-obstruction and load ambulance. Time allowance, 12 minutes.

Compound fracture of the skull. Dislocated shoulder. Two 2½-in. gauze bandages, one 3-in., one 4-in., and one triangular. Time allowance, 10 minutes.

Simple fracture of the forearm. Laceration of fingers and hand. Separate fingers and apply spica of the hand. Two 2½-in. bandages and two 2-in. bandages. Time allowance, 10 minutes.

Compound fracture of the leg and dislocated hip. Bandages, nine 4-in., three 3-in., and one 2½-in. Time allowance, 15 minutes.

Burns of head, neck, body and right arm. Eight 2½-in. gauze bandages. Gauze and cotton. Time allowance, 20 minutes.

Fracture of the spine and lacerated buttock. Bandages, five 4-in. and six 2½-in. Time allowance, 20 minutes.

Fracture of the right patella and crushed left foot. Bandages, two 2½-in., two 2-in., and one 4-in. Time allowance, 10 minutes.

Lacerated ear foreign body in eye. Bandages, one 2-in. and one 1½-in. Time allowance, 5 minutes.

Dislocated shoulder, fractured ribs. Bandages, two 4-in. and one 3-in. Time allowance, 6 minutes.

Rules of Meet

The following general rules governed the work of the contestants:

The dressings will start and stop at the sound of a gong. The dressing of all injuries to be done with materials issued for the purpose. In the application of the spiral reverse bandage, one-third of the width of the bandage must be left exposed. Subjects should wear tight-fitting underclothing or have the skin exposed. All splints to be padded. There will be three judges, and three districts will work at one time, one judge will be assigned to each district. Final dressing to be decided by the three judges.

The Draper Colliery team has made rapid advancement in first-aid work during the past two years. The team has never before distinguished itself in the contests except in 1911, when it took seventh place.

The winners in former years were: Bear Ridge, 1912; Phoenix Park and Wadesville, 1911; Wadesville, 1910; Glendower, 1909; Tunnel Ridge, 1908; Wadesville, 1907; Lincoln, 1906; Wadesville, 1905.

LEGAL DEPARTMENT

Removal of Coal through Adjoining Land

By A. L. H. Street*

SYNOPSIS—Damage to landowner, and not benefit to operator is proper basis for valuation of right-of-way. Decisions of American and English Courts summarized. Cases stated when right passes with conveyance of coal under particular land. Right cannot be condemned for private purpose.

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Ques.—A Tennessee coal-mining company writes Coal Age as follows: "Can you advise us on the question of the value of the right to haul coal originating on the land of one party through the land of another, and on to the land of a third party? This question is now coming up in our coal field and no standards of value are set. Would you please advise us where we could find some of the older cases covering this point in either America or England"?

Ans.—I find but few American or English cases bearing directly on this question; the scarcity being due, probably, to the fact that such right-of-way generally depends upon express agreement with the landowners affected, since it is usually held that it cannot be condemned. Therefore, the question is not apt to arise in litigation, except in suits for damage in making an unauthorized use of land in hauling coal through it.

What the Courts Have Held

In England, the measure of damages for the use of land as a mining right-of-way is said in *The Laws of England,* Vol. 20, p. 588, to be "the value of the land for the purposes for which it is used; compensation is measured by wayleave rent in respect of the minerals carried, and the rate (if any) usual in the neighborhood is adopted as a convenient measure." This statement is supported by citation of the following English cases: Powell vs. Aiken (1858) 4 Kay & Johnson's Reports 343; Martin vs. Porter (1839) 5 Meeson & Welsby's Reports 351; Whitwham vs. Westminster Brymbo Coal & Coke Co. (1896) 2 Chancery Division Reports 538; Jegon vs. Vivian (1871) 6 Chancery Appeal Reports 742; Phillips vs. Homfray (1871) 6 Chancery Appeal Reports 770; A. G. vs. Tomline (1880) 15 Chancery Division Reports 150; Hilton vs. Woods (1867) Law Reports, 3 Eq. 432. In the second cited case four cents per ton was allowed as wayleave.

The Pennsylvania Supreme Court has held that the measure of damages resulting from the establishment of an underground railroad for the transportation of coal is the difference between the value of the tract as a whole at the time of the entry and its value after the completion of the road, as determined from the opinions of witnesses of skill and judgment, who have had opportunities to learn the value of the property in question, or of similar properties in the same neighborhood (45 Pennsylvania State Reports 495). Another decision of the same court is to the effect that mere *unauthorized* use by the owner of underlying coal of a tunnel to convey coal from adjoining lands does not entitle the landowner to punitive damages, or to any recovery exceeding compensation for injury actually resulting from the wrong, though he is entitled to nominal damages, which were allowed in this case (46 Atlantic Reporter 370). In this interesting case, the Supreme Court approved a statement of the trial judge that the *value to the operator of the privilege of running coal through the tunnel could not be considered*; and that any recovery beyond nominal damages must be based on a showing of substantial injury to the landowner.

Rights in cases where coal is sought to be removed from adjoining land through a mine on particular premises are illustrated by a decision of the Illinois Supreme Court. A lease of eleven acres of land for 35 years to the purchaser of coal underlying that and remaining lands owned by the lessor, for the purpose of mining and removing the coal, was held by the Illinois Supreme Court to give the right, before the exhaustion of such coal, to use the leased premises for the transportation of coal mined on other land (25 Northeastern Reporter 795). In this case the court said: "By the sale and conveyance of the fee of the coal, appellee (the owner of the land) severed it from her estate in the land, and the right of her grantees or their assigns to use the estate thus granted by her in the coal so long as her property is not interfered with or injured in any way, cannot be questioned. It is manifest that until the expiration of the term or until appellant or its assigns shall exhaust the coal under her land, she can have no right of reëntry in the mines, or the leasehold estate. It is not conceivable how the proposed use of appellant's mine and shaft can result in damage to appellee. Any action brought by her for supposed trespass for running its cars through the entries in the mines or for hoisting and delivering the same at the shaft, or for any use of the leased land, would be answered by the fact that appellant was rightfully in possession under the contract."

The Pennsylvania cases cited above, and decisions generally on the measure of damage to land resulting from trespass or condemnation of rights-of-way in general fairly indicate a policy of the courts of this country to fix the amount of depreciation in the market value of the land, if any, as the value of such rights as are here considered, without regard to the value of such rights to the coal operators who acquire them.

When Compensation Is Unnecessary

But it is interesting to note, in this connection, that the right to use tunnels, shafts, and other ways on or under particular land, in removing coal from adjoining land, often passes under the terms of the lease or deed covering coal underlying the particular land, thus rendering it unnecessary for the operator to pay additional ompensation for this right. Application of this prin-iple is illustrated by the following decisions:

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*Attorney and Counselor at Law, St. Paul, Minn.

Unless the instrument whereby right to mine coal is ranted contains a provision to the contrary, the space eft by the mining operations may be used during the ontinuance of the grant for the purpose of hauling min-rals and draining water through such space from other nines (Ohio Supreme Court, 80 Northeastern Reporter).

A lease of coal lands with surface right-of-way for racks, etc., at a specified rental, with the privilege to ontinue their use after exhaustion of the coal, at an nusual rental of $20, was held by the Iowa Supreme ourt to give the right to use the way for the removal of oal mined under adjoining land, including the use of nderground entries and shafts, and, hence, not to en-itle the landowner to additional compensation (86 orthwestern Reporter 41).

A conveyance of all the coal under certain land, "to ave and to hold * * * until the exhaustion thereof" rants right to carry, through a chamber, or tunnel cut n the same, other coal dug out of an adjacent mine, for he purpose of taking it out through an opening in land f his own (Pennsylvania Supreme Court, 22 Atlantic eporter 1035). The court held in this case that this ule is not affected by the question whether the mining ight is the subject of an express grant or of an excep-ion in a conveyance of the remaining interests in the and. But, in a later Pennsylvania case, it was held that deed to underlying coal, with a right on the land to arry the coal away did not give the right to take out f the pit on the land, and carry by such right-of-way oal mined under another tract, nor to dump at the pit's nouth refuse from the other mine. It was further held hat the right did not arise because of a practice of the ormer common owner of both tracts (28 Atlantic Re-orter 226).

Noting the conflict between the holdings in the two ast mentioned cases, the Pennsylvania Supreme Court 42 Atlantic Reporter 4) declared that it intended to dhere to the rule that the purchaser of underlying coal vith a right-of-way over and under the land, is entitled o haul through the gangways of the mine coal mined under adjoining land, so long as the mine is necessarily ept open to mine coal still remaining under the par-icular land. And as late as 1909, the same court de-ided that the lessee of a coal mine cannot be charged for se of gangways on the premises for transporting coal rom other premises (74 Atlantic Reporter 26).

Although a conveyance of minerals implies a right-of-vay over the grantor's land, under which they lie, for heir removal, there is no right over the lands of one ther than the grantor (Tennessee Supreme Court, 90 enn. Reports 619; 118 Southwestern Reporter 649).

Statutes in several states purport to give the right to ondemn rights-of-way for mining purposes, but such aws are held by the courts to be unconstitutional so ar as they may be construed to authorize condemnation f a way for private use only. The connection of two eds of minerals belonging to the same owner by a way assing through the land of another is a private use for vhich land cannot be condemned. But statutes provid-ng for condemnation of land for railroads open to the ublic on payment of proper compensation are valid. (Barringer & Adams on Mines and Mining, 1st Ed., pp. 591, 592.)

Who Is Liable for Taxes on Coal Stored on Docks?

The question as to whether delivery under certain conditions is such delivery to the buyer as passes title to him may become important in the question as to who is liable for taxes on coal constituting the subject of sale. This point was involved in a Wisconsin case, reported at *page 227, 120 Northwestern Reporter*. Under the particular wording of the contract of sale in that case, it was held by the Wisconsin Supreme Court that title to Pittsburgh coal sold to railway companies for delivery at Superior, Wis., did not pass until delivery, f.o.b. cars, rendering the seller liable for taxes on the fuel while on docks at Superior before being loaded on cars.

Recent Decisions

When Corporation May Purchase Own Stock—It is beyond the power of a corporation to purchase its own stock, unless expressly so authorized by law. (Maryland Court of Appeals, Bear Creek Lumber Co. vs. Second National Bank of Cumberland, 87 Atlantic Reporter, 1084.)

Right to Question Validity of Mortgage—On suit to foreclose a mortgage covering the property of a coal-mining company, a defense that the mortgage was executed without authority from the stockholders can be raised by them only, and not by the company itself. (Colorado Court of Appeals, Firestone Coal Co. vs. McKissick, 134 Pacific Reporter, 147.)

Liability for Mine Foreman's Negligence—A Pennsylvania coal operator is not responsible for injury to a miner, resulting from negligent failure of a properly qualified mine foreman to make an examination for gases, as required by the law of that state. (Pennsylvania Supreme Court, Watkins vs. Lehigh Coal & Navigation Co., 87 Atlantic Reporter, 860.)

Corporation Disqualified to Issue Accommodation Paper—A business or industrial corporation has no power to make or indorse commercial paper for the accommodation of third parties, unless its charter expressly confers such authority; corporations have only such powers as are expressly or impliedly granted by their charters and the laws of the state under which they exist. (Georgia Court of Appeals, Savannah Ice Co. vs. Canal-Louisiana Bank & Trust Co., 79 Southeastern Reporter, 45.)

Checks Should Be Presented Immediately—Bank checks are not designed as a medium of circulation, but as a means of securing expeditious payment in money; and when a check drawn by a third person is received by an indorsee he acts at his peril, so far as the payee and indorsers are concerned, in failing to promptly present the check for payment, if it appears that it would have been paid if presented within a reasonable time, notwithstanding the drawer's subsequent insolvency. (Georgia Supreme Court, Kennedy vs. Jones, 78 Southeastern Reporter, 1069.)

Lessor's Right to Share in Stock Issue—Where a lease of coal lands reserved to the lessors a one-tenth interest in the lease, in the nature of paid-up and nonassessable stock of the lessee corporation, the lessors were entitled to share only in the stock issued under authority vested in the company when the lease was made, and not in additional stock subsequently issued under authority afterwards conferred by the state, after valuable mining property, other than that covered by the lease, was acquired by the company. (West Virginia Supreme Court of Appeals, Taylor vs. Buffalo Collieries Co., 79 Southeastern Reporter, 27.)

Defense of Employees' Personal Injury Claims in Oklahoma—Under the laws of Oklahoma, it is a complete defense to a suit against a coal operator for injury to a miner that the latter failed to use ordinary care for his own safety, and that such neglect was a direct cause of the accident, regardless of any negligence of the employer; the legal doctrine, in force in some states, that an employee may recover notwithstanding contributory negligence on his part, if that negligence was slight as compared with the employer's neglect, not being in force in Oklahoma. (Oklahoma Supreme Court, Hailey-Ola Coal Co. vs. Morgan, 134 Pacific Reporter, 29.)

DISCUSSION BY READERS

Collapsible Stoppings

Letter No. 1—The question has been asked, Coal Age, Sept. 20, p. 424, whether or not collapsible stoppings would localize an explosion of gas or dust in the mine. I have always been in favor of collapsible stoppings in small mines where the mine is ventilated in, say one or two splits. I would not approve of their use, however, in a large mine, except in the live workings or on the butt headings.

I believe that the best way to localize a mine explosion is to arrange a separate air split for each "flat," by building an overcast at the entrance to that section. If the section contains more than, say 10 pairs of headings, it may be necessary to provide a second main air course, to tap the section midway, which will then require another overcast at that point. It has proven, in many instances, that where a large section containing many rooms is ventilated by a single split of air, a small explosion of gas or dust is confined, generally, to that section in which it occurred.

I have observed that the general practice in large uptodate mines is to build collapsible stoppings of wood or a single course of brick, in the live workings; while the stoppings on the main haulage roads and cross-headings are permanent stoppings built of brick, stone or concrete. This is generally done, however, from an economical consideration, rather than for the purpose of localizing a possible explosion. In these mines, the stoppings on the butt headings driven off the cross-entries, as well as the stoppings in the rooms, are light collapsible stoppings. Here are the live workings where the coal is produced.

It is my belief that a small explosion of gas or dust, in these rooms or butt headings, would be confined to one section, provided that section was ventilated by a single air split. But, if the air current was conducted through other butt headings and rooms, the explosion would probably be carried through the entire air split. It might develop sufficient force, in its course, to blow down one or more permanent stoppings; and, in that case, it would extend into other sections of the mine. We have an example of this in the Monongah explosion, Dec. 6, 1907; the Darr explosion, Dec. 19, 1907; and the Marianna explosion, Nov. 28, 1908. All of these mines had collapsible stoppings throughout their live workings.

The question may well be asked: What is a permanent and what is a collapsible stopping, in a mine containing both gas and dust? Previous to the explosion, the stoppings in the Monongah mine were considered permanent stoppings; but, being blown to pieces by the force of the explosion, they might properly be called collapsible stoppings.

There can be no question but that permanent stoppings should be built on all main haulage roads and airways, in order to maintain a sufficient circulation of air at the working face. Any kind of collapsible stoppings, on these headings, would not receive the attention necessary to keep them in proper shape to maintain the required circulation of air in the workings.

In closing, I want to say that any efficient method for localizing explosions of gas and dust in the mines would be hailed with delight by all mining men. I fear, however, that the collapsible stopping, suggested by the Bureau of Mines, is not the remedy for which we are seeking. It must be remembered that dust is a dangerous factor, and that it permeates the entire mine to a greater or less extent. Mines that are not considered dangerous on account of gas, may be dangerous, owing to the presence of dust and a small amount of gas, perhaps too small an amount to be detected on the lamp. Or a slight disarrangement of the ventilating current may permit the accumulation of gas, in an otherwise well ventilated mine. Only too often, the mine we had considered safest has been wrecked by an explosion.

I cannot see where collapsible stoppings will localize an explosion of dust. We have learned much in regard to the phenomena of explosions; but their frequent recurrence proves our knowledge is not complete.

Pennsylvania Superintendent.

Oliphant Furnace, Penn.

Letter No. 2—My attention has been called to the suggestion that collapsible stoppings built in the crosscuts or breakthroughs between entries, near the working face, would localize a possible explosion of gas or dust in the workings. While I have not, as yet, seen the full statement of this question, I do not hesitate to say that I fail to see the point of the argument that these light stoppings would, in any manner, prevent the development of an explosion and its extension throughout the mine.

I would draw attention to the fact that the usual practice in coal mining is to build the stopping at about the center of the crosscut. This allows the accumulation of more dust in these void places in the crosscuts, than can be found upon the gangways or in the air courses or chambers. My thought is that if these stoppings were collapsible under the pressure of a light gas or dust explosion, all the dust in those crosscuts would be blown into the air and explode, greatly increasing the disturbance and extending rather than localizing the explosion.

Another point should be borne in mind, namely, such light stoppings would frequently be thrown down by the concussion of a heavy blast or a windy or blownout shot; and the quantity of dust thrown into the air, as a result, might be ignited by the flame of succeeding shots and cause an explosion that would not otherwise occur.

For the reasons stated and with the present extent of my knowledge of the question, I would consider the matter of putting collapsible stoppings in cross-headings a very impracticable proposition.

W. D. Owens, Div. Supt.,
Lehigh Valley Coal Co.

West Pittston, Penn.

The Mine Air Current and Explosions

In connection with the interesting discussion on this subject, Coal Age, Sept. 13, p. 390, I want to draw attention to the fact that whether the movement of the ventilating current, in a mine, is caused by an exhaust fan or a blower, it is certain that when either of these fans is stopped, the air current traveling in the mine will not cease immediately. In the use of either fan, the upcast shaft has been warmed by the return air and the heat of the shaft will serve, for a considerable time, to raise the temperature of the upcast current. This will produce an air column in the upcast shaft, that will serve the same purpose as a small furnace, to produce circulation in the mine. This alone would prevent any sudden outflow of gas from the goaves, except in the most fiery mine.

I want to suggest that barometric readings taken at the surface, and in the fan drift, and at different points throughout the mine would prove of considerable interest in the study of mine ventilation.

James Ashworth,
Mining Engineer.

Vancouver, B. C., Canada.

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Education and Training for Mining Men

It is indeed encouraging to note the interest that is being taken, generally, in the education and training of all classes of mining men; but, particularly, the miner. While many may differ as to means and methods employed, all will agree that there is great need for the education and training of men engaged in the mining industry. The broad and intelligent discussion of the subject will eventually develop the best means and methods to employ.

I cannot agree with Samson Smith, who, in discussing this subject, Coal Age, Aug. 30, p. 318, criticizes the suggestion of Mine Inspector C. H. Nesbitt, that safety inspectors and instructors be employed in the mines as a means of training miners in the best and safest methods of doing their work. Mr. Smith claims that the boys should be trained when young, according to the old proverb, "Train up a child in the way he should go and when he is old he will not depart from it." He states that boys should be taken into the mines by their fathers and trained in the work of mining coal.

It is a sad fact that many parents are neither morally nor intellectually qualified to train their children; and we must look to some other source for this training, such as public schools, Sunday schools and other institutions. Again, many fathers, though they have worked in the mines most of their lives, are not practical miners. They cannot build a mine door; or do a first-class job of timbering; or lay a good piece of track; much less lay down a mine switch. Many know little of the laws of ventilation, the dangerous character of coal dust and the nature and effect of mine gases upon the human system. It is evident that fathers who are deficient in the knowledge of these things are not competent to teach or train their sons; and, as I said before, such training and instruction must come from another source. The suggestion of the safety instructor and inspector in mines, appeals to me as it must to many practical men, as a wise suggestion.

The age limit for boys entering the mine, which, in Tennessee and many other states, is 16 years, would make impossible the early training suggested by Mr. Smith. Some of the most practical miners I know, however, are men who entered the mine after they were 21 years of age. These men studied to enlarge their practical experience by acquiring a knowledge of the theory of mining and applying it in their daily work.

I think that Mr. Nesbitt's suggestion for the organization of a department of safety and instruction for each mine, with a practical and efficient person in charge, who commands the respect and confidence of the miners, who knows how to enforce rules and maintain discipline, who looks after the ventilation and sanitation of the mine, and who knows the difference between safe and unsafe conditions as they arise, is an efficient medium of educating and training miners, and must prove much more effective in producing competent and proficient mining men than any training of fathers whose mining knowledge and experience may be limited. As in all other trades and professions, good common "hoss" sense is a valuable element to mix with the experience acquired in mining.

Through lack of discipline, force and system, many mine foremen drift into the habit of telling miners to timber their working places and keep them safe, without expecting them to comply. Upon the mine foreman devolves the responsibility for the coal output. The operator presses him for a few more tons, and in turn he pushes the miner for more cars; and, in order that he may load more cars, the foreman permits the miner to postpone setting a timber his better judgment tells him ought to be set without delay. The slate falls, the miner is killed, a funeral is held and a damage suit follows. If a vigilant inspector was in charge who was responsible for the safety of men and not for the output of coal, he would have recognized the danger and had the timber set instead of permitting the miner to load the car. Perhaps the day's run might be short a car, but a good miner would still be living to provide for his family. My experience as miner, mine foreman and assistant state mine inspector has taught me that it is, generally, the miner that has spent years in mining who gets hurt by falling slate or coal. And nine times out of ten it is owing to his own neglect or carelessness. If the mine had a vigilant inspector who would not let miners grow careless, in the matter of timbering and keeping their working places safe, many accidents would be avoided in coal mines.

John Rose,
District Mine Inspector.

Dayton, Tenn.

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Starting a Fan after an Explosion

Letter No. 1—Referring to the inquiry, Coal Age, Sept. 20, p. 430, and the editorial suggestion, p. 423, of the same issue, that this question be further discussed, permit me to say that, in my opinion, the question of starting up the fan after a short period of idleness, following an explosion that damaged the fan, so that it required to be repaired, will depend on the conditions existing in the mine. There are two possible cases, which differ so materially in the effect produced on the conditions in the mine after the explosion that they should be considered separately.

On the one hand, if the overcasts and stoppings are built of lumber, the stopping being light and collapsible, it may be taken for granted that they will have been blown down by the force of the explosion. The circulation in the mine would thus be cut off, even the natural current that might otherwise prevail, nothwithstanding the fan has been so badly damaged that it is not working. Under these conditions, if the fan is repaired and again started, it may be assumed that the air will be short-circuited at a point not far from the foot of the shaft, by reason of the overcasts and stoppings being destroyed. The air current therefore will not reach the face until these overcasts and stoppings are repaired. As this work of repair progresses, the air current will circulate closer and closer to the face of the workings, and the work will become more dangerous and require greater caution, in order to avoid driving any accumulated gases into an area in the mine where fire might exist.

On the other hand, assuming the overcasts and stoppings are built in a substantial manner and have, for the most part, withstood the force of the blast, the starting up of the fan after the repairs are complete would certainly be accompanied with great danger, because the accumulated gases would be driven into the fire area, which may reasonably be assumed to exist in portions of the mine. The ignition of these gases would cause a second explosion more disastrous than the first; and all hope of rescuing any persons in the mine who had possibly survived the first explosion would be destroyed. In my opinion, it would be safer not to start the fan until a properly equipped exploring party can enter the mine and ascertain its condition, if this is at all possible.

This seems the only wise course to pursue, unless some definite knowledge of the inside condition of the mine is obtainable by observations at the surface. The only hope of rescue, in any event, lies in the calm, intelligent judgment of those in charge; and this judgment must be based on accurate knowledge in the face of the grave dangers the conditions present. It is, of course, necessary that rescue parties should be fitted out with breathing apparatus and safety lamps. Should no evidence of fire existing in the mine be reported by rescuers or be forthcoming after a considerable period of time, the repairs being completed, the fan can be started with a reasonable expectancy of safety. Before this is done, however, all persons should be withdrawn from the mine.

JOHN E. AMBROSE,
Mining Engineer.

New Durham, N. J.

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Study Course in Coal Mining

By J. T. Beard

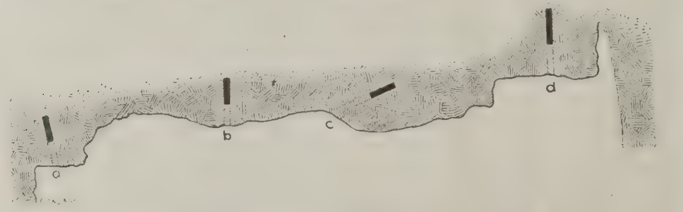
The Coal Age Pocket Book

BLASTING IN MINES

The removal of the coal from its position in the seam generally requires blasting, which under many conditions common to coal mining is a dangerous operation and requires both knowledge and experience.

Theory of Blasting Coal—The blasting of coal differs from that of rock; the former being soft and friable, while the latter is generally hard and brittle. The chief consideration, however, in the blasting of coal, is to break it from its bed in such size as can be readily handled and loaded into the mine cars, but without producing an unnecessary amount of fine coal and slack. To do this requires careful study of the character of the coal to be blasted and a knowledge of the explosive used.

Kinds of Shots—In the accompanying figure are shown four of the principal shots employed in blasting coal. The "rib shot" shown on the left (a) is for the purpose of cutting the rib by blasting, instead of using a pick and shearing the coal as shown on the right. A rib shot is very apt to prove a "tight" shot, unless, as shown in the figure, the coal is blasted back so as to give this shot an opportunity to free itself. A "dead hole" is one that is perpendicular to a practically straight face of coal, as shown at (b). The shot shown at (d) would be a dead hole were it not for the side cut on the right rib, which frees the shot. A "grip shot" is one that is laid at a considerable angle with the face of the coal, as shown at (c), in the figure.



SHOWING DIFFERENT SHOTS IN COAL FACE

Dangerous Shots—The shots classed as dangerous are the following: "blownout," "windy," "squealer" and "heavy" shots. A blownout shot is one that blows its tamping, owing to the charge being laid too deeply on the solid, or the shot being bound and unable to free itself. The same effect is often produced by reason of the charge being insufficient for the work to be performed, or the hole being improperly tamped, or having too large a diameter for the depth of the "stemming," as the tamping is called.

A windy shot is a shot that for any reason expends much of its energy on the air.

The Coal Age Pocket Book

A squealer, in mining language, is a shot that does little more than crack the coal; the force of the explosion finding vent through the crevices made in the coal, produces a peculiar sound like a shrill whistle; hence the name.

A heavy shot is one that produces a strong concussion of the mine air. It is an effect similar to that of a windy shot, but less powerful.

Placing Shots—A shot is well-placed when it performs the work it was expected to do in breaking down the coal, and produces no marked effect on the air. Experience alone is the great teacher in knowing how and where a shot should be laid in the coal in order to produce the desired results. A few illustrations will suggest some important facts and principles in the practice of shooting coal.

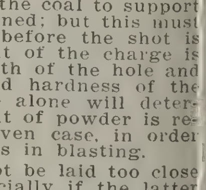


FIG. 1. A GOOD SHOT

In Fig. 1, is shown a well-placed shot in a hard-shooting coal. The coal has been undercut so as to enable the shot the better to free itself. A sprag is shown set under the coal to support it while being mined; but this must be knocked out before the shot is fired. The weight of the charge is suited to the depth of the hole and the thickness and hardness of the coal. Experience alone will determine what weight of powder is required in any given case, in order to avoid accidents in blasting.

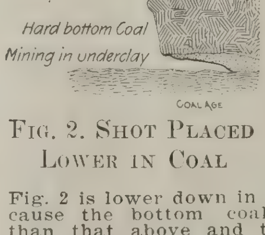


FIG. 2. SHOT PLACED LOWER IN COAL

A shot must not be laid too close to the roof, especially if the latter is harder or softer than the coal itself, or the force of the shot will be lost. The force of gravity must also be considered as acting to break the coal. The shot shown in Fig. 2 is lower down in the coal, because the bottom coal is harder than that above and the force of the shot is more evenly distributed between the hard and soft strata.

Much trouble is experienced in shooting soft seamy coal inlaid in the seam, as shown in Fig. 3. The shot is here laid in an inclined position so as to blow out the hard top coal without shattering the softer coal below. If this shot had been laid horizontaly in the seam the softer measures would have "seamed out" and the shot have proved a failure or perhaps dangerous.

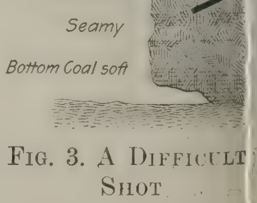
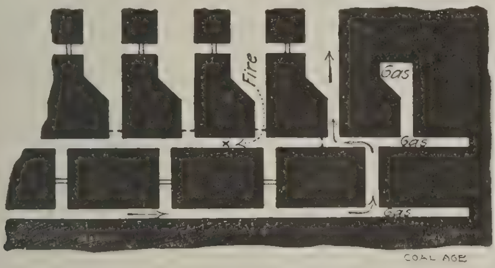


FIG. 3. A DIFFICULT SHOT

INQUIRIES OF GENERAL INTEREST

Fire in Heading Making Gas

I inclose sketch of a pair of headings driven on the strike of a moderately inclined seam, with rooms turned to the pitch, and showing a fire started on the heading a short distance back from the face of the entry. As marked on the sketch, gas is being freely generated in the last chamber turned and at the face of this heading. The chamber has not yet reached the first crosscut. The fire is outside of the second crosscut from the face of the heading, and has gotten a fair start. I would like to ask the best and safest method of dealing with this fire.



Showing Location of Fire

As shown on the sketch, the fire is on the return entry and a curtain hung outside of the last crosscut diverts the most of the air, so that the main current is following the face of the rooms.

A. E. J.

Shamokin, Penn.

On the first discovery of the fire, every precaution should be taken to prevent the air current from reaching the fire, by making the curtains in the heading and in the mouths of the chambers inby from the fire, as tight as possible. This should be done quietly, so as not to disturb the air more than necessary. If men are working in the chambers on this heading, they should be notified to withdraw; and it may be necessary for them to come out by the last chamber but one on the heading, and reach the intake airway through the last crosscut on the heading. In this manner, they will avoid the fumes and gases from the fire. The men should be instructed to move quietly so as not to disturb the air current and any accumulation of gas at the face of the heading, more than necessary.

In the meantime, men should have been put to work to open the stopping from the intake side, in the next to the last crosscut on the heading, just inside of the fire. This must be done with caution and, to avoid a strong air current short-circuiting at this point and passing over the fire, a curtain should be hung so as to practically close the mouth of this crosscut on the intake side, allowing only sufficient air to pass through the crosscut to enable the men to work and keep back the gases generated by the fire. The circulation through these headings may be reduced if necessary. Safety lamps only should be used, all open lights, if any, being promptly extinguished.

The fire should now be fought from the opening made in the crosscut, by stretching a line of hose from the nearest fire-plug on the gangway, or by whatever means are available for fighting the fire. It may be assumed that a mine working under the conditions described would be equipped with hose and pipeline, having fire-plugs at convenient points in the gangway.

During the entire progress of the work, competent men should be stationed in the return heading, at the last crosscut, to observe constantly the action and condition of the air current at this point. It may prove of advantage to hang curtains on the heading inby from this crosscut and at the mouth of the last chamber, so as to partially obstruct the flow of gas, if it becomes too strong. This, however, will depend on conditions observed and will call for the exercise of the best judgment of experienced men.

As soon as the fire is thorougly extinguished and there is no danger of ignition of gas, the curtain on the return heading should be removed and the air current allowed to pass down the return airway sweeping the point where the fire has been. This place should be carefully watched, for some time after the fresh air has been restored, to observe that there are no indications of fire remaining. When it is certain that the fire is extinguished and after the full air current has been gradually restored, the curtains may be removed cautiously from the mouth of the last chamber and from the heading to allow the escape of the gas, which should be made to pass out by the return airway without traversing the face of the chambers. The removal of the gas must be performed gradually, after protecting every point of entrance to the return airway.

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The Hoisting Engineer

What regulations would you suggest to govern the hoisting of men in a mine shaft, in order to secure the greatest degree of safety and avoid accidents that occur as the result of insufficient supervision of the work?

Mine Superintendent.

Hazleton, Penn.

Strict regulations should be adopted and enforced at all shaft mines, restricting the number of men to be hoisted at one time. The rules should be printed in different languages and posted at the cage landings and should permit no one to enter or loiter in the engine room or to communicate with the engineer, in any manner, while he is on duty, except a mine official in case of necessity. An important precaution is to require the engineer to make one trip with an empty cage after any season of idleness however brief, before signaling that he is ready to hoist or lower men. The purpose of this is to clear the cylinders of any water of condensation, and to insure the proper working of the engine. No coal or other material should be allowed to be lowered or hoisted on the opposite cage while men are in the shaft.

EXAMINATION QUESTIONS

Precautions and Safety Appliances

Ques.—What precautions should be taken in respect to abandoned mines?

Ans.—Before a mine is abandoned, a final survey should be made and the mine map extended, so as to show the full extent of all working places in the mine. The elevation should be marked on the map at different points of the working face and at the head of all entries. This map should be kept on file in the mine office and a copy sent to the state mine inspection department as a matter of record. When mining in proximity to abandoned mines an accurate survey should be made at frequent intervals and the map extended and kept uptodate. The survey should be connected accurately with the previous survey of the adjoining mine, which is abandoned.

In addition to these precautions, prospect headings should be driven in advance of all working places approaching the abandoned mine. Such headings should be driven single and should not exceed 8 ft. in width. A drillhole should be kept from 5 to 7 yd. in advance of the face of the heading and flank holes should be bored every 5 yd. on each side of the heading and at an angle forward, in the direction of driving, of about 60 deg. with the center line of the entry. A constant watch should be kept for any increase of water or gas; and plugs should be kept in readiness for instant use, to stop the holes if necessary. Only safety lamps should be used in the work, when driving headings toward abandoned workings.

As far as possible, the condition of the adjoining abandoned mine should be ascertained, with respect to the water that may collect in the mine. A sufficient barrier pillar should be maintained to protect the new workings against any inrush of water or gas from the old mine.

Ques.—Name the different safety appliances that should be employed at the hoisting shaft of a mine.

Ans.—The top of the shaft should be protected by safety gates operated automatically, by the movement of the cages. The cages should be provided with safety catches to prevent their falling in case the rope should break; also bridle chains should be provided to guard against the breaking of the coupling or chain by which the rope is connected to the cage. In deep shafts or in rapid hoisting, gates are often provided on the cage, in addition to the gates at the upper, lower and all intermediate landings. All cages should be provided with covers or hoods to protect men riding on them, from anything falling in the shaft.

All hoisting shafts should be provided with suitable signal apparatus, and deep shafts should be further provided with telephone connection or speaking tubes for communication between the surface and the foot of the shaft. The signals used in hoisting should be posted at all landings, and permanent lights properly protected should be kept at all landings underground.

Ques.—What safety appliances should be maintained in mine slopes?

Ans.—The mouth of the slope should be protected by suitable head-blocks or safety-blocks, to prevent cars from running down the slope by accident. The slope should also be guarded by an automatic derailing switch, for the same purpose. All slopes should be provided with refuge holes cut in the sides at suitable intervals apart, for the protection of men traveling or working on the slope. The switch at the foot of the slope should be automatic, and so arranged that all cars descending the slope will take the empty track. A heavy drag or "dog" should be attached to the rear end of each ascending trip, to prevent the cars from running back down the slope, in case a coupling, or the chain or rope should break while hoisting.

A suitable signal system should be provided, and means of communication established between the surface and the foot of the slope, either by telephone or speaking tubes. The signal wire should be available for giving signals at any point on the slope. The code of signals in use should be posted at the foot and the head of the slope, as well as in the engine room.

Ques.—What precautions and safety appliances are required in the engine room of a mine hoisting plant?

Ans.—The winding drum should be provided with an efficient brake of sufficient power or force to control the movement of the cage at all points in the shaft. Whenever practicable, an emergency brake should be provided, for use in case of accident. An indicator should be provided to show at a glance the position of the cage in the shaft; but too much dependence should not be placed on the working of such a device. The hoisting rope should be marked with paint of different colors, to indicate both the near approach of the cage to the landing and its position at the landing.

To prevent overwinding, many shafts are provided with a device to shut off the steam and apply the brake when the cage arrives at a certain position near the top of the shaft. Like other safety appliances, this one is open to the criticism that its constant use makes the engineer less careful. Barring this objection, however, it is a good safeguard.

Ques.—What general precautions are necessary in hoisting men, in a mine shaft?

Ans.—Place a competent man, as cager, at the head and another at the foot of the shaft, who will have complete control of the signal system at these two stations. They must remain on duty until relieved by substitutes, whenever men are in the mine. Limit the number of men to be hoisted at one time, to what can be safely accomodated on the cage without crowding. Permit no tools or explosives to be carried by the men on the cage. Require that the cager signal the engineer and receive his reply that he is ready to hoist men, before allowing anyone to step on the cage. Allow no one to give signals or bell away the cage other than the regular cager.

COAL AND COKE NEWS

Washington, D. C.

Probably the most important mining suit with regard to the corporation tax brought before the Supreme Court of the United States for a long time past has been filed and briefs have been put in during the past week. The case comes on a certificate from the United States circuit court of appeals for the eighth circuit. The statement of the case is as follows:

> Stratton's Independence, Limited, is a corporation organized under the laws of the Kingdom of Great Britain and Ireland, carrying on mining operations in the State of Colorado, and is the plaintiff in error in Cause No. 3862 in the United States Circuit Court of Appeals, Eighth Circuit, from which court the questions herein are certified.
>
> During all the time in question in said action this company has owned certain mining premises purchased by it for three hundred and thirty-five thousand dollars ($335,000) in cash, on July 29, 1909, and its sole activities have been the mining and marketing of the ores therefrom. During the years 1909 and 1910 it mined ores therefrom and sold the metal contents for a price in excess of the cost of mining, extracting, and marketing the same.
>
> By stipulation in the case it is agreed that such excess represents the true value of the ores so extracted, when in place. The collector of internal revenue for the District of Colorado assessed, levied, and collected from the company a tax of one per cent. (1%) upon such excess, without deduction, other than the arbitrary deduction of five thousand dollars ($5000) per annum, claiming that such excess represented the net income of the company, and that a tax was properly collectible thereon, under the provisions of section 38 of the act of Congress entitled "An act to provide revenue, equalize duties, and encourage the industries of the United States, and for other purposes," approved Aug. 5, 1909 (36 Stat. at Large, p. 11).
>
> The company laid proper foundation for the recovery of the tax, by the necessary appeals to the Commissioner of Internal Revenue, and by payment under protest.
>
> Three questions are certified to this court, as follows:
>
> I. Does Section 38 of the Act of Congress entitled "An Act to provide revenue, equalize duties, and encourage the industries of the United States, and for other purposes" approved Aug. 5, 1909 (36 Stat., p. 11), apply to mining corporations?
>
> II. Are the proceeds of ores mined by a corporation from its own premises income within the meaning of the aforementioned Act of Congress?
>
> III. If the proceeds from ore sales are to be treated as income, is such a corporation entitled to deduct the value of such ore in place and before it is mined as depreciation within the meaning of Section 38 of said Act of Congress?

In defense of their position the attorneys say:

> And we contend that, if a part of the capital assets are removed and sold, the property, as it originally stood, is actually depreciated in value to the exact extent of such removal.
>
> As an actual matter of experience, the original cost of the property must, from its very nature, be highly speculative. The values in the property are invisible and impossible of determination. They may be worth many times the cost or they may be worth nothing. We submit, therefore, that any such basis of capitalization is purely fictitious and this contention is sustained by the manner in which mining companies are capitalized.

The brief goes on to state that a large number of cases both of metallic and coal mining corporations are awaiting the decision of the Court in this case and it is urged that the matter shall be settled as quickly as possible on that ground. In closing the attorneys say:

> First—That Section 38 of the act in question does not apply to mining corporations.
>
> Second—That the proceeds of mining operations are not "income" within the meaning of the act.
>
> Third—That, if such proceeds are held to be income within the meaning of the act, then the value of the ores extracted, when in place, should be deducted as depreciation before the tax is computed.

HARRISBURG, PENN.

In a brief statement this week, Samuel Rea, president of the Pennsylvania Railroad Co., announced that the directors had decided to sell the company's security holdings in anthracite companies.

It is generally accepted that this indicates that the Pennsylvania Railroad Co. will dispose of all stocks which might invite Government investigation. The sale of these coal company securities in themselves is not regarded as momentous from a Pennsylvania Railroad point of view; for the aggregate par value of these securities is only $8,265,802.

These securities consist of 21,368 shares of the Susquehanna Coal Co. par value $2,136,800, and five per cent. certificates of indebtedness par value $6,000,000; 16,667 installment receipts of the Mineral Railroad & Mining Co., valued at $100,002; 500 shares of the Summit Branch Mining Co., par value $25,000 and 200 shares of the Lykens Valley Railroad Co. par value $4000. The income of the Pennsylvania received from these securities aggregated $385,632 last year.

The Pennsylvania Railroad Co. went into the anthracite coal business about forty years ago under the head of the late General Isaac J. Wister. Later, when George B. Roberts was president of the Pennsylvania Railroad, the company built its Schuylkill Valley line at a great expense, partly as an attack upon the Reading Co., and partly for the purpose of getting into the anthracite mining business in an important way.

With all its power this company has never been so large a factor in the anthracite fields as the Reading, the Lehigh Valley, the C. R.R. of N. J. and the Lackawanna. For the first eight months of 1913 its shipments coming practically from the controlled mining companies were 4,076,893 tons, out of a total of 45,709,606 tons.

To whom the securities will be sold has not been ascertained.

That the Pennsylvania Railroad Co. by disposing of its coal suits, has removed itself from attack is evident from dispatches from Washington saying that the Department of Justice will conduct an active campaign to divorce the so called anthracite railroads from the coal properties.

Recently the Pennsylvania rid itself of its holdings of Baltimore & Ohio stock amounting to $42,000,000 by exchanging with the Union Pacific for $38,000,000 of Southern Pacific.

On top of this Mr. Rea has opened negotiations concerning a plan to sell the company' holdings in Cambria Steel, it is also supposed that he will dispose of other securities, including the Pennsylvania Steel, Maryland Steel and Norfolk and Western.

Mr. Rea believes that it is the duty of a railroad company to confine itself strictly to railroad transportation. He made himself clear on this point recently, when he testified as a director of the New York, New Haven and Hartford before the Public Service Commission of Massachusetts at the hearing of the plan to issue $67,000,000 convertible debentures by the New Haven road. On this point Mr. Rea said: "I am opposed to the railroad being interested in other than purely railroad transportation."

Whether or not the stocks of the coal companies will be sold to stockholders of the railroad company, resulting in simply a transfer from the corporation to the individuals that control it, is an interesting question.

The Pennsylvania R.R. will undoubtedly make a full statement to the Interstate Commerce Commission and the Pennsylvania Public Service Commission without waiting for an inquiry to be started by either body.

There has been rumor that the Reading would buy these coal properties in, but there was incorporated a few months ago, a company known as the Eastern Pennsylvania Coal Co., and its capital was raised to a considerable amount, and this is the corporation that the buyers of the coal properties may use in taking title to the property.

Some years ago the Baltimore & Ohio R.R., in order not to antagonize the Commodities Clause of the Hepburn Act, sold its bituminous coal interests. The railroad attached a string to the sale by providing that the shipment be made over the Baltimore & Ohio. It is possible that the Pennsylvanit has incorporated some such provision in its present contract of sale, so that it will not lose the traffic from anthracite mines.

The suits of the Government vs. the Reading Co. will be closely contested, and a tremendous effort will be made to preserve the right to mine and transport anthracite, which double function has proved to be a source of great profit.

PENNSYLVANIA

Anthracite

Wilkes-Barre—On Sept. 23 a carpenter dropping a lighted match in the No. 3 shaft of the Woodward colliery started a fire which, for a time, threatened the lives of 500 men. Gas was ignited and the fire made considerable headway, but was finally checked by a large force of experienced fire fighters.

Pottsville—The recent heavy rains effectually ended the long drought which has prevailed in the anthracite region in the vicinity of Pottsville for several months. A number of the washeries which were compelled to close down because of the scarcity of water have resumed activities.

Shenandoah—Employees of the West Shenandoah, Turkey Run and Kohinoor Collieries, which operations employ 2500 hands, are on strike because of the rock-tunnel contractors' employing nonunion men to take the place of union rockmen, who have been on strike for two months.

Larkville—Three collieries of the D. & H. Co., located in Larksville, have suspended operations for a period of at least two weeks, and 1500 men and boys have been thrown out of work temporarily. The collieries are No. 5, No. 4, and the Boston. The suspension is caused by repairs which are necessary at the No. 5 mine and breaker, through which the coal from the other two collieries is hoisted to the surface and prepared for market. The shaft is in bad condition, and the automatic dumps at its head are to be replaced with more improved apparatus. The breaker is badly in need of reairs, and will be thoroughly overhauled before work is resumed.

Bituminous

Charleroi—Fred Lambert became lost in a mine of the Valley Crystal Ice & Storage Co. on Sept. 22, and wandered all day and all night without sleep or food before he was finally found by a searching party. He had himself given up hope of ever getting out of the mine.

Indiana—Three officials of the Buffalo, Rochester and Pittsburgh R.R. received serious injuries and four others were badly shaken up when their special train collided with a switching engine in the Creekside yards near here.

WEST VIRGINIA

Fairmont—Coal operators are again complaining of the inability of the Baltimore & Ohio R.R. to furnish a sufficient car supply for the mines of the Fairmont field. The railroad people say that conditions will be improved along this line when the Monongah cutoff is constructed and put in operation. The survey for the cutoff has been made and bids for its construction will soon be asked.

Charleston—After 14 years of almost ceaseless litigation, the suit of the Kanawha Hardwood Co. against Stephenson & Coon was settled recently, in favor of the defendant. The controversy involved the title to 720 acres of coal land situated on Cabin Creek and valued at from $300 to $500 per acre; also about 240,000 ft. of timber, valued at $40 per 1000 ft.

Algoma—The Algoma Coal Co. started operations Sept. 24 after a shutdown of eight days following the loss of their electric-power house by fire. The Appalachian Power Co. rushed the necessary equipment to the scene, and, in spite of unfavorable weather, placed a 300-kw. rotary converter and other machinery to furnish power to operate the mine.

Bluefield—The Norfolk & Western has notified the coal operators on its lines that the car allotments would be cut down one-third until further notice.

ALABAMA

Birmingham—The Alabama coal production, which fell off slightly during the month of August, has recovered fully from the depression and the indications are that the coal production for the state for 1913 will exceed 18,000,000 tons, and probably 19,000,000 tons. Reports received by Chief Mine Inspector Nesbitt for the first six months of the year indicate that the production for that period was well over 9,000,000 tons, and from information gathered to date, the production for the first nine months shows over 14,000,000 tons, with several mines which have been running only part time for the past 90 days, running to their full capacity.

TENNESSEE

Knoxville—The Southern Appalachian Coal Operators' Association held its regular quarterly meeting at Knoxville, Tenn., in conjunction with the miners' field day held there recently. A large attendance resulted from the interest taken in the meet, as well as in the various matters up for the attention of the operators, which include as one of the most important the impending question of workmen's compensation acts in Kentucky and Tennessee. K. U. Meguire, of Louisville, Ky., president of the Harlan Coal Mining Co., made an address on this subject.

KENTUCKY

Hartford—The Rockport Coal Co., operating in Ohio County, Ky., recently amended its articles of incorporation for the purpose of acquiring authority to run company stores and operate boats.

Fleming—Announcement was made recently at Whitesburg that another spur is to be constructed at once from Fleming, the new town built by the Mineral Fuel Co., up Bottom Branch, a distance of a mile to reach the company's new mines in that vicinity.

Greenville—Arguments were made recently at Greenville before the circuit court on demurrers filed by the Illinois Central R.R. Co. to the petitions of several miners who are suing for losses in wages suffered by reason of the alleged failure of the railroad to furnish cars to the mines last winter. The court took the matter under advisement, and will probably await the decision of the Kentucky Court of Appeals on similar cases pending before that tribunal.

OHIO

Zanesville—The announcement is made that the Imperial mine of the O'Gara Col Co., which recently went in the hands of a receiver, will continue in operation.

A number of Zanesville people have begun leasing coal lands along the Zanesville, Marietta and Parkersburg Ry., which has been building into the West Virginia coal fields. Developments in that territory will start soon.

Columbus—The Ohio Commission named by Governor Cox to investigate conditions surrounding mining in Ohio has spent the greater part of the past week in Missouri inspecting conditions in mines in that state. They have inspected mines in Indiana, Illinois and Ohio. It is reported that the commission finds a woeful lack of management in the operation of mines, in that only 60 per cent. of coal is removed from the ground. One of the results of the investigation will probably be the introduction of a bill in the next general assembly providing for a greater concervation of the coal properties in Ohio.

INDIANA

New Albany—Edward T. Snider has filed suit in the Circuit Court against the Monon road for $3000 damages, for alleged violation of the statute known as the "shippers bill." It is alleged plaintiff ordered empty coal cars on nine different occasions in March, 1912, and that because of failure to deliver them the plaintiff lost several coal contracts. One dollar a day is claimed for each car that defendant failed to deliver and damages additional to cover losses caused by an advance in coal of $1 a ton while plaintiff was waiting for the cars.

ILLINOIS

Sparta—After being located on the Illinois Southern for ten years, the Moffatt Coal Co. has torn out the Illinois Southern tracks and are now connecting with the M. & O. Failure on the part of the Illinois Southern to find a developing market for coal caused the change. In connection with this, the Illinois Fuel Co. is also putting in the M. & O. for the same reason.

Springfield—The United Mine Workers of the State of Illinois have advertised the fact that they have appropriated another $100,000 for the striking miners in Colorado. It is generally understood, however, that this does not mean that the money will be sent. It is appropriated, but the executive committee will decide later as to whether or not it would be best to send the money.

Herrin—The continued drought is making it expensive to many operators in this field and has for some weeks. Some operators are paying the railroads as high as $25 a day to haul water for their boilers. In many instances the water has to be hauled from 10 to 20 miles or more. In a few places the recent rains have overcome this, but water trains are running on schedule time on many of the roads.

Edwardsville—During the past year 14,755,321 tons of coal were mined from the 27 mines in Madison County. The coal was valued at $1 a ton at the mines.

Belleville—In the circuit court the Western Coal & Mining Co. has been sued for $5000 and the Consolidated Coal Co. for $10,000 by the Illinois Coal Operators' Mutual Liability Insurance Co., who claims the defendant companies refused to pay notes held by the plaintiff, which notes it is said were given in payment for the assessment levied by the plaintiff.

OKLAHOMA

Wilburton—The Union Coal Co. will shortly commence active operations in the mines near Gowan. These are now being equipped with coal-mining machinery, and it is said they will be the best mines, in the way of equipment, in Oklahoma. Nearly all the local operators have commenced installing telephones in their mines in accordance with the requirements of the recently adopted state law.

Yale—A bed of coal 14 ft. thick was struck while drilling a well on the Wright farm, three miles east of Yale recently.

This coal was encountered at a considerable depth, and is said to be of excellent quality.

MISSOURI

Joplin—It is expected that the coal business in the vicinity of Pittsburg, Kan., will be exceptionally large during the winter of 1913-1914. This is due largely to the evident shortage of the gas supply and its unreliability, similar conditions prevailing in the crude-oil industry. Many of the operators have booked orders ahead as far as January and February, and all are preparing to work their mines to their greatest capacity. There is a possibility of double-shifting in some of them.

IOWA

Des Moines—The aggregate coal output of the state of Iowa last year was 7,415,757 tons, the total for the previous year being 6,820,828 tons. A gain was thus made of 594,929 tons. There was a total of 24 fatal accidents, which was six less than the year previous. Monroe County was the greatest producer, having mined 1,535,136 tons, employing 2206 miners.

KANSAS

Norway—D. A. Haney has discovered a 4-ft. bed of coal on a farm a few miles east of Norway. The discovery was made at a depth of 140 ft. This coal is believed to be of a paying quality, and the only drawback in its development is the lack of capital. This will probably be forthcoming in the near future.

WASHINGTON

Forks—A good supply of natural gas has been found at a depth of 1300 feet near Forks, above the Hoh River. The well is said to have been drilled by railroad interests and will be drilled deeper with the hope of striking oil. The gas flows freely, it is stated, and with good pressure.

OREGON

Florence—Coal in promising amounts has been found near Florence at the mouth of the Siuslaw river. Frank Ferguson, of Alder Ridge, has opened a tunnel into a mountain on his place, about nine miles from Florence. He has now reached a depth of 150 feet, finding three veins in that distance and indications are good for another one. Mr. Ferguson is an experienced coal miner and it is his opinion that the hills around the town are underlaid with veins of good coal. Other parties have commenced prospecting in that location.

FOREIGN NEWS

London, England—The strike fever is not entirely allayed in Great Britain. This is indicated by the fact that on Sept. 23, 4000 colliers went on strike because a company policeman is alleged to have insulted a miner's wife. The company refused to dismiss the policeman and expected to close the pit as the result of the strike.

Manila, Philippine Islands—For the last five years the coal consumption of the Philippine Islands has increased at the rate of about 8% annually. Last year 436,687 tons were imported aside from 82,000 tons received at the naval coaling station. Practically all the coal which is used on shore comes from China, Japan and Australia, and the bulk is taken by the railroads and the electric companies, although one tobacco-manufacturing concern uses about 16,000 tons annually. The principal consumers have recently formed an association for the coöperative buying of coal, instigated thereto by the higher prices which have prevailed during the past year.

PERSONALS

Governor Major of Missouri has appointed as delegates to the American Mining Congress, to be held in Philadelphia on Oct. 20 to 24, P. N. Moore and E. S. Gotsch.

John T. Fuller, mining and civil engineer, has opened a consulting office in Little Rock, Ark., and will pay particular attention to the mining of coal and zinc.

Frank M. Fritchman has resigned his position as manager of mines for the Pittsburgh Coal Co. and, on Oct. 1 he will become the general manager of the Pittsburgh & Rochester Coal & Iron Co.

Percy C. Madeira, president of Madeira, Hill & Co., gave a stag dinner in honor of Samuel Rea, president of the Pennsylvania R.R., at his country place "Brookwood," on Sept. 26. Covers were laid for twenty-two other guests.

J. E. Berwind, president of the Berwind-White Coal Mining Co., and H. P. Favison, of J. P. Morgan & Co., have been elected directors of the Erie R.R. The election was to fill vacancies caused by the death of H. McK. Twombley and the retirement of Vice-President Richardson.

President White of the United Mine Workers of America has been named as arbitrator in the dispute involving 3000 coal miners of Bay City and Saginaw, Mich. The strikers were ordered to return to work pending President White's decision at a conference held at Columbus, Ohio. The strike started Sept. 15, following the dismissal of three miners, an alleged violation of the contract between the union and the Michigan operators.

George F. Baer, president of the Reading-Jersey Central Railroads, celebrated his 71st birthday on Sept. 26. Much of the day was spent closely engaged in his office at the Reading Terminal, Philadelphia, in conference with the operating managers of the Philadelphia & Reading Coal & Iron Co., and the Wilkes-Barre Coal Co., on questions pertaining to the production and the trade. Mr. Baer was in good spirits and has no idea of giving up work.

Thomas Toshesky, on Friday, Sept. 26, while at work in the Continental mine of the Lehigh Valley Coal Co., escaping a fall of earth, found himself imprisoned behind a rock barrier. Rescuers immediately set to work, although they believed Toshesky buried under tons of débris. A hole was bored down to the chamber where the man had been working, and a tube lowered. Through this an electric light bulb, food, clothing and finally reading matter, were passed to the imprisoned miner. On Sept. 30, after four days of incarceration Toshesky, speaking through the pipe, sent the message to his family not to worry, that he was in fairly good condition after absorbing several bottles of milk and whipped eggs.

OBITUARY

Andrew Robertson, of Pottsville Penn., died in his summer home at Asbury Park, N. J., Sept. 21, at the age of 88 years. Mr. Robertson was a native of Nova Scotia, but spent most of his life in Schuylkill County. He became wealthy through the operation of the Helfenstein, Greenback, Grady, Henry Clay, Excelsior and Corbin Collieries in the Shamokin region. He also held considerable coal and oil interests in West Virginia and Pennsylvania.

Col. Wm. Busby, known as the coal king of Oklahoma, died at McAlester on Sept. 23, his death being caused by a carbuncle. Col. Busby was born in Pemberton, N. J., 59 years ago. He came to McAlester from Parsons, Kan., where he was mayor and for several years general sales agent of the Choctaw & Gulf R.R., now the Rock Island. He then went into the mining business, becoming one of the largest operators in the field. His estate, which is roughly valued at $1,000,000, will be shared by a wife and six children.

William Armstrong Ingham, engineer, capitalist, scientist and lawyer, died on Sept. 23, at his home in Philadelphia, after a short illness from heart disease. He was 87 years old, and continued active in business until a week prior to his being taken sick. He was president of the Highland Coal Co., the Union Improvement Co., the Broad Top Improvement Co., and the Beverly Ore Co., at one time being president of the Rock Hill Iron & Coal Co., and the Broad Top Railroad Co. He was a member of the American Philosophical Society, of the Franklin Institute, and American Society of Mining Engineers. At the time of his death he was secretary of the Pennsylvania Geological Survey board, having been connected with that organization for many years.

CONSTRUCTION NEWS

Marquette, Mich.—Pickards & Co. will, within the coming year, provide themselves with a new coal dock and the necessary coal-handling equipments.

Belaire, Ohio—A large force of men was put to work Sept. 22, building a new tipple and power plant at the Franklin coal mine, west of Belaire. The estimated cost of these buildings will be $7000.

Earlington, Ky.—The St. Bernard Mining Co. has completed, at a considerable expense, a new coal washer, and installed the best of machinery for making coke. The new turbine generator will soon be completed also, and this will lower the cost of electricity to the city and the mines.

Wheeling, W. Va.—A new 33,000-volt transmission line to the eastern part of Belmont County was recently completed by the Wheeling Electrical Co., and put into service. The new line is for the purpose of serving the coal industry of the section mentioned. The Belmont Coal Co., at Glencoe, is one of the big current consumers.

DuBois, Penn.—The Pennsylvania R.R. is extending a spur two miles in length between Punxsutawney and Clover Run to reach a tipple at a new opening of the Madeira Hill Coal Co. This company is also making a number of new openings, and when these are completed and tipples finished work at the mines will be pushed to its utmost.

Windber, Penn.—Approximately 350 men are at work pushing through to Cairnbrook the eight-mile extension of the South Fork branch of the Pennsylvania R.R. The contractors are urged on by necessity. The Loyalhanna Coal & Coke Co., the Berwind-White Co. and John Lochrie, of Windber, are all waiting for the railroad before tapping rich beds of virgin coal.

Mobile, Ala.—It is reported that the United States Steel Corporation will purchase a large tract of land at Mobile, Ala., and build a plant to receive their Cuban ores. This plant will cost in the neighborhood of $800,000. The Steel Corporation owns a large tract of ore in Cuba, and it is the intention to mine it and send it to this country through the Mobile plant.

St. Louis, Mo.—The Chicago & Eastern Illinois Ry. has a force of 1200 men working 10 hours a day getting its bad order coal cars into condition. The receivers decided some time ago to spend all available money in putting their equipment and motive power in shape, and the Chicago & Eastern Illinois expects to have every car lined up for business within the next 60 days.

Birmingham, Ala.—The Ensley plant of the Tennessee Coal, Iron & R.R. Co., is to have a new blast furnace and steel converter at a cost of $200,000. The new furnace and converter are already under construction. A new process in openhearth-steel manufacture where a 12-hour run will produce 300 tons of steel has required a larger output of pig iron. The erection of the addition follows the need for the material to supply the openhearth furnaces. Further appropriations to the extent of $1,000,000 will probably be made for the Ensley plant in the near future for further improvements.

Pineville, Ky.—The grade work on the new Chesapeake & Ohio route through the Breaks of the Cumberlands is practically finished, with the exception of the Sandy Ridge Tunnel on the Virginia side, and track laying will begin shortly. This tunnel, however, is one of the most difficult pieces of work on the road. It will be two miles long, with a steep grade. An unusual feature of its construction is that a shaft has been driven from the top of the ridge at the center of the line of the tunnel, and two crews will work from this point, in addition to those working from the two ends. The completion of this road will mean greatly increased activity in industrial and mining work in the section affected.

NEW INCORPORATIONS

Elberfeld, Ind.—The Elberfeld Coal Co. has been organized with a capital stock of $15,000 to mine and deal in coal, etc. The incorporators are C. A. Heldt, H. Holtz, W. F. Dassel.

Cadiz, Ohio—The Selway Coal Co., of Cadiz, Ohio, has been incorporated with a capital stock of $1000 to mine and deal in coal. The incorporators are R. H. Menter. D. W. Selway, H. T. Selway, Henry Selway and L. E. Selway.

Pomeroy, Ohio—The Martin Ebersbach Co. has been organized for the mining and selling of coal. The capital stock is $250,000, and the incorporators are H. C. Royal, K. F. Marburger, C. L. Lehr, C. E. Herrman, and F. A. Siebold.

Windber, Penn.—The Lake Trade Coal Mining Co. has been organized with a capital of $30,000. The incorporators are John Lochrie, Thos. Lochrie, C. A. Davis, Windber, Penn., F. B. Filer, Mercer, Penn., J. H. Filer, and E. W. Filer, of Sharon, Penn.

Charleston, W. Va.—The Mingo Land Co., organized by Mercer County capitalists, has been granted a charter by the secretary of state. The authorized capital stock is $150,000. The principal office of the new company is to be in Bramwell, Mercer County, and the chief works in War Eagle, Mingo County. The incorporators are J. B. Perry, E. S. Baker, H. X. Morton, Jr., W. A. Jameson, and Harry Bowen, all of Bramwell.

Philadelphia, Penn.—The regular monthly meeting of the stockholders of the Geo. B. Newton Coal Co. will be held in Philadelphia, on Nov. 24, and the stockholders will be requested to take action upon the proposition to secure by mortgage $242,000, thus increasing the indebtedness of the corporation from nothing to that amount, for the purpose of refunding mortgage liens amounting to $242,000 now existing on the concern's real estate.

Huntington, W. Va.—Huntington capitalists have formed a company for coal and coke production and the development of oil and gas in the Burning Springs property, in Mingo County. The company, which is named after the property, has received a charter. The authorized capital stock is $50,000, of which $500 has been subscribed and paid. The incorporators are David McCormick, of St. Louis, Mo.; F. B. Enslow, J. W. Haden, Jr., N. H. Richardson and W. R. Fulton, all of Huntington, W. Va.

INDUSTRIAL NEWS

Michigan City, Ind.—The Chicago, Burlington & Quincy R.R. has ordered 3000 coal cars from the Haskell-Barker Car Co., of this city, to be delivered as they are completed.

Scranton, Penn.—The Rivenburg-Blackwood Co., Inc., has closed a contract with the Witherbee Igniter Co., for the sale of their electric mine lamps in Pennsylvania and West Virginia.

Gadsen, Ala.—The Alabama Power Co. is beginning the work of storing 10,000 tons of coal at its East Dresden power plant. About 70 tons are used daily and 25 men are given employment.

Cincinnati, Ohio—The Bewley-Darst Coal Co. has closed its Cincinnati branch which is to be consolidated with the Knoxville office of the company. This order was effective Sept. 15 and the business of the office will be finally wound up by Oct. 1. Calvin Holmes will have charge of the Knoxville offices of the company, and Fred A. Gore, of Macon, Ga., will sell the Bewley-Darst product.

St. Louis, Mo.—The Chicago & Northwestern, it is expected, will enter St. Louis during the next month, as its line is practically completed through the coal fields adjacent to the city on the east. Something like 12,000 tons daily is being moved over the Chicago & Northwestern, south of Peoria, and after all connections are made several times this tonnage will likely move via this road to the Northwest.

Sandusky, Ohio—All records are declared to have been broken at the Pennsylvania railroad docks at Sandusky, in the matter of coal shipments this season, and there are two more months of navigation left. Last year the shipments from these docks amounted to 2,000,000 tons of coal, while, according to Supt. C. C. Hand, the 2,000,000-ton mark will have been reached by Oct. 1. The docks will be doubled next season. Seven years ago 400,000 tons was the high mark for a season's shipping from these docks.

Toledo, Ohio—A number of Toledo shippers are planning to enforce the payment of the rebate granted them by the ruling of Judge E. B. Kinkead, of the Franklin County, Ohio, common pleas court, rendered Sept. 9, 1913. This ruling upheld an order of the Ohio Public Service Commission reducing the freight rate on coal from Nelsonville, Ohio. The reduction amounts to 15c. on each ton of Hocking coal received in Toledo and dealers are claiming a rebate dated from Jan. 15, 1910, to the present time, that being the date of the filing of the first complaint.

Toronto, Canada—The merger of the Western Coal & Coke Co. the Pacific Pass Coal Fields, the St. Albert Collieries and the Lethbridge Collieries under the title of the Canadian Coal & Coke Co. has been completed and the respective properties made over to the new company. The authorized capital of the Canadian Coal & Coke Co. is $15,000,000, of which $11,000,000 is common and $4,000,000 preferred stock. Between nine and ten million of the common stock and $3,750,000 of the preferred has been issued, the balance being retained in the treasury. An issue of $3,000,000 of bonds will be placed at once to raise funds for discharging current liabilities, and developing and equipping the properties.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite market quiet but with a generally good demand in all branches; production being increased to full capacity. Bituminous business continues at a maximum and buyers appear resigned to the new high prices. Car supply now one of the leading factors in the situation.

Hard-coal production will shortly be up to full rated capacity, practically all companies having now resumed full time operation. While this would seem to indicate an active market, there is no important change in the wholesale end, nor is any anticipated in less than a month, unless weather conditions become unexpectedly severe. In fact, it will be essentially a weather market from now on. Fear is even expresed in some quarters that the present heavy production may result in the market being overshipped, but it should be remembered that much of this tonnage is being used to make up the deficiency in last year's production.

The demand for bituminous coal continues at a maximum with the better qualities being held closer and closer. Probably the only condition that has prevented a spectacular advance in soft-coal prices is the fact that most consumers and producers are so completely covered that little free coal remains to be negotiated. The larger consumers seem to be resigned to paying higher prices, even those who have overstayed the market in anticipation of a break. Slow dispatch is the rule coastwise, and vessels are beginning to accumulate at the loading ports.

There is no free coal to be had in the Pittsburgh district at base rates, while slack has never before been so scarce during the Lake shipping season. The car supply is becoming steadily worse, but probably not to the extent of seriously restricting operations. Production remains at the maximum for the season probably within 10 to 20% of the full rated theoretical capacity.

The car and labor shortage in Ohio is making it difficult to keep up the output, while the advent of some cooler weather has materially stimulated business; the movement is probably up to the full limit of the car supply. The domestic grades are particularly strong, the retailers endeavoring to accumulate some winter surpluses. Prices are being as firmly maintained as ever. Shippers at Hampton Roads are still short, but the situation is notably easier and more nearly normal supplies are on hand; the demand is also showing some improvement.

The situation in the Southern market is unchanged, operators waiting better prices before increasing the production; however, a good volume of business is being done even now, while it is anticipated that the next 30 days will show a material improvement. The announcement of the withdrawal of the O'Gara Co. has stiffened up the Middle Western market notably; this meant a reduction of some 3000 tons of screenings per day in the Chicago market and precipitated some sharp bidding for this grade. The Eastern coals are fairly steady, but in shorter supply than before.

BOSTON, MASS.

The Southern coals are firmer, but with no material change in prices. Car supply affecting the output of Georges Creek. Small advances made in the Pennsylvania grades and a more active market in prospect. Shortage on stove coal looks serious.

Bituminous—The Pocahontas and New River situation is notably firmer, although there has been no tangible price movement as yet. Transportation has begun to accumulate at the Hampton Roads piers and already there is enough congestion so that certain of the agencies are declining to accept further bottoms. The output is rather lighter than for some weeks and it is clear that we are in for a strong market late in October. Nothing higher than $3 f.o.b. Norfolk has so far been reported but this is due probably to contract requisitions taking practically all the coal at the piers. The Government has come in for large shipments and this together with an active export trade further accounts for the small supply of spot coal for coastwise delivery. What spot sales have been effected have been mostly to other shippers to fill out cargoes.

The movement to New England is gradually getting straightened out after the prolonged heavy weather. Some of the tows took ten day to get from the Delaware to Boston.

Car supply is reported to be poor on some of the roads, particularly from the Maryland districts, and this condition seriously affects the output of Georges Creek. There is still practically none of this grade to be had except by putting in transportation for indefinite waits. Several boats that would normally load at Baltimore have been seeking tonnage at Hampton Roads, but at the present writing, dispatch there is practically no better than at Baltimore.

Prices are up 5c. or so on the Pennsylvania grades and further advances are predicted. Buyers here, however, are not showing as much interest as might be expected. Several of the smaller consumers found they had over-stayed in waiting for Pocahontas and New River to ease off and are now taking relatively small lots of the better Pennsylvania to tide them over. Slow dispatch at Baltimore and at Hampton Roads is so likely to grow rapidly worse and runs up such heavy demurrage bills that an extra demand is bound to fall on coals out of Philadelphia.

Anthracite—All the shippers are now short of stove and dealers here are finding it extremely hard to make room for the other sizes it is necessary to take in order to get this grade; the demand from the public for this size is increasing very fast and it is becoming a big problem. The retailers with relatively small storage are finding it especially hard to manage. Orders are piling up at the other end and shipments are very slow. It is an anxious season for the average retailer.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.55	$1.30@1.70	$1.67@1.77	
Philadelphia*	2.35@2.80	2.55@2.95	2.92@3.02	
New York*	2.65@3.10	2.85@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.90@3.00
Providence†				3.88@3.99
Boston†				2.98@4.08

*F.o.b. †On cars.

NEW YORK

Anthracite companies working practically full time and no coal going into storage; retail trade showing improvement but wholesale still rather inactive. Bituminous quiet but firm. Car shortage spreading.

Bituminous—The spot market on soft coal is quiet, probably because both producers and consumers are so completely covered that there is little business to be negotiated. The tendency to ease up is noticeable at some points, but not to a serious extent. Gas coals are in very sharp demand, while slack is showing an abnormal strength, which will be further accentuated when the Lake season closes.

The car supply is causing more anxiety as the season advances, the situation on both the Pennsylvania and the B. & O. already being rather bad; reports are to the effect that the latter road showed indications of falling behind quite rapidly. There has been only a slight shortage so far on the New York Central. A great deal of trouble is being experienced with labor also, not so much in the supply, which is not any too good, however, as in the difficulty in maintaining continuous operations.

A large local railroad was reported to be in the market for a moderate tonnage recently, but on the whole the spot business is rather quiet. We continue previous quotations unchanged as follows:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The retail end of the hard-coal market is at a standstill at the moment awaiting the appearance of some colder weather. As may be expected during a transitional period from one season to another, reports are of a more or less contradictory nature. On the one hand, it is noted that mines are being put under full capacity operations which would seem to indicate an increased demand. But on the other hand, the feeling prevails that dealers are very heavily stocked, because of the acute shortage and consequent high tension which prevailed in the fall market last year.

Generally speaking, the market may be considered a weather proposition entirely from now on; a protracted spell of cold weather must inevitably develop a sharp demand, while a period of moderately high temperatures up to, say Christmas, will surely bring about a depressed condition and low prices. The fact that production is running substantially ahead of previous years is being mistakably taken as indicative of an easy situation this winter; it must be remembered in this connection that production last year was the lowest on record, with one exception since 1906, and was some 6,000,000 tons below the output for 1911. It is equally true, of course, that consumption was materially restricted last season by the moderate weather conditions, but even allowing for this it is still reasonable to believe that there has been a demand for large extra tonnage this year to fill up the holes caused by the deficiency last year.

At the present time stove coal is in the heaviest demand, and it is freely predicted that it will be selling as high as chestnut before the winter is over. Egg is heavy and difficult to move, with chestnut and pea in rather free supply. Stocking of all grades has been practically discontinued.

Quotations remain practically unchanged as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	....
Egg	5.25	$5.15@5.25	5.20	$5.10@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.30@5.45
Pea	3.50	3.40@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.35@2.70
Rice	2.25	2.25@2.35	1.95@2.20	1.80@2.20
Barley	1.75	1.75	1.50	1.50@1.70

PHILADELPHIA, PENN.

Hard-coal producers are opening up full time. Better tone generally with dealers reporting more inquiries. Weather market from now on and no great activity anticipated for 30 days. Bituminous showing a sagging tendency.

Everything now points to the fact that the anthracite business in this vicinity will soon be on in full swing. It is understood that one of the large producing companies which has been running on a curtailed basis, has now commenced to operate on full time, which in itself is an indication of an immediate improvement. While the conditions locally are not what they might be, at the same time it is evident that there is a better tone to the market; dealers as a rule report that inquiries are better, and deliveries heavier.

It is a weather proposition from now on. An early touch of frost will have the effect of starting up the fires, creating further inroads into available supplies. Of course, no actual winter conditions are expected for at least a month, but the trade generally remembers the situation last year, when the demand was far in excess of the supply, and the prospect not at all definite. However, conditions this year are not likely to be so strenuous, as the companies have fairly good stocks of coal, at least sufficient to keep the market fairly well supplied. Broken coal still continues far short of requirements, and there is a marked improvement in stove, chestnut and pea. Prices ruling at the present time are: Broken, $3.50; egg, $3.75; stove, $4; chestnut, $4.15 and pea, $2.50 at the mines.

While there has been no marked change in the bituminous trade during the past week, yet the tendency seems to be backward. Demurrage on coal at tidewater has again been heard of, but whether on account of lack of facilities for vessel movement, or cancellations due to a falling off in the demand, is not evident. The fact remains, however, that there has been a decrease in prices during the past week of from 10 to 25c. per ton; this doubtless reflects a desire on the part of operators to dispose of standing coal. Taking the market as a whole, however, there is nothing to indicate that it is not holding its own.

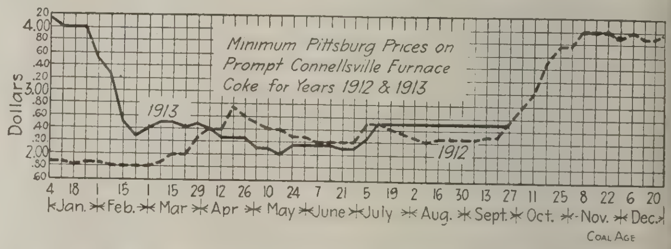
PITTSBURGH, PENN.

Demand for free coal increased, especially domestic. Unusual condition of slack commanding premiums, with stock accumulation this season very light. Increased use of slack and crushed mine-run. Labor and car supply fair. Connellsville coke market uncertain. Accretions to the ranks of the "regulars." Shipments increased.

Bituminous—There has been a further increase in the demand for domestic coal by dealers, who are not well covered by contracts, and operators' asking prices range up to $1.75 for 1¼-in. domestic. There is slightly better demand for free coal from other buyers, and there is practically none to be had at base rates, quotations generally ranging from $1.40 to $1.50 for mine-run. Slack has become decidedly scarce, and readily brings $1, while one large interest would not sell under $1.10, and would buy freely at the circular price of 90c. if the product were offered. Never has so small an amount of slack been accumulated during the Lake shipping season and even those operators who make a practice of storing slack during the summer, for their winter demand, have very small piles. The increase in the use of stokers is shown by the steadily growing demand for crushed mine-run, which usually takes an extra of 5c., being better than ordinary slack as it is lower in ash and of greater thermal value.

Car supply is not satisfactory, but only limits production slightly. Last Saturday one important division furnished only a 30% supply, but Saturday is normally expected to be bad. Men are not working full time, but are doing as well as formerly. On account of shortage of labor and cars, production is probably between 10 and 20% below theoretical maximum, but is substantially as heavy as at at any time this season. We quote regular circular prices, subject to premiums of 10@20c. for prompt lots, unchanged as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The market continues to be cut up by offerings of furnace coke at under the regular $2.50 price, down to $2.25 or $2.20 for coke alleged to be standard grade, but about which there seems to be considerable question. In some quarters it is claimed the market has definitely broken, but this statement cannot be accepted at par when it is universally admitted that the regulars who have held out for $2.50 have not weakened, and it is known absolutely that late last week a sale of some 6000 tons, shipment to the end of October, was made at the full price of $2.50 to a discriminating buyer in the East. From sources hitherto found trustworthy it is learned that in the past ten days one large operator and two small ones have agreed to work with the regulars in the matter of curtailing output to harmonize with the average demand. This will enable the regulars to work at a better percentage provided demand does not decrease further, and as to this there is serious question. We quote prompt and contract at $2.50 for furnace and $2.90@3 for foundry, per ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 20 at 378,437 tons, an increase of 3647 tons, and shipments at 389,742 tons, an increase of 14,831 tons. The excess of shipments over production is represented to be due to the lifting of about 10,000 tons of stock coke by steel works interests.

Later—The Producers Coke Co., which has been handling the output of the "regulars" has just made an announcement which may change the prospects of the market and which has aroused the greatest interest. It publishes a new list of the companies represented, the following additions being represented: Mt. Pleasant Coke Co., Consolidated Connellsville Coke Co., Genuine Connellsville Coke Co., Champion Connellsville Coke Co., Whyel Coke Co. and Puritain Coke Co. The Producers Coke Co. formerly claimed to represent operators producing 2,400,000 tons of coke annually, but with these additions the amount is increased to 3,500,000 tons. A rough count indicates 3000 ovens formerly represented, and 2000 ovens added through the new companies announced this week.

BALTIMORE, MD.

Heavy demand for good grade coals, and they are practically all sold up. Cheap steam fuels still weak and Eastern market for gas coals flat. Coke market off color. Slack still a feature and continues advancing.

The heavy demand for good grade fuels continues unabated. All free coal of this kind is being held tighter and tighter as far as prices are concerned. From $1.55 to $1.60 is now no unusual figure; for the most part, however, producers have little to offer in the open market. Contract calls for this class of fuel are practically at a maximum and most of the consumers would like the opportunity of increasing their tonnages if they were able. A number of mining interests are giving their regular customers first call on what little surplus they have. Most of the larger interests, seem to fully appreciate the present situation and are paying spot prices on excess above their contracts.

Cheaper grades of Pennsylvania steam coals are not any too strong. The movement has been able to meet all demands, and prices are about the same as the previous week, running between $1 and $1.10, the former figure being most generally heard. Poorer grade West Virginia gas coals are in rather poor demand, especially eastward, and sales at from 85 to 95c. were recorded. Slack continued the big feature, the figures demanded and obtained being in excess of the previous week. Sales at from $1 to $1.10 were not infrequent, this being from 10 to 15c. as a general proposition above run-of-mine gas coals.

Coke is not over-strong just now. The West Virginia market was the real barometer, the Connellsville fuels being pretty well sustained, apparently under pressure. Anthracite demand locally is improving, although it will be a month yet before the real rush is on. Steam sizes were in fair demand.

BUFFALO, N. Y.

Bituminous holding up well without any indications of weakness. Car situation becoming steadily worse with practically no gondolas obtainable. Anthracite picking up rapidly.

Bituminous—The local bituminous operators are unanimous in the opinion that the market continues to show all its former firmness; it is a difficult matter to get any shipments even among those who have their own mines. This condition is due mostly to the fact that the production appears to be so completely covered by contracts, that there is little or no free coal available.

The car situation is reaching more serious proportions right along, particularly where the buyer refuses to accept shipments in the regular steel hoppers. These cars have been replacing the gondola type so that the latter could be diverted for use in the steel trade. Producers flatly refuse to consider any orders specifying gondola cars. Although abnormally strong, there is really little of interest in the bituminous trade. Slack seems to be quite as strong and difficult to obtain as the sizes and if this general shortage continues up until Lake shipping closes, the mines will be able to continue making this grade.

Quotations continue very firm at $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run, and $2.25 for slack, with Allegheny Valley about 20c. lower.

Coke—The coke trade continues much weaker than the coal market. Prices having reached an abnormally high level, the inevitable reaction has resulted in an equally complete depression. Connellsville foundry sells f.o.b. Buffalo at $4.85, with high grade 48-hr. furnace, $4.40, and very little stock.

Anthracite—The demand in this trade is becoming steadily more active as the season advances, some of the large shippers already reporting that they are not getting as much coal as they would like. It appears that some companies still have dock room available at the head of the Lakes, while rumors are to the effect that the production of hard coal is not being kept up to the market requirements. Some of the independent operators are asking premiums on the short sizes, particularly stove, but as yet no sales have been recorded at anything above the regular circular. However, it is clear that much more anthracite is coming to this market than ever before. Shipments by Lake are still much reduced, although it is reported that they will show a steady increase from now on; shipments for the week amounted to 86,000 tons.

TOLEDO, OHIO

Car shortage and unsatisfactory labor conditions restricting production. Prices firm or advancing. Cool weather stimulated domestic business.

The demand for lake coal continues good and shipments are being made as fast as coal and boats are available. There is some car shortage and this combined with unsatisfactory labor conditions at the mines has retarded the movement here to some degree. The cool weather of the past week brought on a much better domestic demand while steam coal kept up to the notch. Prices were firm and as a matter of fact, were better maintained than they have been at any time during the season, although prices have been holding close to the list all along.

Pocahontas which has been lagging somewhat came right to the front and slack is very strong. Pittsburgh, No. 8, which has been at the high-water mark for a long time, is expected to reach a dollar within a few days unless some unforeseen circumstance should come up. Despite the traffic difficulties, of which there is continued complaint, more coal has been going up the lakes than is usual at this season and shippers are straining every nerve to secure adequate stocks. An unusual amount of slack has been demanded for lake shipment which has caused a shortage. It is predicted by coal men here that there will be an advance in Hocking coal Oct. 1.

The market is now quotable as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump.........	$2.50	$1.75	$2.50	$2.00	$2.50	$1.45	$1.35
Egg..................	2.50	1.35	2.50	1.50	2.50	....	...
Nut..................	2.00	1.25	2.25	1.75	2.50	1.35	....
¾ lump...............	....	1.65	....	....	....	1.25	1.25
Mine-run.............	1.60	1.35	....	....	....	1.12	1.15
Slack................	....	0.70	....	....	....	0.80	....

Cannel Coal is quotable about as follows: Pennsylvania, lump, $2.85; egg, $2.35; nut, $2.25; Ohio lump, $3.25; Kentucky lump, $3.

COLUMBUS, OHIO

The car shortage gradually increasing and is the controlling factor in the local trade. Demand from all sources continues good and prices strong. No new circular has been issued but some advances have been announced.

The feature of the coal trade in Ohio during the past week is the growing car shortage which has had the effect of still further strengthening prices. No new circular has been issued effective Oct. 1 as was expected but prices on all grades have advanced to a certain extent and no weakness of any sort is reported. The volume of business is all that the car supply can care for and the prospects for the future are bright in every way.

There is a good demand for all domestic grades, which appears to be the strongest point in the trade. Dealers are placing larger orders and are asking for immediate shipment if possible. Retailers are making every effort to accumulate stocks to guard against the rush which is expected at the first cold spell; they are also busy on deliveries now and prices are strong and will probably be advanced soon.

Lake trade is still active although the short car supply is cutting into the tonnage moving to the Northwest. Chartering of bottoms is still going on and the trade will likely be steady right up to the close of navigation. Practically no congestion is reported from the docks at the upper lake ports; dock prices are still strong and no weakness has developed. The total tonnage from Ohio fields will be much more than last season.

The car shortage has interfered with production to a large extent in every mining section of the state. In the Hocking Valley the output is estimated at 75 per cent. which is the best reported. In the Pomeroy Bend field the output is estimated at 50 per cent. and in Eastern Ohio it is 60 per cent. of the average.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$1.75 @ 1.70	....	$2.00 @ 1.90	$1.70 @ 1.65
3-4 inch...........	1.60 @ 1.55	$1.50 @ 1.40	1.75 @ 1.65	1.55 @ 1.50
Nut...............	1.30 @ 1.20	....	1.60 @ 1.55	1.25 @ 1.20
Mine-run...........	1.40 @ 1.30	1.25 @ 1.20	1.35 @ 1.30	1.25 @ 1.20
Nut, pea and slack..	0.80 @ 0.70	....	1.00 @ 0.90	0.75 @ 0.70
Coarse slack........	0.70 @ 0.60	0.95 @ 0.85	0.90 @ 0.80	0.65 @ 0.60

HAMPTON ROADS, VA.

Recent shortage somewhat relieved. Movement coastwise and foreign during the week only fair. Good demand for coal inland.

Although some of the shippers from tidewater are still short the situation at all Hampton Roads piers is greatly improved and the quantity of coal remaining on hand at the end of the week is practically normal. The number of cargo and bunker vessels loading during the week will not compare favorably with the previous ones although there has been several large cargoes to New England and foreign ports. Few spot sales have been made and these only in small quantities at a price around $3 per ton. On these small sales it is difficult to ascertain exact figures as buyers and sellers prefer to withhold these figures.

The demand for coal inland continues good and prices fair. Shipments for foreign points moved to Naples and Trieste, Cristobal, Genoa, Dakar and Cuban ports.

Dealers in domestic coal and coke are complaining at the poor demand during the last few days. Orders are coming in slowly for both prompt delivery and also for October and November delivery.

LOUISVILLE, KY.

Shipments out of state have been so heavy that local supplies are short; strike talk has been discontinued, for the time being at least. Car supply moderately good.

There has been but little change in the local market, domestic coal still continuing in heavy demand, with screenings much in oversupply, and prices abnormally low. The best grades of eastern Kentucky screenings are selling around 70 and 75c., as compared with 90 and 95c. a few weeks ago; the lower grades can be had at almost any figure. The domestic demand has been stimulated by the advancing season, and the generally acknowledged fact that stocks on hand are below normal; the maximum supply of coal in the hands of any dealer will not exceed requirements for a single month. This is probably due to the fact that most of the summer shipments went to the Northern and Northwestern markets. This movement is still continuing, and, with the time approaching when large tonnages will be required for actual consumption purposes, the local dealers are naturally becoming a little anxious to accumulate some surpluses; the same applies to consumers, but the coal is not available.

Cars are in rather short supply, but the situation is by no means acute as yet. The movement is largely confined to other states, both to the North and South, with the result that local dealers are receiving only sufficient to supply current requirements, and are finding it impossible to accumulate any surpluses.

Production at the mines is fairly heavy, and, as already noted, the demand for domestic coals is all that could be desired; except for the weakness which has developed on the steam grades, the local market conditions might be considered ideal.

First-grade eastern Kentucky block coal has been quoted as high as $2.50 f.o.b. mines, although the real market is probably around $2 to $2.25. However, the strong rising tendency is still evident in the market.

BIRMINGHAM, ALA.

Little change in coal market this week. Coke is getting stronger and sales of blacksmith coal increasing. Pig iron firm at $11.50 for balance of year.

There has been little change this past week, either in the amount of tonnage sold, or prices, on both domestic and steam coal. The operators state that they are moving what they get out, but that they are not trying to break any production records and are, rather waiting for a slightly better market and higher prices. The volume of business is good for this season of the year, and prices are holding up well indeed. The next thirty days will show a decided improvement.

There was little doing in furnace coke this week, though foundry coke held its own, some good sales being made. Blacksmith coal is gradually getting better, after the usual dull summer months.

Southern foundry iron for delivery during the remainder of the year is firm at $11.50. There does not appear to be any other price, and it is either a sale at this price or no sale at all. The quotation for the first quarter of next year is $12, though it is believed the $11.50 basis could be obtained on business closed now. Practically all producers are shipping more than their monthly output, thus reducing the amount of storage iron in the yards.

DETROIT, MICH.

Conditions active with cars in short supply and shipments delayed. Domestic market particularly strong; an advance of 50c. scheduled for Oct. 1.

Bituminous—The local market is very active considering all prevailing conditions. The car supply is the predominating feature at the moment, prompt delivery being entirely dependent upon this. The situation in this respect appears to be about holding its own, although the recent cool weather has had a tendency to cause some uneasiness.

The steam business continues strong in every way, manufacturing plants taking large tonnages and showing a renewed interest in contracts, the indications being that these latter will be closed at appreciably higher figures than the old ones expiring. Domestic business is also good, dealers making an effort to obtain some surplus stocks in preparation for the winter rush; most of the large jobbers, however, have their winter requirements covered. Retail prices continue very firm with an advance of 50c. per ton scheduled to take place on all grades Oct. 1.

The Lake shipping still takes a large tonnage, efforts being made to get as much coal into the Northwest as possible before the car shortage becomes acute. The strike in the Michigan coal fields has also become a feature in the situation. The restricted production in this district naturally must be made up from other fields.

Anthracite—The trade is opening up in fairly good condition, and the prospects are for a good fall and winter business. As yet the market is not particularly active, but there are plenty of preparations being made for increased shipments.

The current bituminous market is quotable on approximately the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.50	....	....	$2.75	$2.50
Egg..........	1.65	....	1.50	....	....	2.75	2.20
Steam lump....	1.25	....	1.10	....	....	....	....
$\frac{3}{4}$-in. lump.....	1.10	$1.15	1.10	....	....	....	....
Mine-run.......	1.05	1.10	....	1.00	1.00	1.60	....
Slack..........	1.00	1.00	0.80	1.00	1.00	....	....

INDIANAPOLIS

Difficult to keep up a supply of anthracite, especially chestnut. Other Eastern coal coming fairly steady but in smaller shipments. A touch of frost has increased retail activity. Car situation improved.

Mining conditions and the coal trade generally continue quite satisfactory. There is less complaint about car shortage, the railroads evidently having made an effort to catch up. Coal is moving quite regularly from mines to yards and from yards to consumers. A frost on two or three recent mornings has stimulated buying. In industrial circles, there has not been any material falling off, although some of the smaller automobile concerns are not very active; in fact five of them in this state have gone into receivers' hands the last few weeks. Dealers are finding it difficult to keep up the anthracite supply, especially chestnut. Last winter there was a famine and consumers this season are trying to get a winter's stock in before cold weather. Other Eastern coals keep coming irregularly and in restricted quantities, one car at a time where formerly it was three cars. This is taken to mean that operators are parcelling it out among their customers, trying to serve all with at least part of their order. Any car shortage that may come with the movement of the corn crop will not be severely felt in this territory. The only way the trade can suffer is by the occupation of the motive power in grain rather than in coal carrying.

There has been no change in retail prices in this city since the advance of 25 to 50c., Sept. 23. Operators here are advising the purchase of all the coal possible at the present figures.

CHICAGO

Market stiffened up materially on the report that the production of the O'Gara properties would be temporarily withdrawn. Some cold weather has also stimulated buying. Car shortage becoming a factor in the situation.

The market during the last week was affected somewhat by the appointment of receivers for the O'Gara interests here, which resulted in the withdrawal from the market, of the production of the properties involved in the receivership. The supply for certain large screenings contracts being thus restricted the demand was thrown upon the open market, stiffening the general tone considerably. Another factor was the continuation of the car shortage while there was an increased demand from retailers.

Last week's cold weather resulted in the starting of furnaces in apartment buildings, favoring the smokeless coal market to a great extent. Mine-run smokeless is selling at from $1.40 to $1.50 at the mines, the latter figure prevailing in a large measure. The market for lump and egg is not quite as strong, prices being $2.25 at the mines. There is an improved demand for domestic coke and an increasing supply is attracting attention. An increase of 10c. a ton was evident in the byproduct coke market, while there is little spot buying of furnace and foundry coke. The fulfillment of contracts on the latter is normal.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump............	$2.57	$3.05	$2.52	
Steam lump..............	2.02		2.07	
Egg.....................		2.80@3.05		$4.30@4.55
Mine-run................	1.92	2.30	1.87	3.45@3.55
Screenings..............	1.22@1.32	1.60@1.70	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byproduct egg, stove and nut, $4.85; gas house, $4.65@4.75.

ST. LOUIS, MO.

Considerable activity in domestic sizes. Prices advancing. Screenings market on Standard demoralized but exceptionally good on the high grades. Car shortage will likely keep the market in good shape.

The coal operator here is at last coming into his own; prices are advancing on all grades with the exception of steam sizes, and the effect of the Keokuk Electric Service is driving some cold hard facts home to the operator in the Standard district. Standard screenings are down to 10c. a ton at the mines, and, of course, this has caused the price of screened sizes to go up, but even then, with screenings at 10c., some operators are selling the other 65% of their coal at $1.05, with the cost of production ranging anywhere from 80 to 90 cents.

The Carterville field, so far as steam sizes are concerned,
as come to the front with a jump since the O'Gara oper-
tions went into the hands of receivers. The banks are
sking a higher rate of interest than the receivers antici-
ated, and, as a result, the mines are idle. This has taken
bout 3000 tons of screenings a day out of the Chicago mar-
et, and Chicago is drawing the Carterville screenings that
sually come to St. Louis, so that in a week's time screen-
gs jumped from 40 to 65c., and will likely continue strong.

The market is now quotable on the following basis, fo.b.
ines:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
in. lump	....	....	....	$1.10@1.20
in. lump	....	....	$1.50	....
in. lump	$1.85 @ 2.00	....	1.60	1.40@1.50
ump and egg	1.50 @ 1.60	$2.25	....	....
o. 1 nut	1.40 @ 1.60	....	....	....
creenings	0.50 @ 0.60	....	....	0.25
line-run	1.50	....	....	0.90
o. 1 washed nut	1.60 @ 1.70	....	1.40	....
o. 2 washed nut	1.35 @ 1.50	....	1.60	....
o. 3 washed nut	1.20 @ 1.25	....	....	....
o. 4 washed nut	1.10 @ 1.15	....	....	....
o. 5 washed nut	0.65 @ 0.70	....	....	....

OGDEN, UTAH

**Coal market much stronger. Plenty of equipment at
yoming mines but Utah suffering severely from car short-
ge. Cold snap in Utah draws heavily on storage coal.
ugar factories placing orders for large shipments. Strike
Colorado affecting Eastern market.**

With the demand for immediate shipments increasing,
e coal operators are beginning to run the mines full time,
nd while there are still a few weak spots the demand for
mp coal is good, and all the mines are disposing of this
rade. The surplus of nut coal has been greatly decreased
d very little is now standing on track. Sugar beets are
eing harvested and Oct. 1, will find all the factories run-
ing and consuming the surplus slack. Shipments of steam
al were resumed during the week and the surplus of this
rade is being rapidly diminished.

The car situation at Rock Springs and Kemmerer, Wyo.,
all that the operators can expect. The Union Pacific
ailroad has put forth an extra effort to keep the mines
pplied with equipment and during September, not a day
s been lost on account of cars. If the railroad can do as
ell during October as they have during September, the
ines will no doubt have a very successful winter. Utah
perators have not been so fortunate. The Rio Grande Rail-
ad has been unable to furnish equipment and the mines
e only working two and three days per week.

Quotations remain as follows: Lump, $2.75; egg, $2.50;
t, $2.25; mine run, $1.85; slack, $1.

PORTLAND, ORE.

**Car shortage is beginning to make itself felt as result
heavy demand for equipment. Shipments of coal to this
ty during the past week have shown material decrease.**

The heavy demand upon the railroads for rolling stock to
ove the crop now going to tidewater, is being felt by
e coal dealers here; during the past week shipments from
e mines have been reduced more than 50%. That the
tuation may become quite serious is admitted by dealers,
hose stocks are none too heavy at this time. The indica-
ons are for a good active demand this fall and winter, con-
derably better than last year, when the market was rather
ll, due largely to the open winter throughout the Pacific
orthwest.

A decided car shortage may serve to act as an incentive
importations of coal by water from Australia or other
ints, although there is little probability of any coming
om British Columbia owing to the strike there.

FOREIGN MARKETS

GREAT BRITAIN

Sept. 19—Tonnage is not arriving as freely as anticipated,
t most shippers have sufficient ready steamers for their
mediate requirements. The inferior classes of large and
all coal are in plentiful supply for prompt loading, with
ices weak. There is very little business doing for for-
rd shipment in any class of coal.

t Welsh steam	$4.74@4.92	Best Monmouthshires	$4.02@4.08
t seconds	4.44@4.62	Seconds	3.84@3.96
onds	4.20@4.38	Best Cardiff smalls	2.40@2.46
t dry coals	4.32@4.56	Seconds	2.22@2.34

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or
rry, while those for Monmouthshire descriptions are f.o.b.
wport; both exclusive of wharfage, and for cash in 30
ys.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN R.R.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of August, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas	1,318,149	16,177	1,334,326	1,345,377	86,137
Tug River	232,865	2,382	235,247	199,313	35,935
Thacker	296,422	12,285	308,707	219,876	88,825
Kenova	89,271	10,088	99,359	83,632	15,721
Clinch Valley				158,902	16,376
	1,936,707	40,932	1,977,639	2,007,100	242,934

Shipments of coke entirely from the Pocahontas field amounted to 86,384 tons.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Sept. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	32	17	**17**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	1,499	812	**687**
Ohio; Indiana; Michigan; Western Pennsylvania	327	1,801	1,474
West Virginia, Virginia, North & South Carolina	633	3,186	2,553
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	927	749	**178**
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,162	1,087	**75**
Montana, Wyoming, Nebraska	544	0	**544**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,661	51	**1,610**
Texas, Louisiana, New Mexico	431	0	**431**
Oregon, Idaho, California, Arizona	1,442	28	**1,392**
Canadian Lines	76	0	**76**
Total	8,714	7,731	**983**

	Apr. 15	May 15	June 14	June 30	July 15	Aug. 1	Aug. 15	Sept. 1
Surplus	21,845	12,267	11,098	11,055	13,203	8,810	8,293	8,689
Shortage	2,196	4,226	2,033	2,821	1,826	4,029	7,038	5,209
Net*	**19,649**	**8,041**	**9,065**	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**

***Bold face** type indicates a surplus.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Sept. 27:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	....	....	80	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	33½	31⅝	31⅝	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com	53½	52	52	53½	47¼
Island Creek Coal Pref.	85½	85	85	85	80
Pittsburgh Coal	20⅞	19⅞	19⅞	24⅜	14½
Pittsburgh Coal Pref.	89	86½	86½	95	73
Pond Creek	23	21⅛	22½	23¾	16½
Reading	171	167	169	171	151⅜
Reading 1st Pref.	87	85	87	92½	84
Reading 2nd Pref.	94⅜	92¼	92¼	95	84
Virginia Iron, Coal & Coke	45	45	45	54	37¼

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	99	98	Sept. '13	93½	99⅛
Colo. F. & I. gen. 6s	103	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	82	Sale	80½	83½	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	85⅜	Sale	85⅜	85⅜	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77	79½	78½	Sept. '13	73	80¼
Tenn. Coal gen. 5s	98⅛	99	99	99	98½	103
Birm. Div. 1st consol. 6s	101⅜	102½	100⅝	Aug. '13	100⅝	103
Tenn. Div. 1st g 6s	102	Sale	102	102	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	75	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	..	93	93	92	98

DIVIDENDS

Delaware, Lackawanna & Western Co.—Regular quarterly dividend of 2½% payable Oct. 15 to holders of records Oct. 1.

Lehigh Valley Coal Sales Co.—Regular quarterly dividend of $1.25 payable Oct. 20 to holders of records Oct. 9.

Nova Scotia Steel & Coal Co., Ltd.—Regular quarterly dividend of 1½% on the common, and 2% on the preferred, both payable Oct. 15 to holders of records Sept. 30.

FINANCIAL DEPARTMENT

The New River Co.

The output of the 15 subsidiaries of this company was 1,755,105 tons with a net loss from operations of $116,578. The New River Co. has an investment of $17,069,182 in stock and loans of its subsidiaries of which $16,585,358 is stock. Also an investment in coal and timber lands held for future development aggregating $2,927,218. In addition the company has invested $1,968,395 in the White Oak Ry. and Piney River & Paint Creek R.R. and $7047 in sundry items, making a total of all investments amounting to $21,971,843.

Treasurer Dowst says:

After the present management took charge of the affairs of the company, it was found that certain accounts were being carried on the books which, in the opinion of the new management, should be charged off. The president was authorized to cause the necessary charges to be made against accumulated earnings or losses as of Mar. 31, 1912. The principal items are as follows:

Plant account has been credited with a total of $444,972, losses in plant value as inventory. Mine development has been credited with $153,267, same being largely on account of Sherwood and Skelton developments; $42,920 has been charged off on merchandise, after taking complete inventory at all of the companies' stores. Accounts receivable have been credited with $107,822, largely made up of accounts receivable standing on the White Oak Coal Co. books which are considered not collectible, also covering losses sustained in adjusting differences between the White Oak Coal Co. and the Coal Supply Co. of Chicago.

A further amount of $108,726 has been charged off on notes on which the collateral has been sold and credited and on which the collectibility of the balance is doubtful. The royalty account is credited with $181,176 of minimum royalties on which the time limit of recovery has expired. Underwriting expense is credited with an amount of $625,000. This represents discount and underwriting of $2,500,000 bonds of the company which were placed in July, 1909, which it is deemed advisable to charge off at this time rather than by installments.

Depreciation is credited with $233,406 in order to make it possible for all plant investment unrecoverable at the termination of the life of the operation to be charged off by a fair annual rate of depreciation during the life of the coal in the ground. No appreciation has been made of coal lands or of coal in the ground on leased lands.

INVESTMENTS IN STOCKS AND LOANS

	a Stock	Loans		b Coal Prop. Mch. 31	
	1911-12	1911-12	1910-11	Acres	Tons unmin.
White Oak Fuel Co.	$3,450,091	$20,704	......	5681	51,010,000
Stuart Colliery Co.	1,891,083	645,440	$572,974	3921	39,530,000
Mabscott Coal & Coke Co.	505,454	d10,128	......	479	3,640,000
Collins Colliery Co.	1,047,156	23,813	......	1036	2,260,000
Cranberry Fuel Co.	2,453,915	73,668	29,905	6255	61,130,000
Price Hill Fuel Co.	1,143,848	20,332	32,637	2767	26,510,000
Macdonald Colliery Co.	884,233	25,888	23,824	862	2,600,000
Great Kanawha Collieries Co.	537,895	55,333	42,105	5161	21,500,000
Beckley Coal & Coke Co.	1,306,441	19,746	13,175	3789	39,380,000
Harvey Coal & Coke Co	905,168	85,804	75,926	1627	5,600,000
Dunn Loop Coal & Coke Co.	616,363	2,872	......	917	2,300,000
Prudence Coal Co. c	c.......	......	......	1036	4,460,000
White Oak Coal Co.	c874,711	d268,793	d 16,182	....	....
New River Fuel Co. c	969,000	d210,858	d 339,245	....	....
Reserve coal and timber—					
Pack's Branch	313,445	......	......	785	7,950,000
Gordon's Lands	134,377	......	......	711	7,000,000
St. Raleigh's Lands	1,085,147	......	......	8514	85,000,00
Mossy Real Estate	239,378	......	......	1100	11,000,000
Price Lease	....	......	......	2194	20,000,000
Mossy Coal & Land Co.	281,261	1,351	......	2896	31,000,000
Dillon Coal & Land Co.	863,735	8,525	8,070	6133	65,000,000
White Oak Railway Co.	1,057,105	291,892	267,708	....	....
Piney River & Paint Creek R.R.	552,672	66,727	62,579	....	....
Total	$21,112,478	$852,319	$773,475	55,864	486,870,000

Total of all investments in 1911-12—$21,964,797.

a Substantially the same in 1911. **b** Omitted by new management in 1911-12 reports. **c** The New River Fuel Co. also owns stock to the amount of $120,091 in the Prudence Coal Co. and $80,900 in the White Oak Coal Co. **d** Debit.

NEW RIVER COMPANY—BALANCE SHEET MARCH 31, 1912

Assets	1912	1911	*Liabilities—*	1912	1911
Invest. in sub. cos.	$19,347,179	$19,347,266	Common stock	$18,249,800	$18,249,800
Properties and rights owned in fee	1,772,346	1,771,824	Preferred stock	11,237,400	11,237,400
Treasury stock	9,275,000	9,275,000	Bonds outstanding	2,500,000	2,500,000
Cash & accts. rec.	5,868	9,370	Notes payable	4,225	17,863
Contingent accts.	97,188	769,512	Accrued interest & taxes	32,339	32,250
Loans to sub. cos.	852,319	773,475	Contingent accts.	97,188	......
Profit and loss	*771,053	90,865	Total	$32,120,952	$32,037,313
Total	$32,120,952	$32,037,313			

* Includes in 1912, bond interest and underwriting.

CONSOLIDATED BALANCE SHEET OF SUB. COMPANIES MCH. 31

Assets—	1912	1911	*Liabilities—*	1912	1911
Plant	*a*$5,810,919	$6,551,039	Capital stock	$5,651,000	$5,651,000
Inter-comp. receivable	1,066,937	893,419	Due New River Co.	1,350,370	1,150,391
Mdse., feed, furn., &c.	424,148	490,508	Inter-comp., payable	1,071,226	886,240
Accounts receivable	575,843	*b*591,785	Accounts payable	371,064	*c*487,994
Notes receivable	126,900	233,730	Notes payable	286,575	287,066
Due from New Riv. Co.	498,051	376,916	Pay-rolls	69,260	67,453
Cash	40,910	178,466	Royalties	91,434	62,137
Coal in transit	88,365	371,705	Profit and loss	....	1,190,476
Equities in roy's paid	....	95,188	Total	$8,890,929	$9,782,757
Profit and loss	258,856	....			
Total	$8,890,929	$9,782,757			

a After deducting reserve for depreciation, $566,017. *b* Includes contingent accounts receivable, $69,730. *c* Includes contingent accounts payable, $173,966.

COMPARATIVE STATEMENT OF PRODUCTION AND EARNINGS OF SUBSIDIARY COMPANIES

	Production		Earnings	
	1911-12	1910-11	1911-12	1910-11
White Oak Fuel Co.	485,964	485,663	*$51,010	*$22,404
Collins Colliery Co.	110,429	133,112	8,763	15,061
Macdonald Colliery Co.	94,938	94,638	5,079	12,545
Cranberry Fuel Co.	179,091	167,908	*40,307	*22,468
Dunn Loop Coal & Coke Co.	177,818	198,212	38,789	55,511
Harvey Coal & Coke Co.	94,871	96,484	*9,766	*15,636
Beckley Coal & Coke Co.	123,548	113,753	*6,134	2,305
Prudence Coal Co.	136,436	138,401	12,146	24,863
Mabscott Coal & Coke Co.	69,636	58,251	6,829	7,591
Price Hill Fuel Co.	39,362	89,536	*16,508	*17,906
Stuart Colliery Co.	163,853	168,099	*48,242	*55,865
Great Kanawha Collieries Co.	79,159	94,080	*15,264	*23,217
White Oak Coal terminals	......	......	3,826	*21,044
White Oak Railway Co.	......	......	*12,675	*4,844
Piney River & Paint Creek R.R.	......	......	7,898	5,830
Total	1,755,105	1,838,137	*$116,578	*$14,868
New River Co., proportion of profit and losses of oper. companies, net loss			$132,697	$46,286
New River Fuel Co., profits for year			27,730	31,970
New River Co., losses for year			90,822	64,572
New River Co., net loss			$195,789	$78,888

There was charged off for depreciation $65,920 in 1911-12, against $66,650 in 1910-11.

* Indicates a loss.

⁂

Colorado Fuel & Iron Co.—The surplus after all charges for the fiscal year to June of this year shows a decrease of $74,036 from that for the same period to June, 1912, but a gain of $476,520 over 1911. The gross earnings for this year increased $47,430, but expenses also showed an increase of $199,450.

The National Bituminous Coal & Coke Co. (Washington, D. C.)—The $1,000,000 6% first mortgage 20-year profit sharing gold bonds of 1911, of this company, were offered during last May by a British corporation. The issue has a certain peculiarity in that besides the fixed rate of 6% per annum, the bond holders are entitled to 25% of the net profits. For the year to June 30, 1912, an extra of 2% was paid, making a total disbursement of 8%.

PRICES OF MINING SUPPLIES

MARKETS IN GENERAL

Apprehension is apparent in many quarters over the unsettlement in Washington, and the currency bill looms up as one of the largest factors causing this unrest. It evidently contains more benefits to the agricultural than to the manufacturing interests, and while manufacturers of the country are evidently able to hold their own as far as the tariff is concerned, it will be a little difficult for them to maintain their position with an unfavorable tariff and, at the same time, a currency less suited to their needs than the present one.

The crop situation shows practically no change from a month ago, but the wheat crop shows slight improvement, and there has been no further deterioration in the corn crop.

Railroads of the country are not expanding, and many of hem have all they can do to meet their current expenses and fixed charges. There are a few conspicuous examples, which through careful management, attending to the business of running a railroad, and conserving their resources, are able o put aside money for improvements, but these are few. It s evident that a change is coming over the railroad world, and the recent election of a student of economics to the board of directors of a leading eastern line shows that is slowly permeating through the railroad field.

The statistics compiled by the Copper Producers' Association were uniformly favorable to the holders of the metal, howing as they did only about two weeks' stock.

Financial conditions continue to improve, but there has been more demand for funds to the crop moving, and t is evident that the vast sums hoarded in the continent of Europe will find their way into loans to the Balkan States. The troubles there are not entirely settled as yet, and fresh outbreaks are not at all unlikely. On the other hand, condiions in the bond market have decidedly improved and bond ealers in New York and other large cities have been able o sell a great many securities which they have been carryng for several years.

Railway equipment is being more fully used and the report for the fortnight ending Sept. 15 showed a decrease in dle equipment of 18,000 cars. It does not look as though here would be any serious shortage later in the year.

LABOR

Conditions in the labor world are fairly satisfactory. Complaints come from contractors doing road work, and other utside construction, that there is a dearth of men, but that is lmost always the case at this season. There are comparaively few strikes, and it is evident that there are not going o be any serious disturbances before spring. The arbitration etween the trainmen and their employers continues, and a reat deal of matter is being brought out which is of little r no pertinent value to the question at hand. The strike f the copper miners in the upper Michigan peninsula is altering, and it is evident that this will be ended some time n the near future. Some New England mills report that it is ifficult to secure enough laborers and the railways have acked men to do maintenance work.

Outside labor commands $2 per day. The latest figures f immigration show that 138,244 immigrant aliens were admitted into the United States during July. This aggregates 38,000 immigrants in the first seven months of the calendar ear.

IRON AND STEEL PRODUCTS

Prices of pig iron have advanced. In most finished lines here has been a decline, and in old material the market ppears to be breaking of its own weight with not enough usiness to seriously affect prices. The favorable factor, the nfilled orders of the Steel Corporation which fell off less than 00,000 tons during August, was well received, but coupled ith this came a most pessimistic statement by the president one of the largest independent concerns, and a knowledge the fact that the bookings during September were by no eans as large as during August. It must be remembered hat in wire products the U. S. Steel Corporation alone booked bout 7000 tons daily, and it is stated on excellent authority hat the incoming bookings of this Corporation during Sepmber will average from 30,000 to 31,000 tons daily, compared ith 33.000 tons daily in August. Shipments are not quite s heavy as during August. Hope is held out that the larger railways will order rails in the near future, and it is expected that the leading trunk lines reaching out from New York will order about the same tonnage as a year ago. This would in itself go a long way toward relieving the situation and bringing other consumers into the market. Especial weakness has been shown in steel sheets, and some exceedingly low prices have been named on these commodities.

Pig Iron—In September some fairly good sales were made, not only for delivery during the fourth quarter of the present year, but well into the first quarter of 1914. Foundries purchased freely and prices advanced from 25c. to 50c. per ton in the more active brands. While there was, at no time, any concerted buying movement, nor has there been any large buying of iron, still consumers, both large and small, made it a point to replenish their stocks and prepare for the future. One reason for this lay in the belief that prices were about as low as they could normally be expected to go with the business of the country at least 80% of the maximum, and another that foundries using pig iron had some fair orders on hand which they felt they should cover. Orders are not large, most consumers preferring to wait and see which way the market is going to move before they make any large commitments. One factor which has been most reassuring in the pig-iron market has been a fairly active demand for cast-iron pipe and some very good orders have been placed in this line within the last fortnight. Steel-making iron has also been in good demand irrespective of the fact that steel is much less active.

As stated, prices are somewhat higher, and for fairly large lots are quoted as follows: Southern Foundry No. 2, Cincinnati, $14.25@14.75; Southern Foundry No. 4, Cincinnati, $13.25@13.50; No. 2 Northern Foundry, Chicago, $15@15.50. Bessemer iron in Pittsburgh is $16.65; this includes the 90c. freight rate from the valley to Pittsburgh. No. 2 Southern Foundry or Birmingham is $11@11.50.

Steel Rails—A few orders for 1000 and 2000 tons have been received from minor lines, but the large railroads of the country have not placed any orders for next year's delivery. It is understood that the Pennsylvania and the New York Central are preparing their schedules, but as yet no announcement has been made relative to these orders. It is evident, however, that they will require about the same quantity of rails as this year, and if they do not order them as early the amount will be about the same. The mills are fairly active at present and will probably continue so for the next two or three months. An indication given was the announcement made that the Pennsylvania was figuring on buying 100 locomotives and had appropriated $1,200,000 for the electrification of a branch leading out of Philadelphia.

Quotations are unchanged at $28 per ton for standard sections of bessemer rails and $30 per ton for openhearth rails, both f.o.b. Pittsburgh. These prices represent a quotation of 1.25c. for 25- to 45-lb. rails; 1.20c. for 16- to 20-lb. rails. In Chicago, 16- to 20-lb. rails are quoted at 1.30c., and 12-lb. rails at 1.33c. Relaying rails in Chicago and other points in the Central West are quoted at $24 per gross ton and in New York at $22.

Track Supplies—Orders coming into the mills are mostly for small lots, and these are few. The spike market has not been as quiet in many months as it now is, and prices are weak, as follows: Large lots, $1.75@1.80 Pittsburgh; small lots, $1.90@1.95. In Chicago spikes are $1.90@2; track bolts with square nuts, $2.25@2.40; angle bars, $1.50.

Structural Steel—Business has been better in the last month. Quite a few new orders have been placed and the outlook for new business is very fair. Fabricators in the Chicago market are reported to have about four months' business on their books, and this includes some work for the Panama Pacific Exposition in San Francisco. A fair amount of bridge work is coming out not only for railroads, but for municipalities and counties. In the East most of the new work is for factory extensions with the exception of a large amount of structural work that will be required for new subways in New York. The fabricated steel for the Panama Canal has been practically finished. The contract for the new Ford factory in Philadelphia was let last month, and a new factory in Detroit will be let in the near future for the same company. An elevator plant in New Jersey let a contract for structural work last week. Fabricating steel is fully as cheap as last month, and structural shapes are slightly easier, 1.45c. being obtainable in Pittsburgh. In Chicago 1.63c. is quoted. These prices are per pound in large lots.

Pipe—The market is not as active as last month, and for the smaller sizes of pipe there has been quite a falling off in demand. For line pipe, business is just as active as it has been any time this year, and indications are that the oil-producing companies will buy as much pipe in the next six months as they have in the last for their business is exceptionally active. From present indications it would not be at all surprising if there were another downward revision in the price of pipe, especially for the smaller sizes. At present quotations show no change and the discounts from net prices are repeated from last month as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded..........	80%	71½%
2½- to 6-in. steel lap welded..........	78%	69½%
7- to 12-in. steel lap welded..........	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

Diameter	Cents		Diameter	Cents	
	Black	Galvanized		Black	Galvanized
¾-in.........	2.30	3.26	5-in.........	30.50	45.00
1-in.........	3.40	4.83	6-in.........	42.25	58.25
1¼-in.......	4.60	6.60	7-in.........	59.50	85.00
1½-in.......	5.50	7.90	8-in.........	62.50	89.00
2½-in.......	12.90	17.80	10-in.......	$1.03	$1.46
3-in.........	16.80	23.30	11-in.......	1.13	1.64
4-in.........	23.00	33.20	12-in.......	1.27	1.82

Sheets—Business has been reported as low at 2.05c. Pittsburgh for large lots. This must have been a special transaction, if it was done at all, for some sales to consumers who ordinarily secure about as good a price as any, have been made at 2.10c. for No. 28 black. The sheet markt is exceedingly quiet, operations are at a low figure and mills are probably not running more than 50% of capacity. In addition to the new producing capacity that has sprung up in the last year, there is considerable apprehension that foreign producers may be able to sell sheets in this market, particularly on the seaboard, at close competition with the mills in the Pittsburgh district. The price for large lots is, as stated, $1 per ton lower than last month, quoted at 2.15c. f.o.b. Pittsburgh for No. 28 black.

SMALL LOTS IN CENTS PER POUND

	Pittsburgh, Penn.		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24.............	2.65	3.45	2.60	3.40
Nos. 25 and 26.............	2.70	3.60	2.65	3.55
No. 27	2.75	3.85	2.70	3.80
No. 28	2.80	3.90	2.75	3.85

WIRE PRODUCTS

Wire—Activity in the wire trade fell off considerably during September, but this was to be expected after the enormous business transacted in August. Quotations of wire products have been steady, and there has been little or no cutting, although some rumors were current that nails had been cut. Wire-nail makers have enough business on their books to keep them actively engaged for the remainder of the year. Quotations are unchanged as follows: Annealed fence wire in large lots, $1.50; galvanized barbed wire, $2.15; annealed barbed wire, $1.75. These quotations are per 100 lb. f.o.b. Pittsburgh. In Chicago plain wire is $1.73; painted barbed wire, $1.93, and galvanized, $2.33. These quotations are also for large lots.

Copper Wire—Business has not been especially active, but the recent announcement that the Pennsylvania would electrify a portion of its line, and the very favorable report given to the development of electrical properties by a prominent financier in New York, leads to the belief that wire will be in good demand for some time to come. Prices have not been shaded, although copper can be had at slightly less figures than a month ago. Wire sold on a basis of 17½@18c. per lb.

Telegraph Wire—For lots of fair size measured in Birmingham wire gage, prices in cents per pound are as follows: Extra best, Nos. 6 to 9, 4⅜c.; Nos. 10 and 11, 4½c.; No .12, 4⅝c.; No. 14, 5⅛c.; "Best Best" Nos. 6 to 9, 3½c.; Nos. 10 and 11, 3⅜c.; No. 12, 3½c.; No. 14, 4c. Actual freight is allowed from Trenton, N. J., where it does not exceed 25c. per 100 lb.

METALS

Copper—The heavy buying by consumers in both Europe and the United States carried the price of electrolytic copper well up to 17c. and a few sales were made at that figure. At around 16¾c., however, a very large business was transacted and consumers supplied their needs not only for the present, but for some time in the future. All of the favorable news being out, the copper market lagged and prices toward the end of the month declined and sales were made at 16.62½c. New York for electrolytic. One favorable feature from the consumers' standpoint was the apparent breaking down of the strike in the Lake Superior region, and the probability that by the end of the year the output from this district would return to normal. The statistical position of copper is very strong, and with a continuation of business at the present rate it is likely that prices will remain steady or possibly advance to slightly higher levels.

Tin—As a result of exceedingly heavy shipments from Europe to the United States, prices of tin declined and sales were made at 42c. The shipments from Europe to the United States during September amounted to more than 4000 tons.

Solder—Strictly half-and-half solder is about ½c. per pound cheaper and quoted at 25½@26½c. per lb.

HARDWARE

Nails—There are some reports that nails have been sold at exceedingly low figures in Central Ohio, and when traced to the source this was found to be true. It represented a special case where a mill made an unusual quotation in order to offset an unfavorable freight rate. Wire nails are held at $1.75 Pittsburgh and $2.05 New York in kegs of 100 lb. and large lots to consumers, but for small lots from jobber's store $1.95 is quoted in Pittsburgh and $2.15 at New York.

Iron and Steel—Stocks at jobbers' warehouses are better assorted than last month, but the demand continues heavy. Prices are without change from warehouse in Pittsburgh and other distributing centers, as follows:

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square......................	2.10c.
1½ to 4 in. x ⅜ to 1 in..............................	2.10c.
1½ to 4 in. x ¼ in. to 5/16 in........................	2.30c.
Norway bars	3.60c.
Soft steel:	
¾ to 3 in., round and square........................	2.05c.
1 to 6 in. x ⅜ to 1 in................................	2.05c.
1 to 6 in. x ¼ and 5/16 in............................	2.20c.
Rods—⅝ and 11/16 in..................................	2.15c.
Bands—1½ to 6 3/16 in. to No. 8......................	2.35c.
Beams and channels—3 to 15 in......................	2.15c.

MISCELLANEOUS

Portland Cement—Manufacturers of cement have experienced just as active a demand throughout last month as any time this year, and already talk is current that there may be somewhat higher prices in force next year. Several reasons are given for this, principally the enormous demand for cement for roads and an excellent demand for cement for ordinary uses. There will probably be as much cement used in New York State in 1914 as in 1912 or the present year, irrespective of the fact that the barge-canal work is practically completed and very little work is to be done on the Ashokan aqueduct. Prices are absolutely without change as follows:

Boston, $1.32; not including package.
Pittsburgh, $1.18; not including package.
Chicago, $1.25 f.o.b. not including package.
Cleveland, $1.36 f.o.b. not including package.
Detroit, $1.34 f.o.b. not including package.
Minneapolis, $1.45 f.o.b. not including package.
Pittsburgh, $1.28 f.o.b. not including package.
St. Paul, $1.45 f.o.b. not including package.

Paint—The price of linseed oil is slightly lower at 52@53c. per gal. in 5-bbl. lots. Spirits of turpentine is higher at 42c. per gal. in New York. White lead in oil is steady at the higher figures quoted last month: 8c. per lb. in 100-, 200- and 500-lb. kegs.

Bars, Concrete Reinforcing—Business is fair, but lower quotations have been made, and those given below represent a decline of $1 per ton compared with last month.

PITTSBURGH, CENTS PER POUND

	Warehouse Stock
¾-in.	1.69@2.00
⅝-in.	1.95@2.05
½-in.	2.00@2.10
⅜-in.	2.15@2.25

Brattice Cloth—The market is just as firm as it was a month ago, and the outlook is that brattice cloth may advance to even higher levels. Stocks are fair, but consumers are only buying sparingly.

Roofing Paper—There is a fair demand, and prices are steady and without change. The largest size sheeting which is sold in rolls of 500 sq.ft. is quoted as follows: 20-lb. per roll, 28c.; 30-lb. per roll, 43c.; 40 lb. per roll, 58c. Rubber roofing, which is sold in rolls of 108 sq.ft., is as follows: 1 ply, 35 lb., $1.90; 2 ply, 45 lb., $1.10 3 ply, 55 lb., $1.30.

Tin Plate—The demand for tin plate continues large, the Standard Oil Co. being one of the largest consumers at this time. The reported sale is of 40,000 boxes, but this has not been confirmed. In Pittsburgh, 100-lb. coke plates are quoted at $3.60 per box, and 100-lb. terne plates are $3.45 per box. These quotations are per box of 112 sheets in large lots.

CURRENT COAL LITERATURE

We will furnish copy of any article (if in print) in the iginal language for the price quoted. Where no price is oted, the cost is unknown. Inasmuch as the papers must ordered from the publishers, there will be some delay for reign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

How to Reduce Falls from Roof and Sides. (Abstract of per read by D. J. Griffiths before the Rocky Mt. Inst., June 1913.) Coal Age, July 12, 1913; 1½ pp. 10c.

Nonfatal Injuries in Bituminous Mines. F. L. Hoffman. al Age, Aug. 9, 1913; 3¾ pp., 6 tables. 10c.

Prevention of Accidents in Coal Mines. (Abstract of paper ad by John McNeil before the Rocky Mt. Inst., June 12, 13.) Coal Age, 2½ pp. 10c.

BLASTING, EXPLOSIVES

Advances in Permissible Explosives. (Translated from it. f. d. Gesamte Schliess-u. Sprengstoffwesen, etc.) Coll. igr., September, 1913; ¾ p. 40c.

Belgian Shot-Firing Experiments. (Translated from Ann. s Mines de Belgique, Vol. XVIII, 1913.) Coll. Guard., Aug. 1913; 2⅓ pp., illus. 40c.

External Stemming with Incombustible Dust. (Transed from Ann. des Mines de Belgique.) V. Watteyne and Lemaire. Iron Coal Tr. Rev., Aug. 15, 1913; 1½ pp., illus.

BORING AND TUNNELING

A Combined Coal Cutter, Puncher and Drill. F. C. Perns. Coal & Coke Op., July 31, 1913; 2½ pp., illus. 20c.

Exploring Coal Measures with the Diamond Core Drill. M. McKee. Mine & Quarry, August, 1913; 4¾ pp., illus.

Hand-Hammer Drills in Shaft Sinking. Coal Age, Aug. 16, 13; 1½ pp., illus. 10c.

Modern Mining Pneumatic Drills. F. C. Perkins. Coal Coke Op., Sept. 4, 1913; 1¼ pp., illus. 20c.

COAL DUST

Coal Dust Collecting Plant at Burslem. Iron Coal Tr. v., July 25, 1913; ½ p., illus. 40c.

Coal Mining in the United States, with Special Refer-ce to the Treatment of Coal Dust and Haulage by Electric comotives. (Abstract of paper by Samuel Dean presented fore the N. E. I. M. M. E., Aug. 2, 1913.) Coll. Guard., g. 8, 1913; 1 p. 40c.

Electricity and Dust. (Abstract of address of Sir Thos. ver to section of Industrial Hygiene at Paris Congress.) ll. Guard., July 18, 1913; 1¼ pp., illus. 40c.

First Series of Coal-Dust Explosion Tests in the Eximental Mine. Geo. S. Rice, L. M. Jones, J. K. Clement d W. L. Egy. Bureau of Mines, Bull. 56; 106 pp., illus.

Prevention of Coal-Dust Explosions. Coll. Engr., August, 3; ¾ p., illus. 40c.

The French Coal Dust Experiments. Coll. Guard., July 1913; 1 p. 40c.

COKE

Coke Crushing and Screening Plant. F. W. Hetzel. Coal e, June 7, 1913; 2½ pp., illus. 10c.

Machinery for Beehive Coke Ovens. E. C. Ricks. Coal e, June 7, 1913; 1¼ pp., illus. 10c.

The Pros and Cons of Mechanical Quenching and Loading. Thau, Gas World, July 5, 1913; 1¾ pp. 40c.

Types of Coke Oven Plants as Seen in Operation—III. king installation at "B" Winning Colliery Co., Ltd., Derbyre. Gas Wld., June 7, 1913; 4¼ pp., illus. 40c.

Waste in Coking. G. E. Mitchell. Coll. Engr., Septem-, 1913; 2¾ pp., illus. 40c.

Woodall-Duckham Retorts in Buda Pesth. Gas Wld., g. 30, 1913; 2 pp. 40c.

DRAINAGE, PUMPING, ETC.

Lining the Flush Pipe. Coal Age, July 19, 1913; 1¼ pp., is. 10c.

Pumping Coal Through Pipes. Iron Coal Tr. Rev., July 18, 1913; ⅓ p. 40c.

Sulzer Bore-Hole Centrifugal Pumps. Iron Coal Tr. Rev., Aug. 29, 1913; 1½ pp., illus. 40c.

ELECTRICITY

A Hydro-Electric Plant to Supply Coal Mines. Coal Age, July 5, 1913; 5¾ pp., illus. 10c.

A New Star-Delta Starter. Iron Coal Tr. Rev., July 18, 1913; ⅓ p., illus. 40c.

Electrically Driven Compressed Air Plant. Coll. Engr., September, 1913; 1 p., illus. 40c.

EXPLOSIONS

The Automatic Distribution of Stone Dust. Coll. Guard., Aug. 1, 1913; ¼ p., illus. 40c.

Recent Experience on the Ignition of Firedamp by Electric Lamp Filaments. Dr. Jean Meunier. Iron Coal Tr. Rev., July 4, 1913; 1¼ pp., illus. 40c.

The Brookside Mine Disaster. Wm. Z. Price. Coll. Engr., September, 1913; 2¾ pp., illus. 40c.

The Explosions at the East Brookside Mine. Coal Age, Aug. 9, 1913; ½ p. 10c.

FUEL TESTING

How the Government Determines the Calorific Value of Coal. Isolated Plant, August, 1913; 3½ pp. 20c.

GENERAL

A New World Power in Coal. Description of dock and equipment of the Clinchfield Coal Corp., also methods of mining. Black Diamond, Aug. 2, 1913; 11 pp., illus. 20c.

Askern Colliery. (With supplement plate.) Iron Coal Tr. Rev., July 18, 1913; 3 pp., illus. 40c.

Carrying the Meridian Underground. W. H. Roberts, Jr. Coll. Engr., September, 1913; ¾ p., illus. 40c.

Chemistry Applied to Coal Mining. Dr. John Harger. Jl. Soc. Chem. Indus., May 15, 1913; 2 pp.

Classification of Coals. J. M. Gordon. Can. Min. Jl., Aug. 15, 1913; 4 pp. 25c.

Coal Mines Under the Sea. Coll. Engr., August, 1913; 1 p. 40c.

Germany's Coal Reserves. (Translated from Glückauf.) H. E. Boker. Coll. Guard., Aug. 22, 1913; 1½ pp., illus. 40c.

New Pits of the Warwickshire Coal Company, Limited. Iron Coal Tr. Rev., 1¾ pp., illus. 40c.

The Development of the State Collieries in Westphalia. Iron Coal Tr. Rev., July 25, 1913; ⅓ p. 40c.

The Conservation of Mineral Resources. Jas. Douglas. Min. & Eng., Wld., Aug. 2, 1913; 2½ pp. 20c.

The Industrial Importance of Coal. (Abstract of paper by F. W. Saward read before the joint annual convention of the M. O. I. Coal Assn. and the Kokoal June 17-19.) Coal Age, Aug. 16, 1913; 2 pp. 10c.

Schenck Type of Automatic Weighing Machine, with Auxiliary Sliding Weight. (Die selbsttätige Brückenwage mit Hilfslaufgewicht, Bauart Schenck.) E. Blau. "Oesterr. Z. Berg- Hüttenwes," Jan. 18, 1913, 4 pp.; ill. 40c.

Contribution to Knowledge of the Southern Bohemian Lignites Occurrence. (Beitrag zur Kenntnis des südböhmischen Braunkohlenvorkommens.) O. Novak. "Oesterr. Z. Berg- Hüttenwes," Jan. 25, 1913, 2 pp. 40c.

Results of Social Compulsory Insurance in the Ruhr Mining District. (Die Leistungen des Ruhrbergbaues auf dem Gebiete der sozialen Zwangversicherung). E. Jüngst. "Glückauf," Feb. 15, 22, Mar. 1, 1913, 22 pp., 4 charts. $1.20.

GEOLOGY

Irregularities Met with in Coal Seams. Ernest Watts. Min. Eng., September, 1913; 1¾ pp., illus. 40c.

The Coal Beds of Belgium. (Les Gisements Houillers de la Belgique.) Armand Renier. Ann. des Mines de Belgique, Vol. XVIII, No. 3; 60 pp., illus

The Coal Fields of India. (Abstracted from Vol. XLI of Memoirs of Geol. Survey of India; revised and largely rewritten by R. R. Simpson, Insp. of Mines.) Iron Coal Tr. Rev., July 25, 1913; 1⅓ pp., illus. 40c.

The Yentna District, Alaska. Contains references to the coal beds of that region, with map. U. S. Geol. Sur., Bull. 534; 63 pp., illus.

Tertiary Coal Fields of the Rio Grande. B. L. Miller. Coal Age, Aug. 23, 1913; 3½ pp., illus. 10c.

The McAlester Coal Field in Oklahoma. Geo. M. Brown. Coal Age, Aug. 2, 1913; 3 pp., illus. 10c.

The Coal Fields of Western Canada. Arthur Lakes. Coll. Engr., August, 1913; 3 pp., illus. 40c.

HOISTING AND HAULAGE

Critical Study of Approaching Shaft Guides. These guides are placed as safety cage dogs. (Etude Critique des Guides Rapprochés.) Noël Dessard. Ann. des Mines de Belgique, Vol. XVIII, No. 3, 1913; 23 pp., illus.

Factors of Safety in Vulcanized Bitumen Mine Cables. C. J. Beaver. Iron Coal Tr. Rev., July 18, 1913; ½ p., illus. 40c.

Four-Decked Cage at St. Michael. Coll. Engr., August, 1913; 5¼ pp., illus. 40c.

Four-Claw Detaching Hook and Automatic Lowering Arrangement. Coll. Guard., Aug. 29, 1913; ⅓ p., illus. 40c.

Hoisting at a Chinese Coal Mine. Min. & Sci. Press, July 26, 1913; 1 p., illus. 20c.

The Karlik-Nahlik Barrier for Haulage Inclines. (Oest. Zeit. f. B.- u. H.) Coll. Guard., Aug. 29, 1913; ⅓ p., illus. 40c.

The Bennett Duplex Vertical Overwinding Controller. Coll. Guard., Aug. 29, 1913; 1 p., illus. 40c.

The Use of Steel Ties in Mining. (Paper read by J. C. Evans at meeting of W. Va. Coal Mg. Inst. June 25, 1913.) Coal Age, July 5, 1913; 2¼ pp., illus. 10c.

The "Perfex" Winding Engine Controller. Iron Coal Tr. Rev., July 18, 1913; 1 p., illus. 40c.

Wire Ropes Applied to Mining. Sci. & Art Min., July 19, 1913; 1 p., illus. 40c.

Winding Engine at Celynen Colliery, South Wales. Iron Coal Tr. Rev., July 18, 1913; ¾ p., illus. 40c.

LIGHTING

Acetylene Lamps in Coal Mines. Coll. Engr., August, 1913; 2 pp. 40c.

Selection of Portable Electric Mine Lamps. (Article read by H. H. Clark before Coal Mg. Inst. of Amer., June 16, 1913.) Coal Age, July 12, 1913; 1 p., illus. 10c.

The Use and Care of Miners' Safety Lamps. J. W. Paul. Bureau of Mines, Miners' Circular 12; 12¼ pp., illus.

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Abstract of Current Decisions on Mines and Mining. J. W. Thompson. Bureau of Mines, Bull. 61; 69 pp.

Are Contracts to Abandon Coal Trade Valid? A. L. H. Street. Coal Age, Aug. 30, 1913; 1¼ pp. 10c.

Legal Liability Concerning Docks. A. L. H. Street. Coal Dealer, June, 1913; 1 p. 20c.

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Valuation of Coal Land. H. M. Chance. Bull. A. I. M. E., July, 1913; 26 pp., 3 tables.

MINE GASES, TESTING

An Instrument for Measuring the Flow of Air or Gas. Coal Age, July 5, 1913; 1¼ pp., illus. 10c.

Empson's Apparatus for Analyzing Mine Air. (Paper by W. Kyle, read before recent meeting of Natl. Assn. of Coll. Mgrs.) Min. Eng., August, 1913; 1 p., illus. 40c.

Firedamp Detectors. (Translated from Glückauf.) Coll. Guard., July 25, 1913; ½ p. 40c.

Testing for Carbon Monoxide. Coll. Engr., August, 1913; 1¼ pp. 40c.

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Ash and Coal-Handling Equipments. H. J. Edsall. Coal Age, July 12 and 19, 1913; 7 pp., illus. 20c.

Description of Coal and Ashes Handling Equipment Installed for the Sioux City Co., Sioux, Ia. H. Harrison. Isolated Plant, August, 1913; 3¼ pp., illus. 20c.

New Screening Plant at Whitwood Colliery. Iron Coal Tr. Rev., July 25, 1913; 2 pp., illus. 40c.

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An Emergency Cage. Coal Age, July 26, 1913; ½ p., illus. 10c.

Schaefer Method of Resuscitation. Coll. Engr., Augus 1913; 1½ pp., illus. 40c.

Two Safety Devices. J. E. Jones. Coal Age, July 26, 191 2 pp., illus. 10c.

The Stewart "Broken Back" Splint. W. B. Lloyd. Co Engr., August, 1913; ¾ p., illus. 40c.

SANITATION DISEASES

Sanitation in Mines and Mine Towns. (Reprint of pape by W. H. Moulton; prepared for the Minnesota meeting Lake Superior Mg. Inst., Aug. 26, 1913.) Eng. & Mg. Jl., Au 26, 1913; 1¼ pp. 25c.

Sanitation in Mining Towns. (Abstract of address by H. White before senior sanitary engineers. Univ. of Pitts burgh, May 20, 1913.) Coal Age, July 12, 1913; 2¾ pp illus. 10c.

Welfare Work Among Miners. (Paper read by Ira Shaw before the W. Va. Coal Mg. Inst., June 25, 1913 Coal Age, July 5, 1913; 2½ pp. 10c.

SHAFTS, SHAFT SINKING

Notes on the Sinking of l'Héribus Shafts in Levant Flénu at Cuesmes, Belgium. (Note sur le Foncage Nouveau Puits de l'Heribus.) M. Guérin. Ann. des Mines de Belgiq Vol. XVIII, No. 3, 1913; 27 pp., illus.

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Shaft Signaling Devices Operated from the Moving Cag (Translated from Ann. des Mines de Belgique.) J. Kerste Coll. Guard., Aug. 22, 1913; 2¼ pp., illus. 40c.

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TIMBERING, PACKING, ETC.

A New System of Pit Propping. Coll. Guard., June 27, 191 ¾ p., illus. 40c.

Reinforced Concrete in Mines. S. M. Dixon. Trans. I. E., Vol. XLV, Part 3; 14 pp., illus.

Use of Concrete at Collieries. (Paper read by J. Gregor at meeting of No. Staffs. Inst. of Min. & Mech. Engrs. Iron Coal Tr. Rev., Aug. 29, 1913; 1⅓ pp. 40c.

VENTILATION

A Self-Registering Water Gauge. Coll. Guard., Aug. 1913; ½ p., illus. 40c.

Notes on the Effect of Temperature in Mines in Gre Britain. Prof. John Cadman. Trans. I. M. E., Vol. XL Part 3; 10 pp., 3 tables.

The Water-Gauge. Coll. Guard., July 25, 1913; ⅓ p., illu 40c.

The Ochwadt Self-Registering Water-Gauge. Trans. M. E., Vol. XLV, Part 3; 2 pp., illus.

Ventilating Mines and Removing Gas. Dr. J. J. Rutledg Coll. Engr., September, 1913; 5¾ pp. 40c.

WORKING OF MINERALS

A Coal Cutter with Saw and Auger Movement. (Articl entitled "Hess Dustless Mining Machine," read by R. Taylor at meeting of W. Va. Coal Mg. Inst. June 25, 1913. Coal Age, July 5, 1913; 2½ pp., illus. 10c.

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Proposed Method of Longwall Mining. F. C. Cornet. Co Age, July 26, 1913; 3 pp., illus. 10c.

Universal Coal-Stripping Machine for Surface Minin Coal & Coke Op., July 24, 1913; ¾ p., illus. 20c.

Working an Inclined Coal Bed. G. W. Evans. Coll. Engr August, 1913; 4 pp., illus. 40c.

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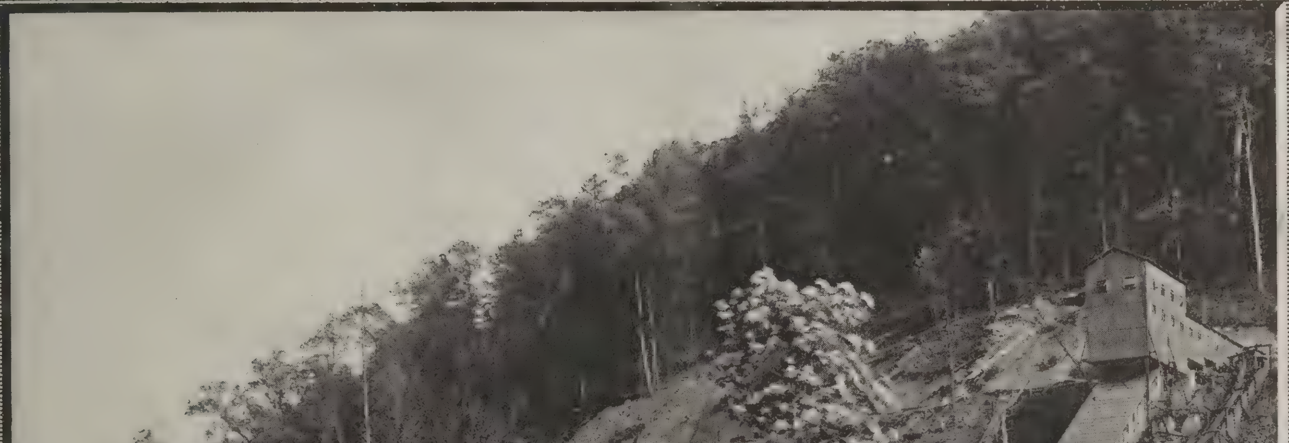

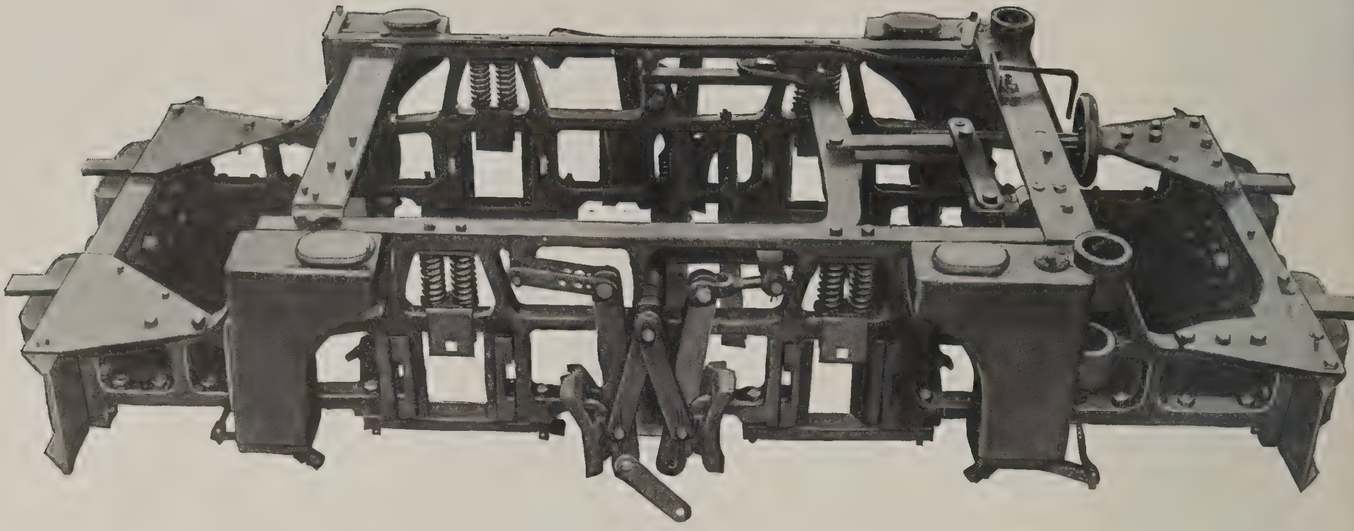

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The Weekly Ad-Talk Page

Old prejudices cling. Like the barnacles on the ship's bottom, they impede progress but don't stop it.

There are folks in the world who believe that automobiles are the invention of the devil—there are horses, old enough to know better, who insist on climbing the fence every time one passes them.

Years ago, when business was done that way, some graybeards accepted things as they were and set up a principle of law which they called "CAVEAT EMPTOR." Put into plain English it means, "Let the buyer beware."

We don't know whether that still holds as a principle in law or not—it doesn't make any difference.

Nowadays, the *seller* has learned that if he tries to do business on that basis his next appeal to the law will be in bankruptcy proceedings.

Yet there are many people who still believe that the seller's first object is to "do" the buyer if he can and that advertising is the advance messenger heralding the coming swindle.

"Truth," says Dr. Charles W. Eliot, "is the new virtue."

Advertising is largely responsible for the place this "new virtue" holds in trade. Instead of doing business in the dark, we get into the light of publicity.

Instead of playing a hold-up game in a dark alley when the moon goes behind a cloud, we come out on the brightest street and plant our wares where all may see.

There is no more potent selling argument for a good article than the truth about it.

There is no more disastrous experiment than juggling with the truth in an advertisement.

There is nothing so expensive as advertising goods that can't make good.

There is nothing better on earth that a manufacturer can have than a customer satisfied that the article lives up to the claims made for it—unless it be a few hundred more of the same customers.

That is why it pays to advertise good goods by telling the truth about them—and likewise why it doesn't pay to advertise poor goods in any way.

The purpose of advertising is to sell things, but in the process it must inform, interest, inspire and educate; it must knit buyer and seller in closer relationship, discover human wants and fill them, promote mutual confidence and spread the truth.

"Caveat Emptor?" Not when the seller prints his claims in plain language, circulates them broadcast, guarantees them—in short, not when he advertises.

COAL AGE

Vol. 4 NEW YORK, OCTOBER 11, 1913 No. 15

There has been a noticeable change in the qualifications of salesmen sent out by various manufacturers. The days of the "four flusher" are numbered and in his stead we find men who are eminently capable of discussing their products from any angle.

As a "mixer" and human visiting card the "four flusher" was almost hypnotic, but, somehow, when arguments and counter arguments were required, he sometimes lost control and his subject's mind would dwell on such proverbs as: "A fool's mouth is his destruction."

The coal industry, along with the other industries, has much to gain by the transformation. We have noted three instances, lately, which demonstrate the efficiency of the new type of salesmanship.

1. A coal mine which produced a low-volatile coal, suddenly found its accessible market territory nearly doubled by a reduction in freight rates. Trial orders were received from a number of possible customers, and everything looked good. But the trial orders failed to result in contracts. Other salesmen were employed, and still the business did not progress beyond the trial-order stage. It was left for a sales engineer to unravel the mystery. All of the prospective customers were accustomed to a high-volatile coal, naturally they did not know that low-volatile coal had different characteristics. This sales engineer made a few trips on locomotives of the railroad whose business was most desirable, and experimented with the nozzles until they were properly adjusted for this particular fuel. After that, the coal sold itself.

2. A coal mine which produced a medium grade of lump coal was unable to show a profit on its operations, because of the fact that too large a percentage had to be screened out and sold as slack. The slack ran very high in ash, and no profitable market could be found for it. A man who had had a wide experience with all kinds of coal was called into consultation. He suggested that a cement works employing the wet process could use the slack coal to advantage. A few cars were sent to a nearby cement plant. Within two weeks a contract was closed for all of the slack, at a satisfactory price.

3. Another mine, producing medium-grade lump coal, had trouble in disposing of its slack at a satisfactory price, notwithstanding the fact that its slack was thoroughly washed. A little experimenting by a coal expert developed the fact that the nut coal contained in the slack gave excellent results as a furnace coal. Following this discovery, preparation was made to screen out the nut from the balance of the washed slack, and this nut coal was extensively advertised. To make a long story short, the nut soon brought in more than the entire slack output had previously sold for, and two-thirds of the slack was still available for sale, at no reduction in price.

Don't think that these three illustrations exhaust the list.

Selling coal often resolves itself, simply, into finding out what the coal is most suitable for, and just so often the success of a coal mine is dependent on a sales engineer.

Safety Provisions of Victor-American Fuel Co.

By F. W. Whiteside*

SYNOPSIS—Describes the many precautions that are taken to prevent accidents from explosions, shot-firing, etc. The main object is to impress the thought of danger on a man's mind, so as to eliminate carelessness from his daily work. Several unique devices are employed in the furtherance of mine safety.

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With the sincere desire of safe-guarding the mine employees in and about its properties, the Victor-American Fuel Co., of Denver, has been making a careful study of the many sources from which accidents originate, keeping ever in mind the more primitive causes which are so often overlooked or forgotten.

A Landing at Gray Creek, Where Experimental Mine Is Located

Some of the Top Workings at Hastings, Where Instruction Car Is Kept

A great deal has appeared in technical and trade magazines relative to protecting the workman from revolving gears, swiftly moving belts and pulleys, electric wires carrying high voltage, and many of the other mechanical appliances where danger lurks. There is also an education necessary to the workman, to teach him to protect his person against himself, his own personal carelessness, thoughtlessness and the inclination to take unnecessary risks.

Never a day passes in a large city but that someone is maimed or killed. The cause may be an automobile, a street car, a motorcycle or a railroad train. The blame is usually first placed upon the vehicle rather than the victim, yet we know, in the great majority of cases, that the accident was due to the injured individual's carelessness or absent-mindedness rather than to the cause usually assigned. The great majority of people need to learn the simple lesson "Always be careful," "Do not take a chance" and "Safety first." Familiarity is said to breed contempt. It is undoubtedly true that it cultivates carelessness. One who is constantly following a hazardous occupation gradually forgets his own danger and that of his fellows, and becoming over-confident, takes unnecessary risks until he is caught.

A Plan to Overcome Carelessness

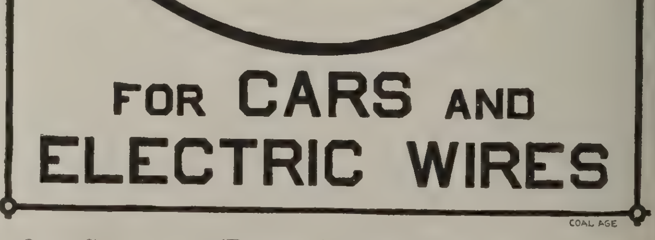
With the view of correcting the tendency toward this growing carelessness, the company has had a pamphlet printed in six different languages, on the subject "Suggestions as to How to Avoid Accidents to Our Employees." This has been freely distributed to the miners, drivers, trackmen, timbermen, trappers and general utility men about the mines. In it, each can find words of caution and advice as to how to safeguard himself and his fellow workmen.

Following the text in each language is a cut of the company's standard danger signal, the word "Danger" in white letters on a dark background, surrounded by the while line of an ellipse. The idea is to create so strong a mental impression upon the man's mind that whenever he sees the sign he will not pass it heedlessly by, but will instantly come to the full realization of its meaning and govern himself accordingly. This sign, as well as others with appropriate wording, are displayed about the mines where there is need of signal, caution or warning. The standard adopted was drawn up by the Engineering Department upon tracing linen from which blueprints are made upon cloth. This is then varnished on both front and back and mounted upon a board.

In the larger mines of the company as the men enter the mine and travel a sufficient distance for their eyes to become accustomed to the darkness, they are confronted by a flash-light sign with the words "Always be careful" in five different languages. The effect upon the mind is very marked. The surrounding darkness accentuates the vivid white letters which repeatedly flash before the eye.

Handling Powder

To further insure his safety, the miner carries his permissible powder in a fiber box holding eight sticks.



One Style of "Danger" Sign Used by Victor-American Company

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*Chief engineer, Victor-American Fuel Co., Denver, Colo.

Flash-Light Sign Placed along Entries

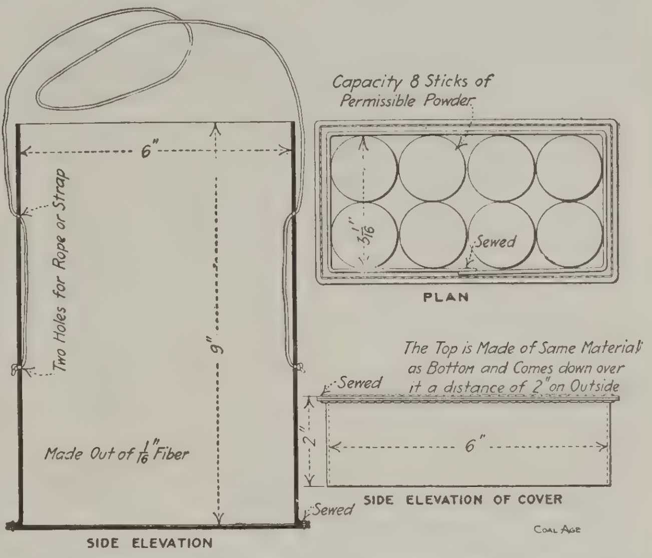
This is hung from his shoulder by a rope or strap. The box is light in weight, and has an air- and moisture-tight cover. Aside from its convenient size and shape, it fixes the maximum amount of explosive that a man will carry into the mine.

The shot-firer carries his firing caps in a fiber box which contains a cork receptacle in which are drilled 72 holes, in each of which is placed a cap, which is thus protected from jar and contact with any metal substance.

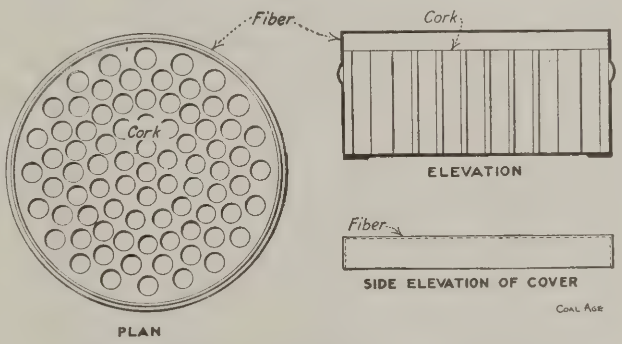
The shot-firer is furnished with a blank form (shown below) on which he makes out his report daily, this he signs and turns in to the Superintendent. On the back of this report the following complete list of instructions are printed. There may be no deviation from these rules except by written consent of the Superintendent:

INSTRUCTIONS TO SHOTFIRERS

1. Holes in coal must not be charged if they are drilled into the solid, or drilled deeper than the undermining.
2. Use only a wooden tamping bar with no metal parts.
3. See that all holes are thoroughly cleaned out and are free from coal dust before charging.


Capacity 8 Sticks of Permissible Powder
6"
Two Holes for Rope or Strap
9"
1 3/16"
Sewed
PLAN
The Top is Made of Same Material as Bottom and Comes down over it a distance of 2" on Outside
Sewed
2"
6"
Made Out of 1/16" Fiber
Sewed
SIDE ELEVATION OF COVER
SIDE ELEVATION
Coal Age

The Miner Carries His Powder in This Box



Shot-Firer's Box for Carrying Caps

4. The charge limit is 1½ lb. of permissible powder per shot.
5. Do not fire any shots on main haulageroads unless you have written authority from the superintendent, and unless the roof, floor and sides are drenched with water, or covered with adobe dust or stone dust, and are free from coal dust for a distance of 100 ft. on each side of the shot.
6. Avoid shooting through a narrow web of coal into an adjoining place.
7. Tamp all holes firmly to the mouth with damp adobe.
8. Fence off every place in which there is a missed shot.
9. Do not smoke when handling explosives or detonators and do not handle them near an open light.

THE VICTOR-AMERICAN FUEL COMPANY

..................Mine, ... 191...

Shot-firer's Daily Report

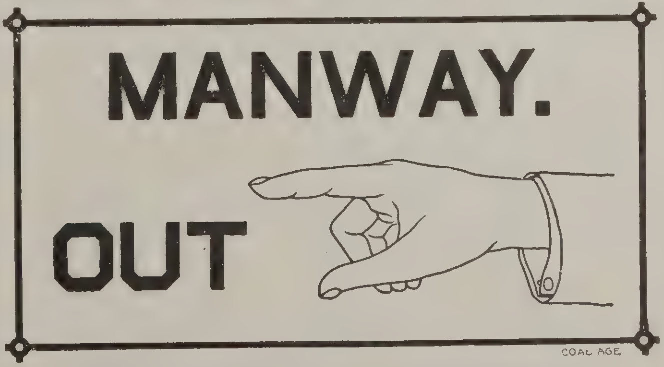
District of mine....................

Time first shot fired?........ Time last shot fired?........
Number shots examined?..........Number tamped?..........
Number fired?.............................
Number of shots condemned, reason why, and where located?
....
....
Did you fire any shots on main haulageroads back from the face? ....
Number of missed shots, where located.....................
....
....
Number of blown-out shots, where located, and cause of blow-out. ....
....
Did you use a wooden tamping bar for tamping all charges?
....
Did you find anyone in the mine during the time you were firing shots? ....
....
Did you find any miners with detonators in their possession?
....
Did you examine all the places again, with the aid of a safety lamp, after you had fired the shots, and leave your initials in chalk on the face where the coal had been shot down?.......
....
Did you fence off all missed shots?.........................
Is your safety lamp clean, and in good condition?...........
Did you find any gas in the working places?.................
State the correct time you left the entrance to the mine?.....
....
State here any further remarks you wish to make...........
....Shotfirer

GENERAL SCHEDULE OF HOISTING SIGNALS

1....Bell....Hoist....If at rest
1.... " ....Stop.....If in motion
2....Bells...Lower
3.... " ....Man....Trip
Engineer will give return signal by raising cage one foot, setting it back slowly. Men will then get on cage and cager will give engineer one bell to hoist.
4....Bells...Hoist....Slowly
5.... " ...Lower....Slowly
6.... " ...Rock
7.... " ...Accident move cage
By 'phone orders only.

ALWAYS BE CAREFUL



Type of Sign Placed at All Manways

10. Do not try to force a primer into a hole of insufficient size.

11. Use great care in carrying and handling blasting caps.

12. Examine during your inspections after firing for gas or fire, using a locked safety lamp. You are warned that powder smoke may contain dangerous gases.

13. Do not charge or fire any holes in a place where you find an explosive mixture of gas.

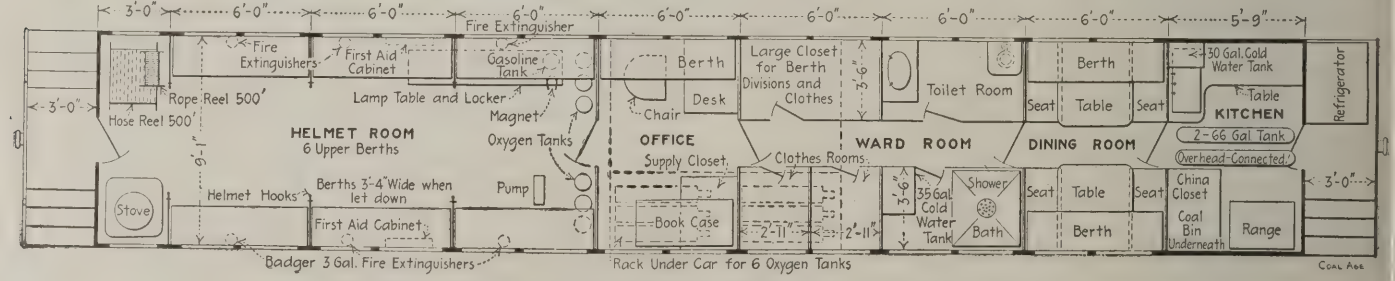
14. Missed shots must not be drilled out, but a new hole drilled and fired; the new hole to be at least 18 in. away from the missed hole and pointed in a direction from it. After relieving holes are fired, the shotfirer is instructed to endeavor to recover the unexploded caps and powder, or satisfy himself that the cap in the missed shot has been exploded from the concussion of the relieving shot, and report the result in either event after question relating to missed shots.

15. Do not commence firing before time appointed by superintendent.

16. Fill in the daily report accurately and completely.

Fan Shaft Operates Flashlight

At the larger and more important of the company's mines flashlights are operated by the revolving shaft of the ventilating fan, so that so long as the fan is working the lights continue to flash. They are placed in the power station and upon some prominent parting and on one or more of the main haulage ways in the mine. The superintendent, foreman or inspector, by timing the number of flashes, is enabled to determine the fan speed and satisfy himself that the machine is revolving at its normal rate. Should he find that the light is shining steadily or has ceased to show, he knows that the fan has stopped and he is prepared to act accordingly.



Plan of the Victor-American Fuel Co.'s Instruction Car

While this device may appear to be an unnecessary refinement, yet where the fan is located in an isolated place, far from the power house and the main beaten track, it has proved to be of much value, for without some signal of this nature, it might be stationary for a considerable time before the fact was discovered.

Much has been written concerning First-Aid Work in and about the mines, so that little need be said here.

The fully equipped instruction car of the company is stationed at Hastings, in charge of a regular foreman. Every Saturday four men from other mines come to Hastings to receive helmet and mine-rescue instruction. Located near the car is an abndoned mine, the main entry of which is so full of carbon dioxide and other noxious gases that a safety lamp is usually extinguished within 25 ft. of the mouth. Here in this deadly atmosphere the helmet men receive a part of their training.

The Victor-American electric-mine lamp was devised by some of the company employees at Hastings and has been brought to a high state of perfection. The lamp has extremely high illuminating power, is light, convenient and safe.

Expect to Test Adobe Dust in Experimental Mine

At Gray Creek, work is now in progress fitting up an old abandoned mine as an experiment station where the efficacy of rock and adobe dust, wet zones and air humidifying as an antedote for dust explosions will each be given a thorough trial.

The Victor company has great faith in adobe dust and has devised a spraying machine for spreading it over the timbers, walls and floors of the mines. It has hundreds of adobe dust shelves in the different workings so that great interest will naturally center in these experiments.

This Abandoned Fan-Engine House Was Converted into an Emergency Hospital

The new Colorado Coal Mining Law, which recently went into effect, prescribes very definitely the manner in which the men shall be checked into and out of the mines. It covers practically all of the main points necessary to safeguard the life of the miner. The operators have been gradually getting their properties in condition to comply with the law, so that it is safe to assume that never in the history of coal mining in Colorado were the mines better protected with safety provisions than today.

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University Extension

One of the hopeful signs of the times is the attempt of the universities to make their work universally available. H. B. Meller, dean of the school of mines, University of Pittsburgh, is sending out a staff of 35 instructors to the mines of Western Pennsylvania, and it is hoped that 5000 miners will receive training. The dangers of underground work will be explained to those attending the schools, and miners will be prepared for the state examinations, which are held semiannually for the positions of fireboss and mine foreman.

Dean Meller's plans have already received a preliminary test as they were first put in operation in January and proved sufficiently successful to warrant doubling the number of classes and instructors in the new field. State College has a similar scheme under consideration.

Coal Shipping on the Great Lakes

SYNOPSIS—A description of the docking facilities at Chicago, which is one of the more important coal-receiving ports. Also some comments on the personnel of the trade and a look into the future. This is the concluding article on Coal Shipping on the Great Lakes.

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THE LAKE BUSINESS AT CHICAGO*

With splendid dock facilities, an immense demand for fuel and a well defined policy for improvements in its harbor and river facilities, Chicago stands among the important ports on the Great Lakes so far as the transportation of coal by vessels is concerned.

LOADING AT THE B. & O. DOCK NO. 2 AT LORAIN, OHIO

FREIGHTER "HENRY S. HILL" CLEARING FROM THE Y. & O. DOCK AT ERIE, PENN.

There is an average of six large boats bringing coal to this city daily. Records show that the volume of this tonnage has been increasing steadily for many years and the receipts for the current year are estimated at 7 million tons. The record from the opening of navigation, Apr. 10, to Aug. 1 was 2,500,000 tons of anthracite coal and four months remain before the season for navigation is closed. Receipts of bituminous coal by boat are negligible, nearly all of that fuel coming in by rail.

There are many large coal docks here with storage capacities running as high as 200,000 tons. G. G. Schenck operates two, one on the north branch of the Chicago River at Division St. and the other on the south branch at Thirty-fifth St. The latter is equipped with two Mead hoists, has an unloading capacity of 250 tons per hour and a storage capacity of 100,000 tons. The depth of water at the dock is 18 ft. 6 in. and the largest boats plying the river can be handled.

The Division St. dock is a replica of the one at Thirty-fifth St. so far as hoisting facilities are concerned. At Division St. a storage capacity of 55,000 tons is provided and the maximum length of boats which can be handled is 500 ft. At Chester St. on the north branch of the river the City Fuel Co. has a dock with an unloading capacity of 240 tons per hour of soft coal and 300 tons of hard coal; the storage capacity is 45,000 tons and vessels 325 ft. long can be handled.

Three docks are owned by the Lehigh Valley Coal Co. The largest is located at One Hundredth St., in South Chicago, and has a storage capacity of 100,000 tons. The unloading capacity for small boats is 300 tons per hour and for large boats 400 tons per hour. There is 20 ft. of water at the dock and boats 480 ft. long can be accommodated. The Chicago Ave. dock of this company has three hoists and an unloading capacity of 2000 tons per day. Its Clybourn Ave. dock is equipped with four Brownhoists and has an unloading capacity of 2000 tons per day. There is storage room at this dock for 35,000 tons of coal and the maximum length of boats which can be handled is 408 feet.

E. L. Hedstrom & Co. operate two docks. The North Ave. dock has two Mead hoists and the unloading capacity is 2000 tons daily; there is storage room for 30,000 tons of coal. The depth of water at this dock is 18 ft. 6 in. and 440 ft. is the maximum length for boats.

At the Ninety-fifth St. dock of the company there is a storage capacity for 60,000 tons of coal. Three thousand tons can be unloaded daily and there is room for boats 525 ft. in length. The dock with the largest storage capacity is owned by the Byproducts Coke Corporation. It is located at 112th St. and has storage room for 200,000 tons of coal. Facilities have been provided for unloading 500 tons per hour. Any coal-carrying vessel not longer than 600 ft. can be handled.

Other docks in Chicago used for handling coal are owned by the Philadelphia & Reading Coal & Iron Co., O. S. Richardson & Co., Pittsburgh Coal Co., Dreske & Minners, Eureka Coal Co. and O. F. Scheunemann & Company.

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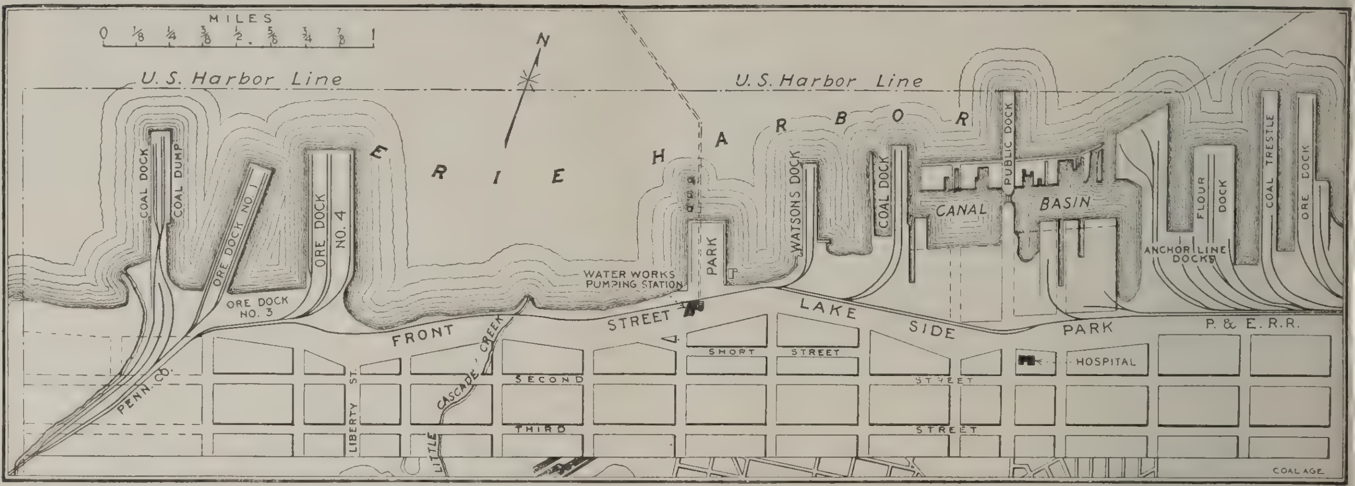
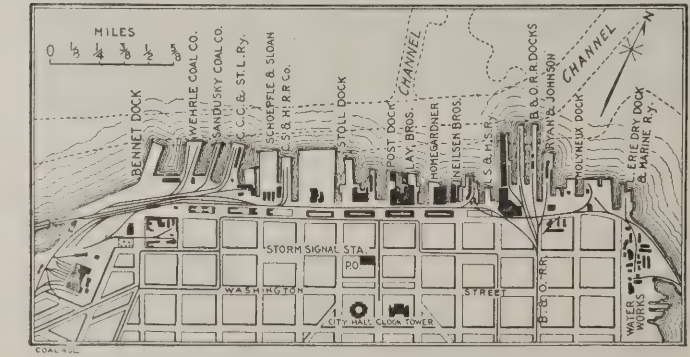
*By Herbert Waters.

The Personnel of the Lake Trade*

Distinctiveness as coal merchants and shippers is due rather to the members of the anthracite trade of the lower lakes than to those in bituminous, for the latter are more closely identified with mining and the iron-ore trade. The anthracite mines are farther from the lakes as a rule than the bituminous. It is not easy to mention a heavy shipper of bituminous on the lower lakes who is not also in some other and allied business. At the same time the personalities are much more apparent in the receiving territory of the upper lakes, in which case both anthracite and bituminous are generally handled by the same concern. On the lower lakes the two are usually separate, although there are one or two notable exceptions.



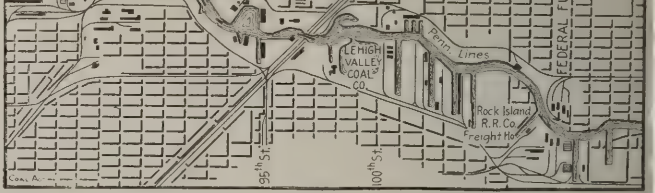
Map of Erie Harbor at Erie, Penn., One of the Largest Bituminous Loading Ports on the Lakes



Map of Sandusky Harbor, Ohio

Without going back to the pioneer days of the trade, when all concerns as a rule were on a small scale, the name of A. B. Meeker, of Chicago, will always be remembered as a powerful factor, both as an organizer and a producer of business. He was connected in Buffalo through E. L. Hedstrom, who located there about 1864, and was also prominent in the trade while he lived. The name of Jervis Langdon is also among the older shippers of anthracite from Buffalo. At one time at the Buffalo office of J. Langdon & Co., C. M. Underhill and J. J. McWilliams were employed, the latter long known later on as the Buffalo representative of the Delaware, Lackawanna & Western interests, the heaviest anthracite shippers on the lakes. Mr. Underhill is still living, having been prominent in the trade all his life. Among others of that trade are H. M. Benjamin, of Milwaukee, and O. S. Richardson, of Chicago. Out of the Benjami office also came men who are still in the trade as managers of later companies such as the Milwaukee-Western Fuel Co. For a long time Robert Law was a leading member of the coal trade in Chicago, handling large amounts of coal received by lake. With him ranked S. C. Schenck, of Toledo, and later on also in Chicago.

At other lake ports large coal shipping and receiving interests have grown up. At Sheboygan, on Lake Michigan, the activity and good business talent of Conrad Reiss long ago laid the foundation of the C. Reiss Coal Co., which is now a large family concern, with receiving docks in several upper-lake ports. At Erie, Penn., the leading name in the trade was that of W. L. Scott & Co., which company shipped both anthracite and bituminous as does its successor, the Susquehanna Coal Company.



Map of Docking Facilities at South Chicago

A Look into the Future

It may be possible that the younger members of the lake coal trade of today have as many problems to solve as did their predecessors, but in that older day most of the difficulties were of a formative nature requiring business talent of a high order and there is no doubt that these men possessed it. The great problems of their day had to do with the establishing and extension of trade in new territory and the adaptation of new routes and appliances to the needs of such a trade. There was more mpetition from other fuels then than now, but the mpetition, especially in bituminous coal, is now chiefly thin the trade itself.

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*By John W. Chamberlin, 90 Johnson Park, Buffalo, N. Y.

The present leaders of the lake trade have to deal with e shipping and handling facilities offered. They have sisted in transforming the 600-ton lake schooner into e 10,000-ton steamer and the old horse-and-bucket isting device into the fast car dump and the clam-shell loader. The change has been so well made that, like e size of the freight car and the length of the freight ain, mechanical genius appears to have found its limit.

The natural question is "What next?" Pioneer work all done. The merely mechanical aids to cheapness d facility are about at the limit, yet the tendency is advance, if not by the old lines then by the new ones. common with most branches of the distributing indusies the problem of cheap selling has in no wise kept pace with the decrease in handling and distributing costs. What the consumer pays is often very much more than the aggregate first price and the cost of transportation. Here is still a wide field for the trade to improve upon.

"FINIS"

As to the future of the lake coal trade not much needs to be said. There have been no great changes in late years and if all-rail competition has reached its limit, as seems to be the case, the natural growth of demand from increased population will accrue to the lake trade. Competition from gasoline, electricity and water power direct is mostly a matter for conjecture. The general idea is that coal will more than hold its own for a long time yet. The lake cities and towns are developing very fast and they must have fuel and power. The rail competition does not control the lake coal carriers as it does the package-freight vessels, so that competition between the two is open and free, with coal shippers always in the market for the lowest possible rates.

It would seem that the coal trade of the lakes has a long and prosperous future and if the enlarged Welland Canal adds Lake Ontario to the list of inland seas this unrivaled water route of 1000 miles will add very materially to its available scope and territory.

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Don'ts for Those Using Detonators

The E. I. du Pont de Nemours Powder Co. publishes the following instructions for those using blasting caps:

There are about 600 accidents every year caused by children and others playing with or investigating the contents of electric and other blasting caps. In nearly every instance these accidents result in loss of the sight, one or more fingers, or perhaps hands, rendering the unfortunate victim a cripple for life and a charge on his relatives or the community. As long as miners, quarrymen and blasters carry blasting caps, electric or other, loose in their pockets or leave them in unguarded places, children will find them and will almost invariably be badly hurt.

Blasting caps should never be carried loose in the clothing and no more than the number required at the time should be taken from the storehouse. They should always be kept under lock and key and in a place where unauthorized persons and children can, by no possibility get at them. This is a matter which should have the serious consideration of every person who has to do with the use of these articles.

(1) Don't forget the nature of blasting caps, but remember that with proper care they can be handled with comparative safety.

(2) Don't smoke while you are handling blasting caps, and always keep them away from lights.

(3) Don't shoot into blasting caps, whether electric or other, with a rifle or pistol.

(4) Don't handle or store blasting caps in or near a residence.

(5) Don't allow blasting caps to be stored where children or irresponsible persons can get at them. Keep them under lock and key.

(6) Don't store or transport blasting caps of any kind with high explosives.

(7) Don't keep blasting caps, electric or other, in a damp place.

(8) Don't carry them in your pocket.

(9) Don't tap or otherwise investigate them.

(10) Don't try to pull the wires from an electric blasting cap. The wires should not be jerked or roughly handled.

(11) Don't attempt to take blasting caps from the box by inserting a wire nail or other sharp instrument.

(12) Don't allow priming (the placing of a blasting cap in dynamite) to be done in a thawing house.

(13) Don't fasten the blasting cap to the fuse with the teeth or with a knife. Use a cap crimper made for that special purpose.

(14) Don't handle electric blasting caps during the immediate approach or progress of a thunder storm.

(15) Don't attempt to use electric blasting caps with the regular insulation for very wet work. For that purpose, use waterproof fuses.

(16) Don't use old broken leading or connecting wire for electric blasting caps. A new supply will not cost much and will pay for itself many times over.

Experimental Explosion at Bruceton Mine

SYNOPSIS—Details of the explosion and conclusions reached by Messrs. Rice and Jones. They believe the cars were blown into the mine by detonation and not by unbalanced atmospheric pressure resulting from a vacuum formed at the face after the explosion.

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G. S. Rice and L. M. Jones have made public a report on the experimental explosion at Bruceton, Sept. 23, 1913, known to the Bureau of Mines as experiment No. 46. The following minor supplementary facts are culled from this report:

Coal Dust—In all 2200 lb. of coal dust were placed inby of the Garforth and Taffanel barriers and 800 lb. were distributed outside these so as to extend the explosion should they fail to do their work.

This loading of coal dust gives a layer of ¼ to ¾ of an inch on the 3-in. width of each of the ten shelves along the sides of the entries. Some dust was spilled on the floor in distributing it and wherever a puddle of water was encountered, a small amount of coal dust was spread over it. The cross-section of the entries measures approximately 60 sq.ft.; 2 lb. per foot of entry would, therefore, be equivalent to 0.523 oz. per cubic foot of space. This is 4.3 times the theoretical amount which for complete combustion will exhaust the oxygen present.

The Taffanel and Garforth Barriers—The average depth of the stone dust in the Taffanel barrier was 9 in. and its total weight on the shelves was about 1.8 tons. The under sides of the shelf boards were 5 ft. 6 in. from the bottom and the height of the entry averaged about 6 ft. 10 in., the shelves and dust occupying 10 in. The ratio of the cross-section occupied by the barrier shelves to total cross-section of the entry was 10/82 or 12.2 per cent. The stone-dust zone in the air course was 300 ft. long, from A 1050 to A 750, and the stone dust was placed on the side shelves and partly on the ribs, the loading being 4½ lb. per linear foot of entry.

Character of Coal and Stone Dust Used—The coal dust was prepared by grinding the coal mined from the face of the air course. As will be remembered the coal worked at the experimental mine is part of the Pittsburgh bed. An average analysis and screen test give the following results:

Analysis		Fineness	
Moisture	2.43	100 %	through 80 mesh
Volatile matter	35.10	99.1%	through 100 mesh
Fixed carbon	54.49	94.2%	through 150 mesh
Ash	7.90	88 %	through 200 mesh
	99.92		
Sulphur	1.18		

The stone dust used was prepared by grinding the draw slate which occurs above the Pittsburgh seam in a hammer crusher equipped with a very fine screen. A screen test gave the following results: 50.5 per cent. through 80 mesh; 41.5 per cent. through 100 mesh; 38 per cent. through 150 mesh; 35.5 per cent. through 200 mesh.

The dust contains about 7.98 per cent. of combustible matter.

Air Current—A sample of mine air taken at the face of the main entry before firing the igniting shot showed normal mine air with no methane present.

The humidity of the air current increased from 82 per cent. at a point in the main entry 200 ft. from the portal to 97 per cent. at the last crosscut.

General Humidity Conditions—The sides and roof of the mine were damp and sticky to the touch and in some places on the main entry from 150 to 300 ft. from the face the roof was wet. The floor for the most part was damp and well packed. The surface had been swept and the floor cleaned so that practically the only coal dust likely to have taken part in the explosion was that artificially distributed and this the analysis indicates was quite dry.

Obstructions—The cars were placed in the main entry for the purpose of obstructing the passage of the explosion, thus increasing the resulting pressures; the one in the cut-through was used to prevent, as far as possible, the dissipation of pressure near the origin which might occur due to the increased space at this point.

Appearance of Explosion at Openings—A small puff of smoke first appeared at the main opening and a muffled report, which was probably the sound of the igniting shot. Immediately afterward a tremendous cloud of smoke and dust shot out of the main opening accompanied by a loud report. Some of the $\frac{3}{16}$-in. steel plates covering the top of the concrete relief section were thrown high in the air, one of them about 20 ft. above its original position. Pieces of boards and shelves were scattered in front of the opening, on the slate dump and in a field on the opposite side of the valley from the mine. Two 8x8-in. posts were found, one 250 ft. and the other 350 ft. from the opening.

Length of Flame—All points in the main entry are measured from the main portal and the distances are marked with a capital E preceding the figure. All points in the airway immediately opposed to points in the main entry are marked with a capital A and the figures denoting their distance along the airway are identical with those of corresponding points in the main entry. This preliminary statement will help in interpreting what follows.

The evidence concerning the length of flame was somewhat complicated. Gun cotton is used to get supplementary information as to length of the flame, but the chief reliance is placed on the lead foil of the circuit breakers in the main entry. However, in this heading the gun cotton on the station plate at E 250, as well as the tin-foil flame circuit breaker, was gone but those on the wires at E 275 and on station plate E 350 were not burned while those at E 325 and E 372 were only partially consumed. The stone dust, therefore, did not at once completely blanket the flame, but permitted a tongue of flame to extend some distance beyond. It is improbable that the coal dust outby the barrier influenced the explosion.

Rescue Corps of Bureau of Mines at Mouth of Experimental Mine

In the air course the flame extended out to about A-700. On this side also there were a number of gun-cotton tufts only partially consumed; although the flame probably extended beyond the stone-dust zone, yet it is improbable that any of the coal-dust outby that point took part in the explosion, or the flame would have extended to a point much farther out.

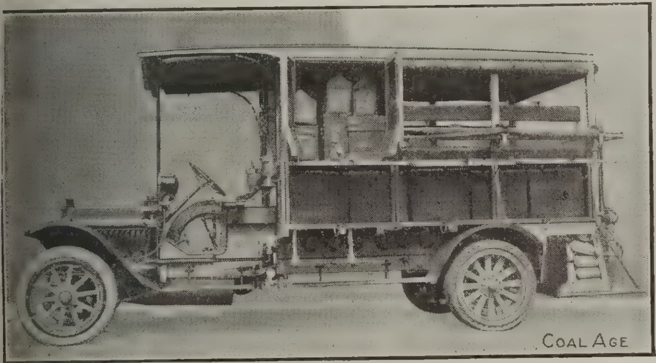
Damage Within Mine—An 8x8-in. post from E 232 was found at E 75. Pieces of the Taffanel barrier from E 500 to E 440 were found along the floor from E 180 to the opening. The posts found in the field across the ravine probably were blown from rib grooves at E 425 and E 460 indicating travel of over 700 ft. A post found across the track at E 310 was probably blown from the rib at E 495. A post against the east rib at E 410 was thought to have been blown from the rib at E 525. A post at E 425 near the east rib was identified as having been blown from E 550. A post at E 570 was originally at E 588. The reinforced-concrete stopping in the crosscut at E 650 has a small crack for a foot above the door. Two cracks, $\frac{1}{16}$ in. wide, extending from top to bottom of the stopping in line with the sides of a doorway through the stopping appear on the air-course side. There are also minor parallel cracks. A post from the line brattice at E 775 was found at E 745. The loaded car originally at E 925, with sprag set, was moved to E 954. It was still on the track. The loaded car which had been at E 1000 had jumped the track 3 or 4 ft. inby and was caught against the rib, at E 1045. About 8 in. of topping had been blown off. A shelving post against the west rib at E 1092 was identified as having been in a groove at E 950. The loaded car which had been at E 1075 was lifted from the track not far from its original position and thrown inby. Near E 1105 it made a scar in the roof 11 ft. long and several gouges in the floor, breaking a tie at E 1107. The car broke numerous side shelves and finally landed diagonally across the entry at E 1222 with all dirt out of the car and with sideboards and closed end badly broken.

he track at E 1222 was moved 3 in. to the east by the car edging between the rib and rails.

A shelving post originally set at E 1090 was found against he east rib at E 1132. The boards in front of the cut-hrough cannon had been broken up and scattered. Four hort 8x8-in. blocks from this bench were blown to the face f the entry; the other was found in the air course at A 1240. he car placed in the cut-through was blown against the ir-course rib opposite the crosscut and part of the load pilled out. It knocked out the lead rail and scarred the ransfer rail of the crosscut switch. The cross bar of the urtain frame on the air course at A 875 between the butt ntries was blown outby to A 500, 375 ft. of travel.

Coked Dust—Very little coked dust was observed after the xplosion. Some was seen on the outby side of the ost at E 639 on the east side of the heading. A small atch of coked dust was noted on the outby side of a nut on shelving bolt at E 700, on the west side of the entry. Coked ust deposit was found on the outby side of a post at E 755 on he west side of the entry. Coke globules were found on the ntry side of the crosscut stopping at 850. Coke globules, $\frac{1}{16}$ in. nd less in diameter, were found on the floor from E 855 to 1000. A coked dust deposit was found on the outby side of post near the top at E 1072 on the east side. Coked dust eposit was found on the outby side of a post at A 1118, on the west side of the entry; also on outby side of post at A 1090, n the east side.

Coal Dust—Practically all the coal dust was swept off the helves by the explosion. The only exception was in the air course from 1250 to 1050, where about one-third remained in position. There was considerably more dust on the floor in the inner portion of the mine than in the outer and it seems probable that much of this remained on the shelves when the explosion passed, but was swept off by later pressure waves passing inby.



THE RESCUE AUTOMOBILE, SHOWING MANNER OF LOADING

Conclusions—This test confirmed previous experiments: (1) That it is possible to get a violent explosion in a mine where the surfaces are damp, if there is an ample supply of dry coal dust present. (2) That as a secondary defense, the Taffanel barrier is of great advantage. It is fully recognized that an explosion, such as this, would suffocate all the men in the section of the mine in which it occurred and hence means to prevent an explosion originating are most important; but if by any mishap an explosion should take place in one section of the mine, it would be desirable to have the other sections of other splits defended by such barriers, in order to prevent the explosion from passing from one section to other sections. (3) That a zone treated with sufficient rock dust will prevent the passage of an ordinary explosion, which is also illustrative of the impossibility of starting an explosion in a well treated zone.

There was one feature of more than passing interest in this explosion, confirming other explosion experiments at the mine, namely, the development of the explosion center; its passage past the cars, and its increase in intensity, whereby it was enabled to throw the cars back toward the origin of the explosion. The latter effect cannot be considered the result of a wind filling the vacuum at the face following an explosion, for while this would be able to throw light articles it could hardly have hurled heavily laden cars through the air.

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The gas engine operated by producer gas furnishes an efficient means for conserving fuels by making available for power generation such low grade fuels as peat, lignite, low grade coals, waste gases and even cornstalks; in fact, almost any low grade combustibles or wastes may be used to furnish the gas.

The Situation in Colorado

SPECIAL CORRESPONDENCE

The strike situation in the southern Colorado field has not materially changed since last week. There have been some clashes between strikers and mine guards, the most notable being that at Oakdale, near Walsenburg.

These have been stigmatized by union leaders as "frame-ups" on the part of operators and guards in order to mold public sentiment. This assertion is hardly logical. Men are not given to firing such formidable cartridges as the 25-35, 30-30, and those of similar type and power at each other, even at distances of 500 yd., merely for the purpose of producing a psychological impression upon the public.

Although the net changes in the situation have, as stated above, been small, the condition is nevertheless assuming a portentous aspect. More than once the governor has been requested to call out the state troops, and although this request has come from civil officers, it has been persistently denied. Both parties to the strike seem as determined as ever to fight until the end.

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To Make Shotfiring Less Dangerous

BY CHARLTON DIXON*

The flame-producing explosives, now largely used in mines, should be and, in my opinion, will be, at no distant day, replaced by a comparatively safe means of blasting. The science of chemistry is yet in its infancy, and things that seemed impossible, a few years ago, are now commonplace. If the scientists and specialists of the great Carnegie, Rockefeller and other Institutes were requested to specialize on the matter of providing a safe explosive for the coal mines, and were encouraged in the work by the guarantee of a substantial reward, there is little doubt, but that a satisfactory substitute for black blasting powder would be found in a short time. I would like to see this matter brought prominently to their attention. It is certainly as important, if not more so, than the annihilation of the hookworm, which has received so much attention recently.

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Colliery Construction in Yorkshire, England

Arrangements are being made, according to the *Daily Consular and Trade Reports,* for sinking a new colliery at Darton, near Barnsley, Yorkshire. An area of 2300 acres has been acquired. It is expected to reach a 4-ft. bed of coal at a depth of 260 yd. The new colliery will have two shafts 14 ft. in diameter, with steel headgear of the latest design, and arrangements to facilitate handling coal.

A screening and washing plant will be erected 80 yd. from the shaft. Steam power will be used for winding purposes, but electricity will be employed for driving the fan and other surface plant, and lighting. The loaded cars will gravitate from the screens to the railroad. Coal will be carried from the shaft to the screens by creepers. The colliery, when completed, is expected to employ 1500 men.

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*Pittsburgh, Penn.

Shotfiring and Watering Systems in Utah Mines

By John E. Ambrose*

SYNOPSIS—A good description of electric shotfiring, as conducted in the mines of the Utah Fuel Company. Division of the work of mining the coal, drilling, charging and firing the holes, and inspecting the system. The spraying system in use. Effect of humidity in reducing the dust danger in mines.

⁂

During a recent inspection of the Utah Fuel Co.'s coal operations at Winter Quarters, Clear Creek, Castle Gate, Willow Creek and Sunnyside, I had the pleasure of seeing one of the most complete shotfiring and watering systems that has ever come under my observation, during my experience of 30 years in coal mining. These mines are all under the direct supervision of W. B. Williams, the general superintendent of the company. Mr. Williams is an able and practical mining man to whom a great deal of credit is due for the system he has installed at all the mines under his supervision. The system may be described as follows:

The Work of the Miners

Each miner takes his required allowance of explosives or black powder into the mines in the morning. This amount, not to exceed 5 lb., is kept in a wooden box made for the purpose. He then proceeds to undercut the coal to a depth of 4½ or 5½ ft. Holes are then drilled to a depth 6 in. less than the depth of the mining. When undercutting the coal, the strict rules of the company compel the putting in of sprags, for the better protection of the miner while doing the work. All minings are loaded out as the cutting progresses.

The Work of the Inspectors

About 12 o'clock, noon, the local inspectors of the various districts, proceed to the mine, taking with them the detonators (electric exploders) and make inspection of all cuts made in the coal. These cuts are measured; also, the depth of each hole, which must clear the rib by at least 12 in. The resistance against each shot is carefully considered by the inspector, who then proceeds to charge the hole, after first seeing that it has been previously cleaned out thoroughly by the miner. These holes are tamped with damp surface clay, to the mouth of the hole, with a wooden tamping stick.

The miners are not allowed to go near the shots after the holes are loaded. The inspector proceeds thus to the end of his district. All drill holes must have a sufficient clearance in the hole to allow the charge to be pressed home, without friction or jamming, thus overcoming the danger of prematurely exploding the charge.

The Work of the Shotfirers

During the afternoon, the shotfirers proceed to the separate districts allotted to them. Each man unlocks the box containing the switch for his entry, and sees that it has not been tampered with. He leaves the switch thrown out and again locks the box. It may be remarked here that this does not interfere with the haulage motors, as they are on a separate line. He then proceeds to the face of the entries and connects up the shots; from here he goes from room to room, till the work of connecting up the shots is completed. The method of connecting the shots is illustrated in the accompanying figure.

The miners are now all out of the mine and the shotfirers return to the entry where the main switches are still thrown out. The company has a system of checking off the men as they enter and leave the mine. The checkboard is kept in a case made for the purpose, at the fan house and in charge of the fan man, whose duty it is to check off each miner as he comes out of the mine. When all the miners are out of the mine, and the proper time has arrived, as previously arranged by the shotfirers, the fan man throws out the main switch and gives a series of signals to the shotfirers, who are at their respective places on the main entry, waiting for the signal. They then throw in the main-entry switches, and retire to the bottom of the shaft, where they meet previous to going out of the mine. The fan man now informs them that all the miners are out of the mine, according to the checking up of the board and they return to the surface.

Firing the Shots

The fan is then slowed down, and after a few minutes have elapsed, to allow the air current to come to a partial state of rest, the main switch on the surface is thrown in, which fires all the shots simultaneously. After the lapse of half an hour or so, the shotfirers again enter the mine and, going to their respective districts, throw out the main-entry switches, at the different places on the main cross-entries. Having done this, they lock all boxes and the firing is complete.

Inspection and Repair Work

During the forenoon, wiremen go into the mine and examine the different districts, putting up and repairing the wires blown down by the shots the night previous. The inspectors locate all blownout and missed shots, if there are any, and make a report of them in a report book kept on the outside for the purpose. These missed shots will occur with the best and most experienced men. If, however, the inspectors would carry a testing machine with them, for testing the electric exploders, they would overcome some of the difficulty. At the same time, many misfire shots are caused during the act of loading the holes; as, in tamping, the insulation is liable to be rubbed off the wires, which causes a contact and short-circuits the current.

The Spraying or Watering System

The system of watering the mine is as follows: A pipe line is laid along the main entry and sections run up each cross-entry, from which branch-line connections are made to each separate room. Sprinklers are employed, who have a certain section to sprinkle during the day, till a certain time before the time of firing the shots. The mines are kept saturated with water, the spraying being done not in the haphazard way seen in some mines today, but the system is kept up continually. at all working faces as they advance, and the ribs, pillars and all roadways are well watered, not once a week, but every day; and not sparingly, but plentifully.

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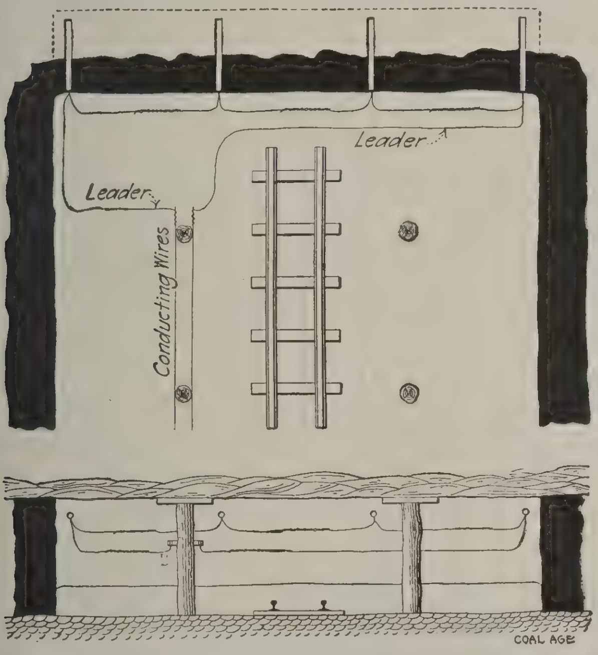
*Mining Engineer, New Durham, N. J.

THE IGNITION OF AN INFLAMMABLE ATMOSPHERE

It was stated before the Coal Mining Institute of America (June, 1908), that coal dust cannot be made wet in a usual sense. The method of fine spraying is productive of the best results; but even then, it is questionable, as the most careful system of watering is merely an "ounce of prevention" and it is an open question whether it is not positively detrimental.

These statements are fallacies, in my opinion. Mr. Ashworth referring to this matter, pointed out (*Transactions I.M.E.* Vol. XXXIII, 193) that no form of water except steam could saturate an air current sufficiently to place a barrier in front of a gas or dust explosion. But if the dust is properly saturated and made wet, there will be no floating dust and there will result only a local explosion of gas.



SHOWING METHOD OF CONNECTING SHOTS TO BE FIRED BY ELECTRICITY

Mr. Ashworth further deduced from the hygrometrical observations taken at Wingate Grange, that air saturated with moisture was no protection against the extension of an explosion, claiming on the other hand that it assisted in the oxidation process; and stated, in addition, that the explosion (Wingate Grange) was reported to have passed over two wet places of considerable length. Now, it seems clear to me that if the so called wet places referred to, had been extended to the outside, along each haulage road, the force of the explosion would have been spent in its passage out, having nothing to feed upon. I think that if these places are kept saturated constantly, like the system installed at the above named operations, there can then be no dust, and these explosions, if there are any, must be local. At the above operations the exhaust steam from the fans is turned into the intake airways, directly after the shots are fired, and anyone coming out of the mines then can feel the effect of it for some distance before reaching the outside as the steam moistens the air for thousands of feet in the workings of the mine.

Again, J. B. Atkinson, late H. M. Inspector of mines, in his report on the circumstances attending the explosion that occurred at the Washington Glebe Colliery, Durham, Feb. 20, 1908, comments on the general interpretation of the Coal Mines Regulation Act, and the explosives in Coal Mines Order, and states that a claim of exemption from watering cannot be supported.

CONCERNING PERMITTED EXPLOSIVES

It may be said, however, that shotfirers look upon permitted explosives in this light; and do not take the precaution they would take if using black powder. Mr. Atkinson further states, "I do not altogether share the view held by some of my colleagues, that the decline in explosions, in recent years, is principally due to the employment of permitted explosives. I think it is more probably due to the increased knowledge of the causes of explosions, generally. Safety should be sought outside the shothole, and the use of permissible explosives should only be looked upon as an additional safeguard."

I am of the same opinion myself and believe the above are practical facts, considering the risks that some classes of shotfirers assume in doing their work in a careless, daredevil sort-of-way. As Mr. Atkinson states, exemption from watering cannot be upheld. The practice stands upon record as the best system, if thoroughly installed, of laying the dust in coal mines as a prevention against the extension of explosions. It stands to reason and good judgment, that if the system is properly installed, and then kept down, by loading it out of the mine, it must have the desired effect.

In Bulletin, No. 425, Department of the Interior, on The Explosibility of Coal Dust, p. 73, in reference to the treatment of coal dust, there is the following statement:

> The method of using pipe lines through the mine, with connections at intervals for attachment of hose, was introduced in England and used to a slight extent, after the report, in 1886, of the Accidents In Mines Commission. In the same year, W. N. and J. B. Atkinson published their book "Explosions in Coal Mines." In their suggestions for remedies, they state that the use of water pipes, with cocks at short intervals and hose, is a better system, and they advise that where watering causes trouble by affecting the roof and floor, the mine may be divided into sections by arching entries, whitewashing the arched sections, and sweeping up the bottom dust.
>
> In Germany, in consequence of the report of the Prussian Firedamp Commission of 1885, watering, chiefly by hose sprinkling, was introduced. . . . The mining department now insists that the roof and walls of the gangways, be not merely sprinkled, but washed by a stream from a hose. . . .
>
> In the United States, the system of watering by hose and nozzle has been employed in the coal mines of Utah, since the Scofield disaster of May 1, 1900, and it is now required by the Utah mining law. The conditions for the use of this method in the Utah field are very favorable, as the floor and roof are generally sandstone, and are therefore not affected by the direct application of water. . . .
>
> Wherever the method can be employed it is undoubtedly an efficacious one, particularly if the water pressure is good, but it requires constant effort, and the employment of men to go continually from point to point.

The writer is of the opinion that too much time is allowed to elapse between the shots fired by the shotfirers and the time the firebosses make their inspection of the mine, the following morning. We may assume that a feeder of gas is ignited at the face when the shots are fired, as happens every day, in some of our mines. This feeder burns several hours, and sets fire to the loose coal at the face, which is not detected until the fireboss makes his rounds the next morning, causing untold troubles and disastrous results. I think this is a point that should be well considerd.

POWER DEPARTMENT

Burning Anthracite Culm

By J. E. Parrish*

SYNOPSIS—At the present time no anthracite which will pass through a $\frac{3}{32}$-in mesh screen is salable. A few years ago there was no market for sizes as large as pea. Improvements in boiler and furnace design have rendered the reworking of the old unsightly culm banks not only possible but profitable. It is not unreasonable to expect that in the near future further refinements in grate and furnace construction will render available for steam-making even the "slush" or "mud."

⁂

According to statistics, the anthracite coal fields of Pennsylvania cover an area of about 480 sq.mi. Approximately, 200 sq.mi. are comprised in the northern or Wyoming territory, 130 sq.mi. in the middle territory, while 140 sq.mi. or thereabouts, is included in the southern territory.

The growth of the anthracite industry is well illu trated by statistics. In 1820, the anthracite productio was 365 short tons, or one ton for each day in the yea in 1912, it was 84,426,869 short tons, or 231,306 to daily.

Mr. L. F. Loree, president of the Delaware & Hu son Coal Co. in July furnished to the Philadelphi *North American* some interesting figures as to the co per ton for producing anthracite coal during the yea of 1902 to 1912. The article by Mr. Loree has probabl been read by many interested in coal mining as well a other similar articles upon the production of coal whic have appeared from time to time in the papers.

There is still another point of interest to many a more especially to those who live in the coal territory o whom the writer is one. This is the rapid diminution o the culm of refuse piles which in former days were rightfully called "eye sores," but which in latter years ha proved to be veritable "bonanzas."

During the early days of mining the marketable, o what was considered consumable, coal was prepared i

A Culm Pile Being Worked Over and the Larger

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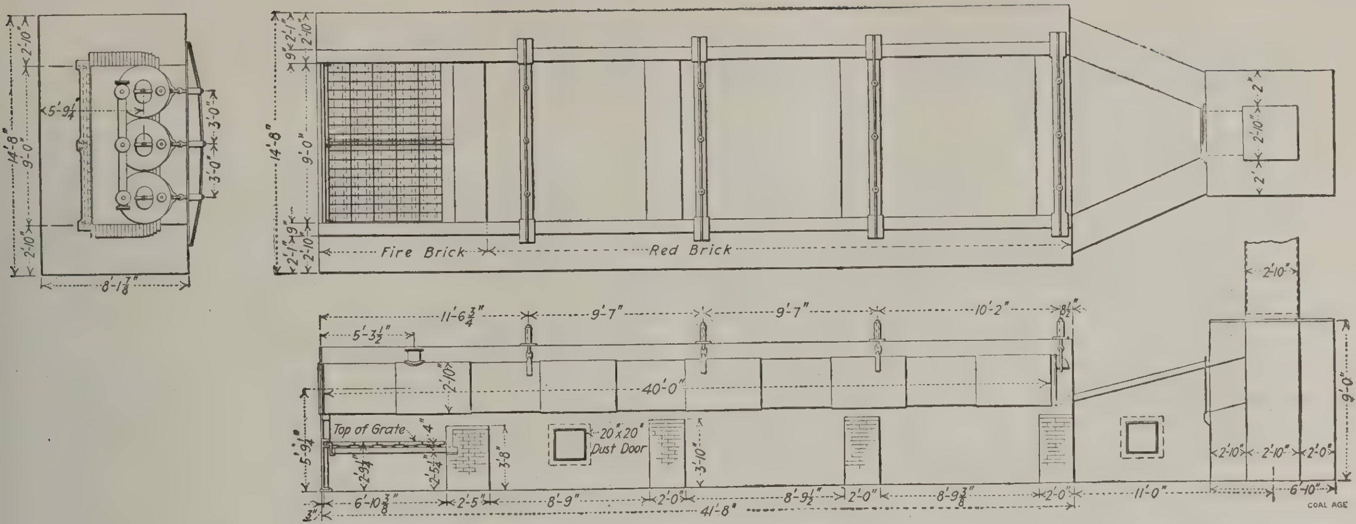
*Mechanical engineer, Scranton, Penn.



Type of Cylindrical Boiler Used in the Early Days. Many of These Boilers Are Still in Use at the Older Mines, Burning Pea or Coarser Fuel

the sizes now known as lump, broken, egg, stove, and a little later, a small quantity of chestnut. While the sizes termed pea and chestnut had to be made in the process of preparing the coal for market, they could not be sold. Consequently, they went to the culm pile, together with what is now known as the buckwheats, barley, rice and dust, there to remain as refuse until improvements in boilers and steam engineering created a demand for the smaller sizes.

These culm or refuse piles mountain high, covering thousands of acres of ground, containing millions of tons of what in later years proved to be the very best coal for steaming purposes, were the accumulated rejections of the early mining days.

Prepared for Market. The "Mud" Does Not Show in This Picture

Appearance after Culm Pile Has Been Worked Off

A history of boiler improvements, boiler specialties and advances in steam engineering with reference to economy in the use of fuel covering the past and present years of coal mining, would make an extremely interesting article in itself.

Fifteen or twenty years ago when it became known that the refuse in these piles contained as much carbon and consequently as large a heat content as the larger sizes of the then marketable coal, improvements in boilers and grates paved the way for the demand for the smaller sizes. The demand being thus created, the coal operators by means of suitable changes in the breakers, etc., perfected the means of preparing the buckwhe barley and rice sizes for the consumer. They then we back to these culm or refuse piles and by suitable r working methods, secured large quantities of the small sizes therefrom.

Twenty years ago anyone could buy all he wanted these culm piles for 10c. a ton. The writer well r members that his company in 1889 bought a culm pi at that price, made the necessary changes and additio in the boiler plant, added more units and successful burned this refuse.

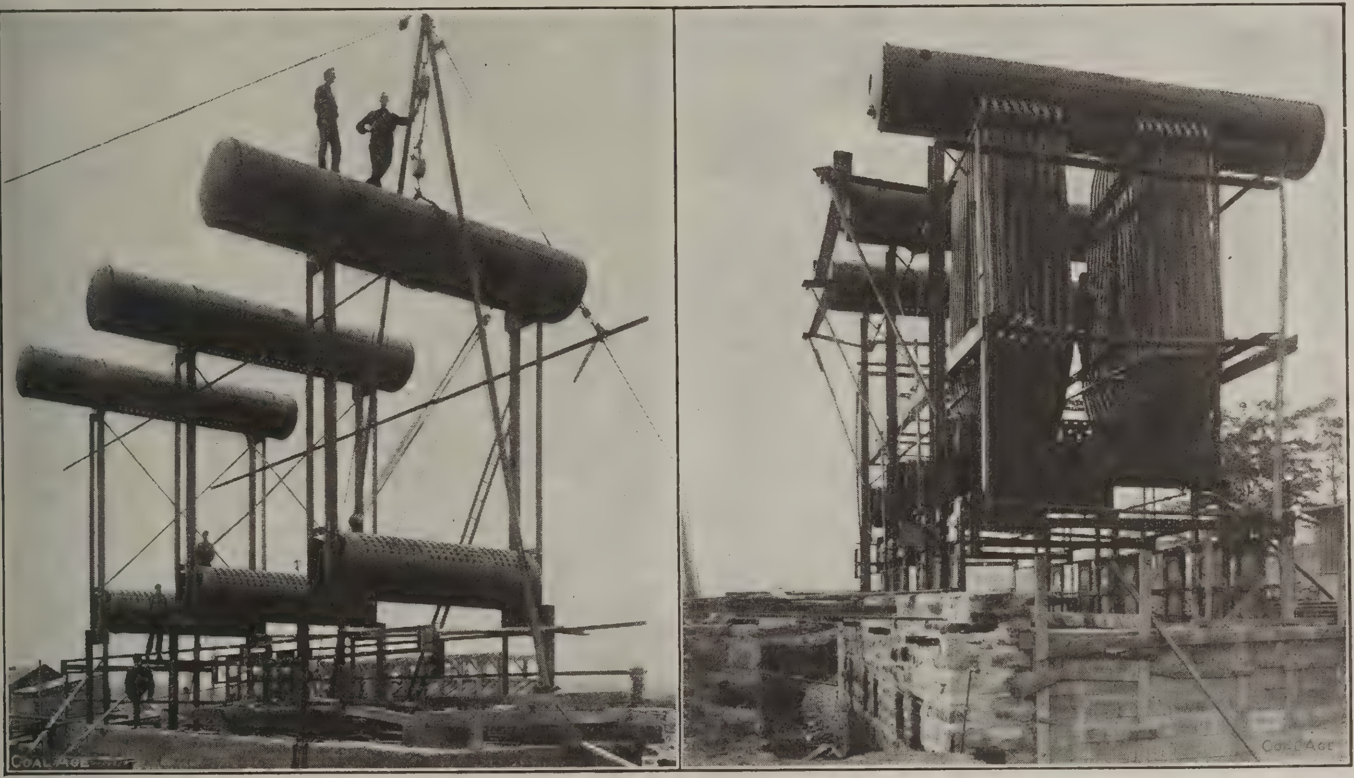
Looking over the anthracite fields now, anyone can s

Picking Coal from a Culm Bank

Working Over a Culm Pile

that these vast culm piles are rapidly diminishing, and it is safe to predict that in ten years or possibly five years all will be gone except what is called "slush" or "mud"—that which has passed through screens with $\frac{3}{32}$-in. meshes.

Many will affirm that this slush or mud is worthless and cannot be used for fuel under boilers. This is not true, for it has been found that there is as much or nearly as much carbon in this slush as there is in the buckwheat, barley and rice sizes. It is safe, therefore, to predict that this slush or mud can and will be used for steam making, so that eventually nothing will be left of the old culm piles and as no new ones are being created, nothing will be wasted on every ton of coal brought to the surface. Sooner or later also bony coal or what is part coal and part slate will be crushed, mixed with the slush or "fine stuff" and used for fuel in making steam.



Three Modern Water-Tube Boilers in Process of Erection. These Boilers Burn Refuse and Are Each Equal to 30 to 40 of the Cylindrical Type Illustrated above, in Steam Capacity

To do this is purely a question of furnace design, proper ratio of grate area to heating surface, a low percentage of air space in the grate, high ash-pit pressure, balanced stack draft conditions and a stoker suitable to handle or feed the "fine stuff" into the furnace. These conditions will all be worked out by the boiler, grate bar, forced draft and stoker manufacturers and indeed one large boiler concern is now preparing special plans along these lines.

Seven to 10 years ago grates with 20 to 30 per cent. air space, employing a forced-draft pressure of ½ in. water in the ash pit, was the general rule. Today, grates with 4, 5, 6, or even up to 10 per cent. of air space with ash-pit pressures ranging from 3 to 5 in. of water-gage are being adopted and used.

It is interesting indeed to trace the path of improvements from the plain cylindrical boilers, as used in the mining regions years ago, fired with lump and broken coal and employing natural draft, down to the modern water-tube boilers burning buckwheat, barley and rice sizes with forced and balanced draft. What improvements are to come later in order to burn slush and mud with "bone" ground down to slush size, will be far more interesting, and these improvements are not far distant either.

In many cases manufacturers and coal operators, who have old boiler plants in operation consuming high-grade fuel, would like to burn that of a lower quality. They believe, however, that they cannot do this with the present boilers, and, of course, do not wish to go to the expense of installing those of a more modern type. They need not believe, however, that their condition cannot be improved, for this is in many cases perfectly possible. Many others, finding themselves in the same predicament, have derived great benefit from certain changes which have been made in their old boiler plants, giving either increased power or a reduction of expenses through the use of lower grades of fuel.

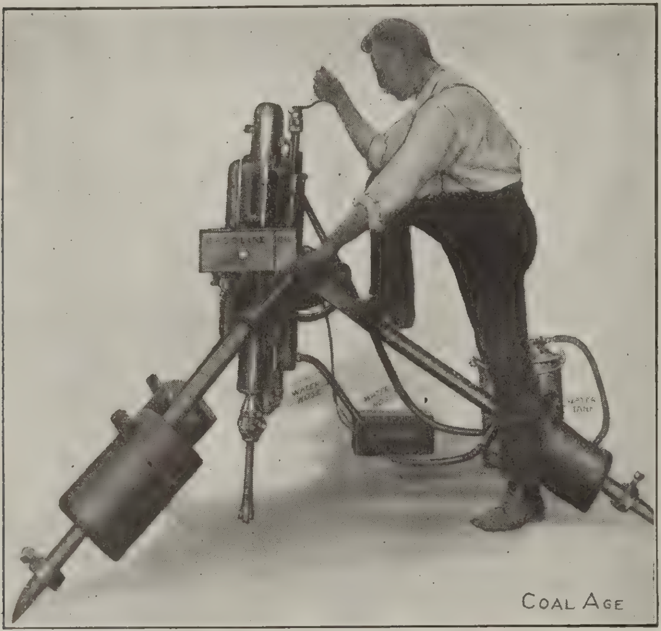
Meeting of American Mining Congress

This society meets for its 16th annual session at Philadelphia, Penn., Oct. 20-24. The prepared addresses will be printed and distributed among the members of the convention at the first day's session. Each author will be given 10 min. to make any supplementary statement. The subject will then be open for discussion. Among the important questions to be discussed are safety, workmen's compensation, mine taxation, the Alaska situation, Federal aid for mining schools, mining investments, revision of mineral land laws and conservation of coal resources. The mining exposition will contain exhibits of the various kinds of machinery used in and about mines.

A New Gasoline Rock Drill

The advantages of the power-operated rock drill are obvious, but for small jobs or temporary work its shortcomings are many. The expense of installing boilers, air compressors and the necessary pipe lines is frequently sufficient to exclude rock drills from work and cause a reversion to hand methods.

The Rice Gasoline Rock Drill Co., of Philadelphia, has just placed upon the market a machine which, it is claimed, is as rapid and reliable in action as the air drill, and has the advantage of being self-contained.

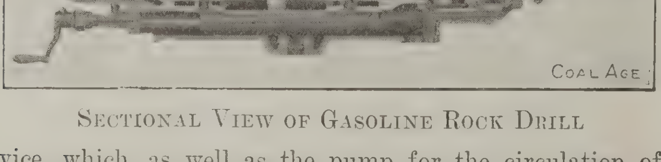


The New Drill upon Tripod

The constructural principle involved in this machine is simple and easily understood. The drill, which is mounted upon an ordinary tripod or bar, is practically two two-cycle, three-port engines, opposing each other, the piston rod, carrying two pistons, oscillating backward and forward between the impact of alternate explosions upon either end.

The rapidity of operation is at all times under control of the drill runner. This is of great advantage in starting a hole, particularly if the drill does not deliver its blow exactly perpendicular to the rock surface.

Ignition is accomplished by an electric sparking device, which, as well as the pump for the circulation of jacket water, is actuated by the plunger. Lubrication is automatic, the cylinder oil entering with the fuel.



Sectional View of Gasoline Rock Drill

The moving parts of this drill are few. It has been subjected to long and severe tests under adverse weather and rock conditions before being placed upon the market. It is the firm belief of the makers that it will give a satisfactory account of itself under any and all conditions for which it is intended.

Oklahoma's Coal Output

The total production of coal in Oklahoma in 1912, according to E. W. Parker, of the U. S. Geological Survey, was 3,675,418 short tons, valued at the mine at $7,867,331.

The coal areas of Oklahoma belong to the Western Interior coalfield. They lie entirely in the eastern and southeastern parts of the state, forming the connection between the Kansas field on the north, and the Arkansas field on the east. The principal developments are in the southern portion of the field, in what was formerly the Choctaw Nation of the Indian Territory, and is now included within Haskell, Latimer and Pittsburg counties. The total area underlain by workable coal is estimated at 10,000 square miles. The coals, of which there are ten or more beds, range from a medium grade to a high-grade bituminous, some of the latter approaching semi-anthracite. Some of the higher grades have coking qualities, but efforts to make coke in the beehive ovens, constructed for that purpose, have not been conspicuously successful.

Diminished production of petroleum and natural gas in the Mid-Continental field is reflected in increased production of coal in Oklahoma, and a substantial advance in prices. The quantity of coal produced increased from 3,074,242 short tons, valued at $6,291,494 in 1911, to 3,675,418 tons, valued at $7,867,331 in 1912.

The record of 1912 exceeded that of the previous maximum output (that of 1907) by nearly 33,000 tons. Compared with 1911 it showed a gain of 601,176 short tons, or 19.6 per cent. in quantity, and $1,575,637, or 25 per cent. in value. The average price per ton advanced from $2.05 to $2.14.

The year 1912 was the first in a decade to encourage the coal-mine operators of Oklahoma, and the other Southwestern states. For ten years the industry in those states had been kept practically at a standstill, the output in 1911 being just about the average for the decade ended in that year. The production in 1912 exceeded that average by nearly 20 per cent.

The only assignable reason for the increased activity appears to be, as already stated, the diminution in the supply of natural gas and fuel oil in the market tributary to Oklahoma coal. Competition with coal from other states, particularly Colorado and New Mexico, is keen.

In 1912 the average number of days worked was 174, the largest number in recent years excepting during the boom period of 1907. The general average of working time among the bituminous mines was 223 days, and the number of men employed was 8785.

In 1912 out of a total of 3,675,418 tons produced, 3,175,455 tons, or 86.4 per cent., were shot off the solid. The quantity mined by machine was relatively small, amounting to 259,719 tons, or 7.1 per cent.

The death rate in Oklahoma in 1912 was unusually high, owing principally to an explosion of gas in the San Bois mine, at McCutcheon, on Mar. 23, which resulted in the loss of 73 lives. According to the Bureau of Mines, the total number of fatal accidents during the year was 99, all being underground. Seventy-seven were due to gas and dust explosions; 11 to mine fires, and 7 to falls of slate and coal. The death rate per thousand was 11.27, and there were 37,125 tons of coal mined for each life lost.

EDITORIALS

The contest for supremacy between approved types of safety lamps and the portable electric mine lamps that have forged their way to the front within the past two years, is still undetermined. The open lamp or torch is a recognized menace in all mines operating in gaseous territory; but, before the electric lamp can fully supplant the safety lamp, in mine work, a reliable means of detecting the presence of dangerous gases in the mine air must be devised. Let someone get busy.

The Tuberculous Miner

Dwight E. Woodbridge, in his bulletin "Sanitation at Mining Villages in the Birmingham District," says that "among miners, tuberculosis alone annually takes many times the number of lives that are lost in accident." An important statement, if true, but we are convinced he cannot prove it. The U. S. census statistics in 1900, which are the most recent reported, show that 1.21 miners and quarrymen per thousand died of consumption in that year. The death rate in 1911 from accidents in all U. S. mines was 3.82 per thousand. The census statistics, covering such a few states, and only those where mining is unimportant, do not prove anything, nor do such unsupported statements as those of Mr. Woodbridge.

He quotes the tubercular death rate of the city of Birmingham in proof of what he says, though we are convinced all are not miners in that city. Yet he can only show 2.77 deaths per thousand at that point, and as our readers know from English experience, quoted in these columns, coal and iron miners have a low death rate from tuberculosis as compared with other occupied males. Another reason why Birmingham is not typical of mining towns, but probably has a higher death rate, is that "the mortality curves for tuberculous and nontuberculous diseases are highest in large towns," as Sir Thomas Oliver stated before the fifteenth International Congress of Hygiene and Demography. He declared further, "These diseases bear a distinct relationship to the size of the town, the density of the population and the social well-being of the people." Mining towns are small, their population relatively scattered and all the men make good wages.

So we believe that the miners in villages are not likely to be as tuberculous as the citizens of Birmingham, and we think that Mr. Woodbridge has been merely guessing. Sometime we will learn whether his guess is right, but at present writing every indication proves he is wrong, and not a single fact, not even those he advances, prove that he has a foot on which to stand.

That there is such a disease as miner's consumption has been abundantly proved. Where conditions are favorable, as on the Rand in the Transvaal, its ravages may be terrible, especially where Kaffirs, who are new to the disease, are engaged. In England the tin and copper miners are said to be seriously infected, but the direct and indirect action of the returning miners from South Africa on the death rate of these workingmen remains to be determined.

Until we know definitely the true menace of miner's consumption it is better for us to use statements which will express the uncertainty of our knowledge.

The Bureau of Mines as a National Force

The Bureau of Mines has been in existence long enough that we have begun to regard its activities as almost preordained by circumstances. We hardly realize that had it been directed by other and less enterprising heads, an entirely different organization might have been created.

It might have been a purely scientific body to determine principles and leave them as such for the more enterprising managers and engineers to apply to their needs. This they would have been slow to do because the expenditures would probably have been resisted by those who, though they hold the purse strings, often know little about mining. These men must be reached not through bulletins but by the public press, not so much by logical argument as by a benign atmosphere. This beneficent influence, so greatly needed, the Bureau has created, and as a result the laggard but generous spirits of the industry have been directed toward a consideration of the needs of miners so that they have followed closely on the wake of those who were first to set the example. As for the more sordid capitalists, public sentiment is now forcing or will soon compel them to follow the lead of the others, and state laws will accomplish what conscience and social pressure cannot perform.

Had it not been for its active work and energetic propaganda, the impress of the Bureau of Mines on the coal industry would have been less marked than that of any organization of like kind in any European country, for most of these have administrative powers which enable them not only to recommend but to enforce. In Great Britain, as in the United States, there is no such power granted to the experimenting faculty but the investigating authorities and the chief inspector being immediately subject to one common head, the Home Office, there is an organic unity between determinatory and administrative powers which makes both one. In the United States, there is no such unity, yet the Bureau of Mines has obtained a most commanding position largely because of its diplomatic combination of mere scientific result with institutional activity. To use an expression borrowed from another sphere, its work as laid down by its officers is not merely to propound dogma but also to engage in active ameliorative work.

The mine-rescue cars, the first-aid training, the gas- and oil-well conference, the demonstrations of explosions at the experimental mine and in galleries, have served to turn mere theories into an actual force and have given the Bureau a power to do by suasion and example that which by virtue of the constitution it cannot perform by law. Thus many excellent practices used by a single corporation or by a group of companies have been diligently spread over the country by the Bureau. Without this careful sowing, the results effected might have been delayed many long years. Wherever the Bureau has found systems worthy of imitation, it has followed them itself and urged their adoption all over the United States.

It must always be remembered that it is hard for any national bureau to introduce some entirely new method involving the expenditure of large amounts of money until some company has had courage and philanthropy enough to adopt that improvement. If ten years ago, a national body had urged the introduction of septic tanks and sewerage in every camp, it would have faced a fierce opposition. Today by showing what enlightened corporations are doing and have done, the sanitation of mining camps will take a rapid step forward.

Great credit should be given to the Bureau for its energy and resource in extending the knowledge of safety and sanitary provisions. It is true that in much it has merely followed the work of the anthracite companies and of the subsidiaries of the U. S. Steel Corporation, but no little credit is due to those who make local conditions national or transplant foreign methods on native soil.

We believe the institutional work of the Bureau will eventually wane when it has served its purpose. Already in the anthracite regions, the coal companies are so well fitted with rescue teams and apparatus and the first-aid men are so well trained that the Bureau cannot do the work there that can be done, for instance, in Oklahoma, Kansas or Tennessee, or even in the bituminous fields of Pennsylvania.

At the Brookside explosion, the Bureau of Mines was almost entirely unrepresented, having only two men and a cook. There are some who think that this revealed the Bureau in an unfavorable light; personally we think it demonstrated that the ability of the anthracite region to take care of its own rescue work had been recognized by the Bureau. Thus the showing was a credit to the anthracite coal companies and no disparagement to the governmental force.

And we think eventually every part of the coal territory will be able to protect itself from disaster, and will have, as in all European countries, its central rescue stations instituted to serve far smaller radii of action than the cars of our Bureau of Mines. It is time for such an organization to be formed in every section of the country, without national aid. Whether an automobile or railroad car is needed should be determined from local conditions but one or other should be owned by every group of mines and should be maintained by all mines near-by, large and small, whether they possess helmets and hire trained men at their works or not, for one squad of men is not enough to do the rescue work of a large mine.

Unless the Bureau of Mines undertakes to teach mining as well as first-aid, it cannot furnish sufficient employment so that it can assemble as many trained men as were mustered at Brookside. It cannot, therefore, do more than supplement rescue work and first-aid, and must be content to be last on the field when explosions and other accidents happen. So that in well developed fields, its largest service will be scientific.

The most desirable rescuemen are those who have worked in the mines where the disaster occurs and the professional men of the Bureau will always lack that intimate knowledge of the intricacies of individual mines which is enjoyed by the men who work therein. Th is markedly true of the anthracite region.

But even if the Bureau ultimately loses its active si and disposes of its cars, ceases its demonstrations and b comes purely scientific, nevertheless it is worthy of th greatest of honor for having spread a movement whi will later continue and develop by its own internal for That credit is rightly due to Joseph A. Holmes and h colleagues.

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Experimental Explosion at Bruceto Mine

We publish today G. S. Rice's interpretation of th mysterious kick-back of the recent experimental expl sion. Though he does not say so, we believe that it is h opinion that the explosion reached a certain maximu violence, died down and then, near the Taffanel barrie but at its inby edge, developed a new force and drov the cars back into areas of inferior pressure. It is a r assertion of the oft-repeated declaration that every e plosion is not a single phenomenon, but a series of cu minations. The space curve of pressure is said to be, n a line gradually rising till a maximum is reached, b a series of waves as the violence rises and falls alon the heading. We suppose that Mr. Rice will justify h conclusion by comparing the low pressure found 750 f from the portal with the pressure ten times as great a 550 ft., only 200 ft. away.

We agree with him that a mere vacuum, doubtless n by any means complete, could hardly impel cars with any thing like the force with which they were thrown durin the explosion. That statement we have already mad But if the new focus was near the Taffanel barrier, w wonder why the cars most remote from that point move furthest inward and otherwise evidenced the mos violence.

Surely the flame did not gain in volume or the blas in force as they together traveled backward through th vitiated air; in fact, we doubt seriously whether the flam ran back at all. Moreover, why did not the cars shoot out ward with the first blast? The torn shelving near th inby car in the entry starts from the point where the ca was standing, as if the loaded wagon did not go outby before it was hurled inward.

Somehow, we have a hankering after a belief in Joh Verner's theory, and we hope some time that the Burea will find out, not only when the cars go in, but when the leave their original stations, and whether they travel bot outby and inby. We are prone to believe that the in-rush really accompanies the initiation of the explosion, i more violent near the originating point, travels along a separate path from the explosion and is not a mere vac uum rush, but is the result of the pressure of the explo sion on the intaking current.

Experiment only will answer, and we hope the Burea will make tests which will determine this moot point Meantime we hope no one will be so dogmatic that h cannot later with grace reverse his own decision, fo the problem is not easy and the answer is as yet far t seek. The advocates of the "vacuum" as a sufficient caus may well believe it could damage cars and track as stated The only difficulty is to grant that a current traveling horizontally could have such *lifting* power.

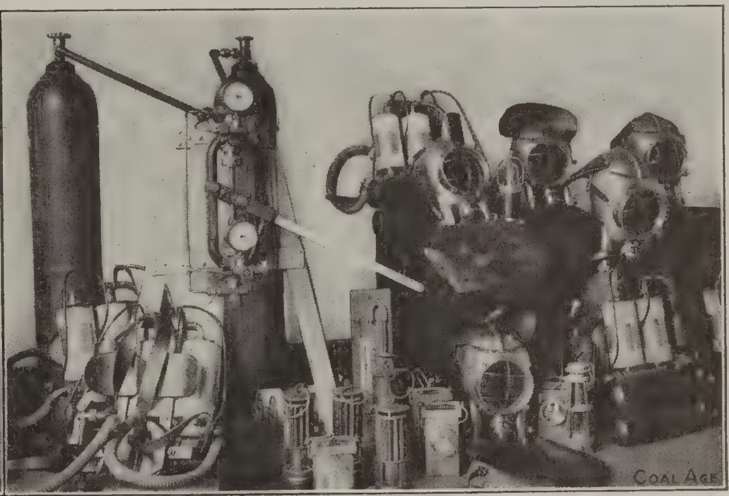
SOCIOLOGICAL DEPARTMENT

Safety Precautions of the Consolidation Coal Co.

By A. W. Hesse*

The "Safety First" movement in the Fairmont region, more particularly with the Consolidation Coal Co., received an impetus at the time of the Monongah explosion, which has kept it going ever since.

This company has spared no expense to introduce devices, or machinery to protect its employees. Arrangements were made at all its mines to introduce steam to keep down the dust; firebosses were established at more than half the operations because oil and gas wells had been drilled in the neighborhood of the workings, although most of these latter were considered nongaseous. An outside field man now follows the drilling of all wells through the company's coal; also, arrangements were made to have all drilling companies protect the outer casing with cement where it passes through the coal seam.



Adjoining operations are no longer connected, but arrangements are made, when the workings of two mines approach each other, whereby they can be readily and quickly connected if desired.

The company has never relied entirely on the state for the inspection of its mines; it employs a chief inspector and three assistants continually who report on safety conditions inside, and make recommendations for improving them. Later a superintendent of mining was established, who with an assistant, continually visits the mines, instructing the foreman and men how to mine coal properly besides supplementing the work of the inspectors.

All these men are trained in the use of rescue helmets, having taken the course at Pittsburgh under the Bureau of Mines. Five sets of helmets, together with necessary charging apparatus, are kept at Fairmont, where they are tested every week by competent men, trained for this work. These men come under the Testing Department and besides keeping the rescue apparatus ready for service, they visit the mines liberating, or likely to liberate any gas, sample the air, analyze it and report the percentage. They also take the humidity on these visits and report on same, in order to determine when to introduce the steam.

Emergency Outlets

In the past few years the company has gone to large expense in making extra openings for emergency outlets. Besides having completed one 195-ft. shaft and the present sinking of another 250-ft. deep, an adjoining property was purchased for the 136-ft. shaft outlet on it. Shotfirers are employed at a number of the mines to increase safety precautions, especially for untrained miners.

The value of this "Safety First" movement is better illustrated by actual figures. The decrease in the death rate per 1000 employees for 1912 over 1911 was 34.9 per cent., whereas the tonnage per death for 1912 was double that for 1911. The death rate for this company for 1911 was more than 16.4 per cent., and more than 45.6 per cent. less in 1912, as compared with the 1911 rate for the state. The tonnage per death was more than double that of the entire state.

The first-aid movement has not had quite the attention given it in other fields, due, perhaps, to the fact that the company's many doctors can reach the scene of accident so quickly; yet the movement has not been entirely ignored.

The accompanying picture shows the team which represented the West Virginia Division of the Consolidation Coal Co., at the recent meet held at Pittsburgh.

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The presence of blackdamp, a mixture of carbon dioxide and nitrogen, will often neutralize the effect of firedamp on a flame. Analyses of mine gas, which gave only a faint cap when tested with a safety lamp, have shown 4 per cent. of methane mixed with blackdamp. When testing with a lamp, remember that the flame is not clear in lamps that have been burned some time in a dusty atmosphere as in lamps burned but a short time in clear air.

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*Assistant engineer, Consolidation Coal Co., Fairmont, W. Va.

The Muckle Cup Contest

Special Correspondence

With 18 teams competing, presenting remarkable demonstrations of primary relief work, the fifth annual inter-company first-aid contest of the American Red Cross was held on Sept. 27, at Valley View Park, Inkerman. The chief prize in this interesting competition is the Muckle silver loving cup, donated in 1909 by Mrs. John S. Muckle, of Philadelphia, as a memorial to her husband. To secure permanent possession of the trophy, it must be won three consecutive times. The winners to date are as follows:

Team from Old Forge Breaker, Pennsylvania Coal Co.

(The winning team in the fifth event. M. Ballentine, captain; M. Quinn, T. Cranston, H. McGerrity, S. Sibley and W. Bennett, subject.)

Old Forge Breaker Team, Pennsylvania Coal Co., and Judges

(The team on the bench was the winner of the Muckle cup at the Red Cross meet, Valley View, Sept. 27, 1913.)

Wilkes-Barre, Oct. 2, 1909, Law Shaft, Avoca, Pennsylvania Coal Co. Valley View, Sept. 17, 1910, Woodward Colliery, Lackawanna Coal Co. Valley View, Sept. 16, 1911, Brisbin Colliery, Lackawanna Coal Co. Valley View, Sept. 28, 1912, Pine Brook Colliery, Scranton Coal Co. Valley View, Sept. 27, 1913, Old Forge Breaker, Pennsylvania Coal Co.

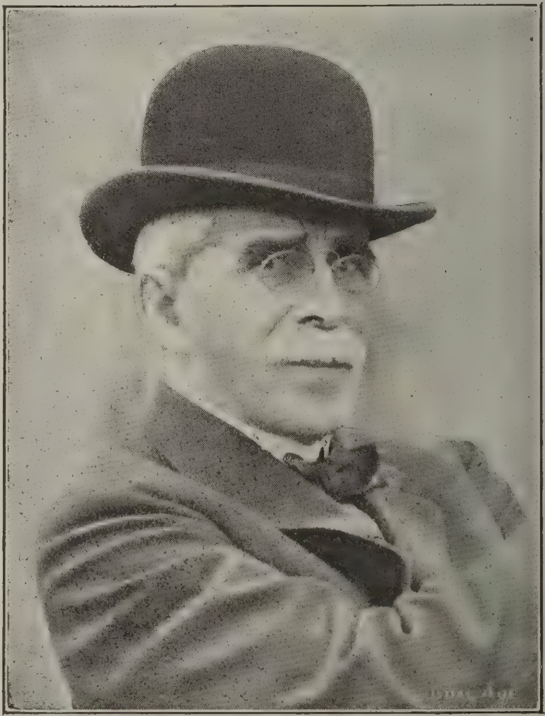
The contest was open to all first-aid teams of the operating companies of the anthracite region, and the 18 teams represented the Pennsylvania, Hillside, Temple, "Lackawanna," Jermyn and Scranton Coal companies. The event is annually the big feature of first-aid work in northeastern Pennsylvania and the teams competing are those making the best scores at previous company meets.

The contests were conducted under the direction of Dr. F. F. Arndt, of Scranton, who has charge of the first-aid work of the Pennsylvania and Hillside companies. The judges were Dr. W. S. Fulton, of Scranton; Dr. John W. Grant, of Carbondale; and Dr. J. A. Singer, of East Stroudsburg. The other officials were: Secretaries—F. D. Conover, secretary to Capt. W. A. May; J. S. Angler, secretary to A. F. Law; Edgar Weichel, timer.

In previous years, the War Department has sent army physicians to Valley View to judge the contests, but this year it was reported that no mileage was obtainable. Major Patterson had been detailed to supervise the event, but his work as doctor of the field work of the American Red Cross drew him away from Washington, and Major Lynch was substituted. A death in the fam-

Forty Fort Colliery Team in Fourth Event

(Injured spine and broken left forearm. P. Williams, captain; J. Casparen, subject; J. Jim, W. Jones, F. Romenkoski and I. Hochreiter.)



Captain W. A. May, General Manager Pennsylvania Coal Co.

(Said to have introduced first-aid methods in the American anthracite field.)

ily of the latter this week prevented his being present, and the department was not represented.

Two of the events were run off before the noon recess, when lunch was served by the companies interested. The problems worked out by the teams were framed by physicians of the War Department at Wishington, and sent to the park in sealed envelopes. There were five events, and the cup award was on the general average. The events were as follows:

1. One-man event. A miner has been injured by a fall. There is an incised wound on the right knee, with little bleeding, and a lacerated wound on the palm of the left hand, which is bleeding profusely. Treat appropriately and carry 50 ft. Time allowed, 8 minutes.

2. Two-man event. A man is found unconscious, lying with his abdomen across a live electric wire. Rescue the patient and give appropriate treatment. Time allowed, 10 minutes.

3. Three-man event. A man has his head, face, neck, shoulders, arms and hands burned, following a gas explosion. Treat the case. Time allowed, 15 minutes.

4. Full-team event. A man is found with his spine injured—apparently broken. The left forearm has sustained a simple fracture of both bones. Treat the patient and carry 50 ft. Time allowed, 20 minutes.

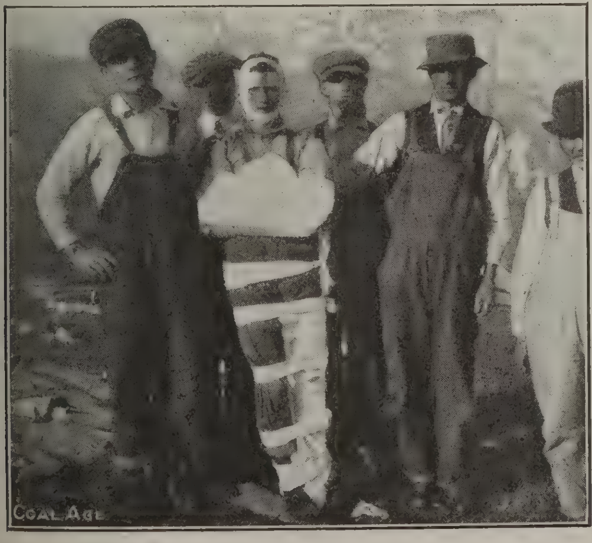
5. Full-team event. A man has been injured by a fall of coal and slate. There is a compound fracture of the right forearm about the middle. His left thigh has a simple fracture 6 in. above the knee. The back of his left hand has a deep cut, which is bleeding profusely. There is also a lacerated wound of the right cheek. Treat the case and carry 50 ft. on an improvised stretcher. Time allowed, 15 minutes.

Some of First-Aid Teams at Work at Red Cross Meet

(Fifth and crowning event.)

A Neat Spiral Bandage—The Hardest of All to Make

(Winning team performing fifth event.)



Team of No. 5 Shaft, No. 6 Colliery, Pennsylvania Coal Co.

(Fifth event. Victim is bandaged for lacerated wound of right cheek, compound fracture of right forearm, a cut in the back of the left hand and a simple fracture of left thigh above knee.)

The participating teams follow:

1. Sterrick Creek Coal Co.—Isaac Davis, captain.
2. Fernwood Slope, Butler Colliery, Hillside Coal & Iron Co.—James R. Pollard, captain.
3. Law Shaft, Pennsylvania Coal Co.—William Creedon, captain.
4. Pine Brook, Scranton Coal Co.—John Igall, captain.
5. Nanticoke Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—William Hill, captain.
6. Brisbin Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—John Pierce, captain.
7. Lackawanna Colliery, Temple Iron Co.—Harry Saxe, captain.
8. Mt. Lookout Colliery, Mt. Lookout Coal Co.—George Bumby, captain.
9. Old Forge Breaker, Pennsylvania Coal Co.—Moses Ballentine, captain.
10. Erie Colliery, Pennsylvania Coal Co.—Martin Cawley, captain.
11. Storrs Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—David Edwards, captain.
12. Forty Fort Colliery, Forty Fort Coal Co.—Fuller Williams, captain.
13. Northwest Colliery, Northwest Coal Co.—Charles Seipher, captain.
14. Sloan Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—William King, captain.
15. No. 2 Shaft, No. 1 Colliery, Pennsylvania Coal Co.—C. F. Beachem, captain.
16. Jermyn Colliery, Jermyn Coal Co.—Charles Llewellyn, captain.
17. No. 5 Shaft, No. 6 Colliery, Pennsylvania Coal Co.—Peter Hoolihan, captain.
18. Bellevue Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—John M. Jones, captain.

The standing of the teams in the different events was as follows:

Team	1	2	3	4	5	Average
Sterrick Creek	94	95	100	95	100	$96\frac{4}{5}$
Fernwood Slope	95	98	100	95	100	$97\frac{3}{5}$
Law Shaft	100	95	96	97	93	$96\frac{1}{5}$
Pine Brook	95	97	97	100	94	$96\frac{3}{5}$
Nanticoke	100	96	100	100	91	$97\frac{2}{5}$
Brisbin	98	88	96	97	89	$93\frac{3}{5}$
Lackawanna	95	98	94	100	91	$95\frac{3}{5}$
Mt. Lookout	90	96	94	100	92	$94\frac{2}{5}$
Old Forge	100	96	96	100	100	$98\frac{2}{5}$
Erie	100	97	91	98	100	$97\frac{1}{5}$
Storrs	98	98	94	96	90	$95\frac{1}{5}$
Forty Fort	100	96	98	98	95	$97\frac{2}{5}$
Northwest	80	85	90	96	90	$88\frac{1}{5}$
Sloan	85	100	95	96	97	$94\frac{3}{5}$
No. 2 Shaft, No. 1 Colliery	98	100	95	90	89	$95\frac{2}{5}$
Jermyn	90	95	98	96	88	$93\frac{2}{5}$
No. 5 Shaft, No. 6 Colliery	89	100	100	98	97	$96\frac{4}{5}$
Bellevue	92	90	96	96	100	$94\frac{4}{5}$

The prizes were presented by Dr. J. A. Singer, of East Stroudsburg, instructor in first-aid for the D. L. & W. R. R. Besides the Muckle Cup, each member of the winning team was given a bronze Red Cross medal, from the American Red Cross.

Third Annual Outing of the Lehig

OFFICIALS AND EMPLOYEES OF THE LEHIGH VALLE

Valley Coal Company Social Association

Coal Co. Met at Hazle Park, Penn., Aug. 23, 1913

Rescue Contest of the Vandalia Coal Company

The third annual first-aid contest of the Vandalia Coal Co. was held in Mahan's skating rink, Linton, Ind., Saturday evening, Sept. 13. A passageway similar to an entry in a mine was erected. Obstructions were placed in this passageway, and the various teams, fitted with breathing apparatus, were compelled to carry a man over these obstructions on a stretcher. Injuries, such as fracture of the thigh and other limbs, burns, electrical shock, etc., were demonstrated and treated by the different teams.

Other Vandalia Teams That Took Part in the Contest

Six teams entered the competition, and the rescue corps from Mine No. 9 received the highest percentage, thus winning first prize. This team was composed of Charles Dodge, captain; Jack Brown, John Parks, Thomas Parks and Dave Beaty. This same team was sent to Pittsburgh to compete in the national meet held there Sept. 22-24.

During the evening William Houston, president of District No. 11, U. M. W. A., delivered an interesting address on "The Desirability of First-Aid Among the Miners." Mr. Houston stated that anyone who looked upon the first-aid movement with scorn and ridicule did so out of ignorance, and that Linton, which is the best coal-mining city in Indiana, should be proud that this great movement originated there.

Some Members of the Vandalia Rescue Teams

The Vandalia Coal Co. is the pioneer of mine-rescue work in the Middle West, having adopted first aid three years ago.

Mine-rescue car No. 3, of the U. S. Bureau of Mines, with Luther Floyd in charge was in Linton at the time and the crew gave training in the use of breathing apparatus to a number of miners.

The following men acted as judges of the contest: John Talbott and Luther Floyd. The various teams of the Vandalia Coal Co. were trained under the direction of Dr. A. F. Knoefel.

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Coal-Dust Explosions

A lecture arranged by the British Association was delivered by Sir Henry Cunynghame, K. C. B., the chairman of the late Royal Commission on Mining Accidents and of the Eskmeals Dust Explosions Committee. His subject was "Explosions in Coal Mines and the Means of Preventing Them." Sir Henry adopted simple language, deeming it best not to presume an acquaintance on the part of his audience with the methods of working coal mines.

Coal, he explained, consists of the residue of the vegetation of bygone ages. The plants of which coal is composed were mostly ferns, many of which were of gigantic size. It contains woody fiber and seeds of a very resinous and inflammable kind. A pound of it when burned will give enough heat to raise about 9 gal. of water from 60 deg. F. to the boiling point, and has a work-doing power of one horse for about five hours; that is, it will raise 4800 tons weight to the height of one foot.

On coal we depend for domestic heating, gas-light, cooking, electric light, for means of locomotion by land and sea, and for almost the whole of our manufactures. This coal we waste in a most unjustifiable way. A common kitchen range burns more than a ton of coal a month—that is, about 75 lb. a day—an amount which if properly employed would cook for 1000 people.

The common gases found in mines are methane, which, roughly speaking, is like common coal gas, and is the gas given off from marshes; carbon dioxide, the gas given off from effervescing drinks; and carbon monoxide, a deadly poison. In common language they nearly correspond to firedamp, chokedamp and afterdamp. The first is capable of rendering air explosive, the second chokes you, and the third poisons you. Thus explosion, suffocation and poison are the dangers to which the miner is exposed.

Methane Was Thought to Be the Only Cause

The old theory of mine explosions that they were caused by methane was the natural one, but Sir Henry explained the improbability of this theory and its utter variance with the phenomena of a coal-mine explosion, discussing the origin and development of the dust theory of explosions. Explosions of gunpowder were shown to be exactly analogous to dust explosions. In the one case the oxygen in a condensed form is supplied to carbon dust at rest in a heap; in the other case oxygen in the gaseous form is supplied to a cloud of finely divided dust particles.

Speaking of the modern theories of mine explosions, the lecturer said death results not so much from violence, still less by suffocation, but almost entirely by reason of poisonous carbon monoxide. The employment of mine ventilation to sweep the mine free of gas has the effect of producing clouds of dry dust which is explosive. The remedies suggested for mine explosions are: (1) regulations as to the use of naked lights, electricity and blasting; (2) wetting the coal, which plan, although difficult to carry out, is effective and still will probably have to be used extensively; (3) incombustible dust. In order to understand the probable action of incombustible dust in impeding the ignition of coal dust, it is necessary to call to mind the kinetic theory of gases.

In reference to the experiments following upon the proposal of Mr. Garforth to spread incombustible dust in mines, it has been found that with three parts of stone dust to five of coal dust, the explosion is feeble; with four to six it is smaller still; with equal proportions it stops. It is highly probable, if the dust in a mine consisted of over 50 per cent. of incombustible matter, it would be almost impossible to explode it, except by a very large-scale explosion, which is in the highest degree unlikely to happen if the whole mine is treated from end to end with the incombustible dust.

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Shock

By A. S. Snyder*

Shock, or collapse, is a depression of the vital functions of the whole system. The action of the heart becomes weak and there is a dilation of the blood vessels of the internal organs, so that an accumulation of the blood occurs in the interior of the body, and the amount of blood circulating near the outer surface and in the head is decreased to such an extent that it produces a profound depression of the nervous system.

SYMPTOMS

Face is pale, anxious and pinched.

Eyelids droop; eyes are dull with dilated pupils.

The patient is stupid and takes no interest in what is going on or happening about him.

He may be partly or totally unconscious.

Breathing is feeble, and there is sighing and great thirst.

The pulse is feeble, fluttering, rapid and barely perceptible.

The skin is cold, the temperature subnormal.

When an injured person begins to get chilly and shiver, no matter how slight the injury, he is suffering from shock.

TREATMENT

Place in a position with the head low, so that more blood will flow to the brain.

Loosen all tight clothing, especially about the neck, wrists and waist, but do not remove more clothing than is necessary to examine and treat the injury thoroughly.

Cover patient with blankets, coats or brattice cloth if no blankets are immediately at hand.

If in a mine where safety lamps are used, apply heat by placing lighted safety lamps under the blankets or covering.†

If the victim is conscious, give him stimulants, such as aromatic spirits of ammonia, tea or coffee.

Rub the limbs to stimulate the circulation.

If unconscious, hold ammonia or smelling salts to the nose, and in severe cases apply artificial respiration.

When warmth is restored and the patient recovers from cold and chilly sensation, the treatment is successful.

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Mining Exhibit at A. M. S. A. Meet

An interesting mining exhibit was held in the parlors of the Fort Pitt hotel. The Lungmotor was shown by the Life Saving Devices Co., Chamber of Commerce Building, Chicago, Ill., and attracted much attention. The apparatus is portable, little liable to get out of order and simple in operation. It is used for resuscitating the asphyxiated.

The Draeger Oxygen Apparatus Co., of Pittsburgh, Penn., demonstrated their well-known helmets and pulmotors. S. F. Hayward Co., of Chambers St., New York City, exhibited the Westfalia long- and short-time helmet outfits, of which nearly 100 are said to have been sold in this country.

The American Red Cross exhibited their dressings as also Johnson and Johnson of New Brunswick. N. J. Burroughs, Welcome & Co. showed their tabloid first-aid packages which are equally available for aviators and for mine use. They are light, compact and therefore easy to carry.

The Mannesmann Light Co., of 55 John St., New York City, made a fine exhibit of their CEAG lamps and the Koehler Manufacturing Co., of Marlboro, Mass., showed their safety lamps and igniters. The lamps give a light of 1.6 candle power. The Hirsch Electric Mine Lamp Co. had a complete exhibit of electric cap lamps and batteries. The Union Electric Co., of Pittsburgh, exhibited mine telephones, headlights, condulets, trolley clamps, and other electric supplies. The Western Electric Co. showed their complete line of mine telephones.

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Itinerary of Federal Mine-Rescue Cars

Wilkes-Barre Car No. 1—Itinerary No. 2—Revised Sept. 3, 1913

At	Companies	1913 Arrive	Leave
Carbondale, Pa........	Hillside Coal & Iron Co., Delaware & Hudson Co., Temple Iron Co., Scranton Coal Co., and several individual mines..............	Oct. 1	Oct. 17
Philadelphia, Pa.......	American Mining Congress.......	Oct. 20	Oct. 25
Peckville, Pa..........	Scranton Coal Co., Temple Iron Co., Delaware & Hudson Co., and several individual mines...	Oct. 27	Dec. 1
Olyphant, Pa..........	Delaware & Hudson Co., Scranton Coal Co., Temple Iron Co., and several individual mines.......	Dec. 1	Dec. 17 1914
Dunmore, Pa..........	Price-Pancoast Coal Co., Pennsylvania Coal Co., and several individual mines..............	Dec. 18 1914	Jan. 23
Providence, Pa........	Delaware & Hudson Co., Scranton Coal Co., Pierce Coal Co., and several individual mines.......	Jan. 24	Mar. 6

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The Meet of the Susquehanna Interests

The allied Susquehanna companies have published a most complete score sheet, showing the team ratings at the elimination and final contests, and giving a list of the winners and a description of the various events.

The following figures are quoted:

Event	First Prize		Second Prize	
One-man	Hickory Ridge.............	95⅓	Nanticoke No. 5 No. 2 Shaft	91
Two-men	Nanticoke No. 5 No. 4 Slope	87	Luke Fidler Outside.........	86
Three-men	Cameron Outside...........	97	Pennsylvania...............	95
Full team	Scott Outside..............	96	Pennsylvania...............	95½

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*Instructor in First Aid, Cambria Steel Co., 1005 Somerset Ave., Windber, Penn.

†The more usual practice is to extinguish the lamps. On this matter discussion is invited.—Ed.

DISCUSSION BY READERS

Starting Fan after Explosion

Letter No. 2—Assuming that an explosion has occurred in a mine and the force of the blast has damaged the fan so that it must be repaired before it can be used, the question of starting it up again before the mine has been examined is a serious one. My answer to this question is an emphatic "No."

Experience has shown that there is always more or less unburned marsh gas remaining after an explosion. Miners who have survived an explosion in a mine state that there is usually a reflex wave following the first blast. The result is that most of the oxygen of the mine air is consumed, leaving the atmosphere in the mine, largely devoid of power to support life or flame. Frequently, there are piles of hot dust, and the timbers and ribs of the entries are coated with dust.

In this condition, air from the workings not traversed by the explosion furnishes enough oxygen to start numerous small fires in different parts of the mine. The effect of starting up the fan under these conditions, would be to increase the draft and spread the fire. Moreover, the circulation through the mine would render the gas accummulated in portions of the workings highly explosive and bring this in contact with the fire. A second and more disastrous explosion would certainly follow. This is my reason for saying that the fan should not be started until the helmet men have penetrated far enough into the mine to ascertain its true condition.

FIREBOSS.

Republic, Ala.

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Letter No. 3—I was much interested in the question of Ralph W. Mayer, COAL AGE, Sept. 20, p. 430, referring to the danger of starting a fan that had been thrown out of commission by an explosion, before correctly ascertaining the condition of the mine. While it assumes the worst conditions that could arise, the question is a good, practical one, and, for the benefit of those less familiar with mining conditions, should be discussed thoroughly from a practical standpoint.

There is always the danger of a second explosion following the first, on the restoration of the air current. This is liable to occur whether or not the fan is started. Those familiar with the situation know that ventilation in the mine is always more or less deranged by the destruction of stoppings, brattices, doors, etc., throughout the mine. Frequently, gas feeders and combustible material have been ignited by the flame of the explosion. It must not be thought for a moment that all of the air or available oxygen in the mine has been consumed by the first explosion which belched flame and smoke from the mine openings. It is usually the case that more or less pure air exists in portions of the mine, while other portions are filled with the carbon monoxide, carbon dioxide and nitrogen of the afterdamp. If fire exists at any point in the mine there may result a dangerous amount of carbon monoxide from the incomplet combustion due to the slack ventilation and scarcity o oxygen. Or the fire may start a circulation that woul cause explosive mixtures of this gas or methane accumulated in other parts of the mine, to reach the fire an becoming ignited, produce another explosion.

The fact that a fan is thrown out of commission by a explosion always increases the danger of the situation immediately following; because the period of idleness of th fan affords an opportunity for the accumulation of dangerous bodies of combustible and poisonous gases, whic otherwise would have been removed as they were generated, in those portions of the mine where the circulatio was not deranged too badly. Notwithstanding the ris incurred in entering the mine after an explosion ha taken place, it is the duty of those in charge to do everything in their power to rescue any who may have survived the first explosion. However, action in this regar must be guided and controlled by good judgment an experience, and it is absolutely necessary to disregar sentiment at such times.

A properly equipped rescue party should be organize at once, consisting of the most experienced men amon the volunteers. The best type of breathing apparatu should always be available and portable electric lam should be used; but at least one safety lamp should b carried into the mine to ascertain the gaseous conditio of the mine air.*

Conditions in the mine will determine the method o proceeding underground. If the explosion is general i a large mine, it may be possible to accomplish little i regard to rescue work, until the circulation can be restored with the aid of the fan. It would be advisabl however, to explore the workings as far as possible, no their condition, and ascertain the possible existence o fire in the mine and the probable location of men wh may have survived the explosion and are still alive, so a to render them any possible aid. Where fires are foun they should be extinguished promptly.

On the return of the rescue party to the surface, th fan should be started very slowly at first, the idea bein to restore the circulation in the workings explored an to avoid, as far as possible, setting up a circulation i sections that have not been explored. To accomplis this, the ventilation must be kept under control. It wi now be possible to enter the mine and explore furth other sections; but in no case should the circulation b restored in those sections until it can be ascertained th no fire exists in them.

It is only possible, thus, in a general way, to outli the work; but great care and good judgment must dicta what is best to be done.

BENJAMIN HARTILL

Johnstown, Penn.

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*A caged bird or mice should also form part of the equi ment, to reveal the presence of dangerous quantities of ca bon monoxide.

The Liquor Problem in Mining

It is candidly admitted that the miner drinks; but whether this habit has any stronger hold upon miners than upon other classes of workers may be seriously questioned. At least, miners, as a class, are entitled to this consideration. For example, select an equal number, say 500 men, from each class of workers such as glass blowers, iron workers, machinists, foundrymen, etc.; and compare the proportion of drinking men in each class, with the proportion of drinking miners. I am confident that such a comparison would not prove unfavorable to the miner.

In all industries, it is common to hear the drinking class referred to as "good workers if they would not drink." To the credit of the miners, I will say that, in my opinion, 75 per cent. of them are honest workers, and the remaining 25 per cent. are mostly honest workers when they are sober. The same can be said of a large number of our best tradesmen; they are good workers when they are sober. Only a few days ago, I heard a boss say of one of his men: "He is the best workman we have on the job, but he will not leave drink alone."

In reference to the increase or decrease of the drinking habit among miners, I would say that there is an increase, generally, in localities where miners are crowded together in a small town or camp, devoted wholly to the coal-mining industry. But, in larger communities, where miners mix with workers in other industries, it cannot be said that they drink any harder or oftener than their fellows in other callings.

While a mine superintendent cannot always employ men who are sober, he can discourage the drink habit among the men by his own example of abstinence and by refusing to hold any position open for a man who drinks habitually. I consider drinking booths, canteens, and bootlegging should be abolished from every mining camp, and more especially for the sake of the coming generation. If we can keep the boys away from the saloons when young, they will not be enslaved to the habit when they become men. The mine foreman, by his example and by the courteous treatment of his men, can do much to overcome the baneful influence of the drink habit among his employees, while a curse and a dark look, in place of a smile, will go far toward increasing the evil.

John Sutton.

West Terre Haute, Ind.

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Mixed Lights in Mining

Letter No. 18—I have been deeply interested in the discussion on this subject, and regret that the question does not seem to have reached a successful climax. One of the cardinal issues, in the operation of a gaseous mine with respect to the health and safety of the employees is, in my opinion, the exclusive use of an approved type of oil-burning safety lamp or electric lamp. This seems necessary as a reasonable precaution to avoid the possible ignition of a body of explosive gas. By prohibiting the use of open lights in such mines, we eliminate one of the factors largely responsible for mining catastrophies.

It is argued by some that the operation of a mine on a mixed light basis is justifiable under certain conditions where the quantity of explosive gas generated is small or the mine makes gas only in the solid or live workings and the circulation is sufficient in quantity and velocity to carry off and render harmless the gases generated. It cannot be guaranteed, however, that the conditions on which this argument is based will continue for any length of time. There are many things of common occurrence in coal mining that impair the efficiency of the ventilation at the working face, to the extent that an apparently safe mine becomes suddenly dangerous. The failure of the ventilating fan; the accumulation of ice in the air shaft; a heavy fall of roof in the air course, by which the mine resistance is increased; a door left open or a brattice torn down; or any one of numerous other causes may, in a moment, so disarrange the ventilating system as to render the workings dangerous where mixed lights are employed.

There are, besides, numerous geological changes that are liable to occur in coal seams and that would prove a menace to the safety of a mine operating in a gaseous district. The presence of spars, faults or clay veins is frequently accompanied with a change in the gaseous condition of the mine workings. It often happens that a strong feeder of gas is liberated by the blast of an explosion, or by the miner's pick or drill, or by the undercutting of the coal, by machines. There is no way of foreseeing and providing against such occurrences, or estimating the amount of gas that may be given off from a clay vein, fault or feeder.

As an illustration of this fact, I will mention an incident that occurred in my own experience. In the mine where I was employed, a clay vein was exposed suddenly, by the undermining of the coal with a machine. The quantity of gas given off from this clay vein was such as to render highly explosive an air current of 10,000 cu.ft. per min., for 3 hr. after the vein was cut. No argument is needed to make clear the fact that an open light, at such a time, would have supplied all that was needed to cause a mining catastrophe, the magnitude of which would be measured only by the number of lives lost and the property destroyed. I am thankful to say that, at this particular mine, safety lamps were used exclusively and this fact alone averted the danger.

The chief claim of the mixed-light advocates is that a man can perform more work in less time, with an open light, than with a safety lamp, because of the fact that the open torch gives a better light and can be carried on the head, leaving the hands free for work; it can also be relit, if extinguished, with less trouble than a safety lamp. It is claimed that the miner can produce better coal and is less liable to injury himself when using an open light. While these statements may be true, in respect to men who have been accustomed to using an open light for years and were compelled, suddenly, to adopt the safety lamp, they do not apply to men long accustomed to the use of safety lamps. The latter become and are as skilled workmen as the open-light miner, and can produce as much coal in the same time.

There are certain benefits that accrue from the exclusive use of the safety lamp. Briefly stated, these are: 1. The safety lamp tends to make the miner more careful, because it is a constant reminder of possible danger. 2. The safety lamp, incidentally, brings the miner into closer contact with the mine foreman and his assistants. When the lamp is given to the miner in the morning the opportunity is afforded of notifying him of any peculiar danger in his place. 3. Safety-lamp mines are more free from smoke and soot, as the oil burned in these lamps is, generally, a better grade than that commonly used in the open light. 4. The flame of the safety lamp being protected, there is less danger of igniting either gas, timber, explosives, or other combustible material.

The contention that a safety lamp in the hands of an ignorant workman may prove as dangerous as an open light, is too absurd to be regarded seriously. One of the well known features of a safety lamp is that it is quickly extinguished in a body of gas, unless great care is exercised by the one holding the lamp. This is an invaluable feature in respect to the use of the safety lamp by ignorant or inexperienced workmen.

The greatest drawback and the feature that most tends to make the safety lamp unpopular with mining men, however, is the difficulty experienced in relighting an extinguished lamp. At times, the workman must travel a considerable distance to a lamp-lighting station. The cause of the lamp being extinguished may be due to careless handling; but it is often caused by the neglect of the attendant in charge of the lamp station to properly fill the lamp with oil or replenish the igniter; or, perhaps, the igniting apparatus is out of order or damp, or, as has happened, has been left out entirely, by mistake. Trouble is largely overcome, at the present time, by the use of a friction plug, the sparks of which relight a lamp burning a volatile oil. This igniter seldom fails and is a great improvement over the tape or match formerly used.

The points I have mentioned demonstrate conclusively, to my mind, that the use of mixed lights in a gaseous mine is a dangerous proposition. In such mines or districts, the life and health of the men underground can only be protected by operating the mine on an exclusive safety-lamp basis. The introduction of the electric lamp at the working face is an innovation in coal mining.

FIREBOSS.

Herminie, Penn.

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Star Chamber Methods

In regard to your editorial of Sept. 20, in regard to "Star Chamber Methods," I would say that, while the faults for which penalties were inflicted at the Lehigh Valley Coal Co. contest at Hazle Park were not announced on the field, there have been prepared circular letters for each competing team, and for each team present at the meet, showing just what penalties were inflicted in each event.

E. C. LEE,
Engr. Dept., Lehigh Valley Coal Co.
West Pittston, Penn.

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Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

QUANTITY

The term "quantity," in mine ventilation, refers to the volume of air passing in an airway, estimated in cubic feet per minute. This is often spoken of as the "circulation" of the airway or mine.

How Quantity Is Estimated—As stated above, the quantity of air circulated in an airway or mine, or the "circulation," as it is called, is always estimated, in this country, in cubic feet per minute.

How Quantity is Measured—To measure the quantity, in ventilation, it is necessary (1) to measure the sectional area of the airway at the point of observation and (2) to carefully measure the average velocity of the air current at the same point. From these measurements, the volume of air passing or the circulation is calculated by means of the formula,

$$\text{Quantity} = \text{area} \times \text{velocity}$$
$$q = a\,v$$

Example—Calculate the circulation in an airway having a sectional area of 50 sq.ft., the average velocity of the air current being 600 ft. per min.

Solution—Substituting the given values in the formula for quantity in terms of velocity and area,

$$q = a\,v = 50 \times 600 = 30{,}000 \textit{ cu.ft. per min.}$$

Quantity of Air Required—In determining the required circulation of a mine, it is necessary to consider (1) the requirements of the mining law of the state in which the mine is located and (2) the requirements of the mine as determined by the natural conditions existing in the seam and the enfolding strata.

Requirements of the Mining Law—These vary somewhat in different states. Owing to the numerous and changing conditions, in mines, mining laws are of necessity arbitrary standards, which must, however, be met, except in cases where the law specially confers discretionary powers upon the mine inspector or the mine foreman, thereby authorizing them to decrease the circulation in any mine or section of the mine, as conditions may require or their judgment dictate.

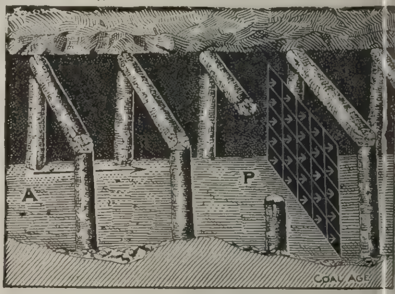
The mining law commonly specifies from 100 to 150 cu.ft. per man, per min. for nongaseous, and 200 cu.ft. per min. for gaseous mines. In addition, some of the laws require from 500 to 600 cu.ft. per min., for each animal employed underground.

Natural Requirements—Gaseous mines naturally require more air than nongaseous mines. The rise workings of seams generating marsh gas or the dip workings of mines giving off quantities of blackdamp are often difficult to ventilate and require a circulation greater than what the law specifies, in order to keep the workings free from gas and healthful and safe for work. Slips and faults often give off much gas when least expected and require, therefore, a larger circulation of air than would otherwise be necessary in the same mine.

The Coal Age Pocket Book

WORK—POWER

The terms "work" and "power," as used in mine ventilation, are synonomous, because the work performed in moving the air through the mine airways is based on a unit of time, both the velocity and the quantity being rated per minute of time.



SHOWING PORTION OF MINE ENTRY AND CROSS-SECTION

Power on the Air—The air current in an airway or mine is moved by a pressure called the "ventilating pressure." The ventilating pressure or the pressure producing the circulation is the total pressure (pa) exerted on the entire sectional area of the airway, as illustrated in the accompanying figure. The small arrowheads represent the unit pressure or the pressure (p) on each square foot of cross-section. The large arrow shown at A represents the total pressure P = pa.

It is a law of mechanics that when a force (pa) moves or is exerted through a distance (v) the work performed is equal to the product (p a v) of the force and the distance. But in this case, the force (pa) moves through the distance (v) in one minute. The work (pav) is, therfore, performed in one minute and is the "power on the air." The work performed per minute or the power on the air is expressed in foot-pounds per minute. Calling this work per minute or power on the air u, the formula for power is

$$\text{Power} = \text{unit pres.} \times \text{area} \times \text{vel.}$$
$$u = p\,a\,v$$

Again, since q = av, the formula for power on the air may be written

$$\text{Power} = \text{quantity} \times \text{unit pres.}$$
$$u = q\,p$$

The formula for horsepower of the circulation is, therefore, since 1 hp. = 33,000 ft.-lb. per min.

$$H = \frac{q\,p}{33{,}000}$$

The power formulas, in ventilation, make it possible to calculate the power required to produce any given circulation, against any given pressure or water gage when the efficiency of the ventilator is known or assumed.

INQUIRIES OF GENERAL INTEREST

Unit Weight of Air

Will you kindly answer, through the columns of COAL AGE, the following question: What is the weight of 1 cu.ft. of air, at a temperature of —460° F., and a pressure corresponding to 1 in. of mercury?

I. C. PARFITT.

Jerome, Penn.

The temperature given, namely, 460 deg. below zero (—460° F.) is the absolute temperature of the Fahrenheit scale. At this temperature and an atmospheric pressure corresponding to 1 in. of mercury column, a cubic foot of dry air has been calculated, from numerous careful determinations, to weigh 1.3273 lb. This is the constant used in the formula:

$$w = \frac{1.3273 \times B}{460 + t}$$

which gives the weight of a cubic foot of dry air, at any temperature (t) and pressure (B), since the weight per cubic foot varies directly as the pressure and inversely as the absolute temperature.

For example, the weight of 1 cu.ft. of dry air at 60 deg. F. and a barometric pressure of 30 in., is

$$w = \frac{1.3273 \times 30}{460 + 60} = 0.0766 \text{ } lb., \textit{ nearly}$$

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Gasoline Mine Locomotives

Kindly state whether the gasoline locomotive is considered safe for hauling coal in a mine.

J. J. HOPKINS.

California, Penn.

Opinions vary in regard to the question of safety, in respect to installing a gasoline locomotive in a coal mine, particularly a gaseous mine. There is, naturally, a strong objection, we may not say prejudice, to permitting so large a quantity of such an explosive liquid as gasoline, to be taken into the mine. For the purpose of haulage, the gasoline is handled in sealed tanks, which are taken into the mines and installed under heavy covers near the center of the machine, to guard against possible accidents due to the breaking of the tanks in the event of collision and the igniting of the gasoline.

It is claimed that with reasonable care the gasoline mine locomotive, as now built, is safer than the electric locomotive used for the same purpose, in mines. It cannot be denied, however, that the presence of gasoline, in the quantities required for mine haulage, is and must necessarily be regarded as a menace to the safe working of the mine. The majority of mine accidents are due to carelessness or neglect; and, to avoid disaster from these sources, all explosive material should be kept out of the mine, as far as possible. Many mines, however, are operating gasoline locomotives successfully, and it may be said that few serious accidents have resulted.

In this connection, another danger aside from that of fire and explosion, must be considered. When a gasoline motor is not working properly, the combustion in the cylinder is incomplete, and the exhaust gases then contain appreciable amounts of carbon monoxide. In the normal working of the engine, the exhaust gases consist chiefly of nitrogen and carbon dioxide, with water vapor. The possibility of poisonous gases in the exhaust, though comparatively slight, may result in fatal consequences under the varied conditions in coal mining. In well ventilated workings there is little danger to be anticipated from the exhaust of the engine; but the poisonous effect of the gases should be thoroughly understood by all concerned in the operation of this class of motors. When the engine is working properly, there is little smoke or odor noticeable in the exhaust; and when these are observable, they indicate incomplete combustion in the cylinder, which should be remedied in order to avoid danger and obtain the highest efficiency of the machine.

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Safety in Mining

Will you kindly state what, in your opinion, are the most essential elements relating to the safe operation of coal mines. There has been so much spoken and written, in recent years, in regard to means and methods, the adoption of which it is claimed would reduce danger and make the mine more immune from accidents, that the practical man is very much confused as to what methods will produce the greatest degree of safety.

The importance of humidifying the mine air by the introduction of steam into the intake airway of the mine, has received special attention and seems reasonable, both as a means of laying the dust on the roadways, and decreasing the capacity of the air traveling through the mine, to absorb moisture and dry out the workings. It has been suggested that the danger of blasting coal in mines is greatly lessened by reducing the air current at the time of firing, but the question is yet unsettled.

A less reasonable suggestion is that the mine air should be immunized by reducing its oxygen content, and even by introducing into the air current certain inert gases, mainly carbon dioxide. Now comes the suggestion of building light collapsible stoppings, in order to localize a possible explosion of gas or dust at the working face. Is there any wonder that the layman is practically at sea in regard to most of these matters?

MINE SUPERINTENDENT.

Pottsville, Penn.

We are glad to receive this inquiry as it reveals the uncertainty that prevails in the minds of a large number of practical mine superintendents and foremen who are desirous of adopting any measures that will make the mine more safe. While no definite answer can be given to this inquiry in detail, we are glad to state that much light has been thrown on many of these questions by the discussions in COAL AGE, giving the views of practical men on these subjects. The question of collapsible stoppings is now being discussed.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What precautions should be taken in the use of safety lamps in mines?

Ans.—All safety lamps used in the mine should be of an approved type and, as nearly as practicable, of the same kind, except those used by the firebosses, who should own and care for their own lamps. The miners' lamps should all be owned by the company and in their charge. They should be examined, cleaned, filled and trimmed in a properly equipped lamp room or station, by competent men, after each shift. Preferably, each lamp should be stamped with a number corresponding to a check to be given to the man using that lamp. As far as practicable, each miner should have the same lamp given him, from day to day, and should be held reasonably responsible for its condition. The lamps should be given out in exchange for the proper check, previous to each shift, and the check should be immediately hung where it can be seen, on the hook or in the place previously occupied by the lamp. At the end of each shift, every miner returns his lamp and receives again his check for the same. The hooks, or pigeonholes, for the lamp should all be numbered to correspond to the number on the lamp.

On receiving his lamp in the morning, each miner should carefully examine the same before leaving the lamp room, to ascertain for himself that it is properly put together and in good condition, trimmed and filled. In the mine, the lamp should be carried in an upright position, at the side or in front of the person, to protect it from a strong draft; it should not be swung or tilted to one side so that the flame inclines toward the gauze or the glass of the lamp. The wick may be cleaned by the pricker when necessary to improve the light, but care must be taken not to raise the wick too high so that the flame will smoke. The lamp must not be exposed to too strong a draft and should be protected, as far as possible, from the concussion of the air caused by a heavy shot. While at work, the miner must put the lamp where it will not be in danger of falling, or being knocked over, or injured by a blow or fall of slate or coal. The miner must observe the lamp continually, at brief intervals during the day. It should not be hung too high in the roof, and, in testing for gas, must not be exposed to the gas longer than to detect the presence of the same.

Ques.—If when making an examination of the mine you found a large body of explosive gas, state what precautions you would take to prevent an accident.

Ans.—If the gas is discovered in the early morning examination, that section of the mine should be fenced off, and no one permitted to enter until the gas has been removed and the workings examined and reported safe. It may be necessary, under certain conditions depending on the arrangement of the ventilating system and the quantity of air in circulation throughout the mine, to adopt the wise precaution of undertaking the removal of the gas before anyone is permitted to enter the mine except those necessary to perform the work. There is always danger in the presence of a large body of firedamp in any section of a mine, however well isolated that section may be from the other workings. The danger lies in the possibility of a heavy roof fall or other unforeseen occurrence driving the gas back into adjoining sections. This could occur, to a dangerous extent, as the result of a slight derangement of the ventilating system, or a heavy fall of roof; and, in case of a serious accident resulting, the mine management would be responsible for not having taken every possible precaution.

In the removal of the gas, only competent men should be employed, and safety lamps should be used exclusively. All entrances to the mine or the affected section should be carefully guarded. The work should be approached from the intake side, and should be conducted with the utmost caution, time being given for the complete removal of the gas from a place, before advancing further. The progress of the work should be carefully watched by making frequent tests for gas with the safety lamp.

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine before conducting it to the face of the workings, and if not, why not?

Ans.—The intake air current in a mine should be conducted as directly as possible to the face of the heading or the inby end of the workings and returned along the working face. The air current should never be conducted through abandoned workings before sweeping the working face, for the reason that there is always more or less gas given off and accumulating in these waste places, and, as a result, the air would be contaminated to a dangerous extent. As far as practicable, all abandoned places that are not sealed off should be ventilated by a separate air current, which should then pass directly into the main-return airway and thence out of the mine.

Ques.—A mixture of marsh gas and air at its most explosive point is passing through an airway 4x5 ft. in section. The average velocity of the current is 100 ft. per min. What quantity of fresh air must be added to this current so that it will not be possible to detect gas on the safety lamp, assuming a cap cannot be detected when the gas content in the air is 2 per cent. or less?

Ans.—The area of the cross-section of this airway is $4 \times 5 = 20$ sq.ft. The volume of air in circulation is $20 \times 100 = 2000$ cu.ft. per min. Firedamp at its most explosive point contains 9.46 per cent. of marsh gas. The volume of gas in this air current is, therefore, $2000 \times 0.0946 = 189.2$ cu.ft. per min.

Now, assuming that this quantity of gas is 2 per cent. of the entire mixture after the fresh air is added, the volume of the current would be $189.2 \div 0.02 = 9460$ cu.ft. per min. Subtracting from this total volume of air and gas, the original volume, gives, for the fresh air added, $9460 - 2000 = 7460$ cu.ft. per min.

COAL AND COKE NEWS

Washington, D. C.

President Wilson signed the new tariff bill on Friday, Oct. There were no changes of importance in the rate schedules of the free list, subsequent to the report of the conference committee on Sept. 30. Attention is now being concentrated upon the income tax sections of the law and upon its administrative features. In particular the working of the income tax seems to be the subject of strong interest on the part both of individuals and corporations.

The following summary gives those portions of the income tax law which have a direct and important bearing upon the payment of the tax by those who own mining shares or who are operating mining corporations and are obliged to make tax returns for the same. Some important changes were made by the conference committee in this phase of the law at the last moment, embodying provisions that had not previously become known. The income tax section itself is an extremely lengthy document but the following summary gives practically all of those portions, scattered here and there throughout the section which are germane to the subject.

The provision as to allowances for depreciation in the value of mines in making report of net individual income for taxation is interesting and follows the Senate amendment to the income tax sections. After it has provided for the so-called "normal tax" on ordinary incomes the tariff bill allows certain offsets among which is included the allowance for mine depreciation, in part as follows:

> That is computing net income for the purpose of the normal tax there shall be allowed as deductions: First, the necessary expenses actually paid in carrying on any business, not including personal, living, or family expenses; second all interest paid within the year by a taxable person on indebtedness; third, all national, state, county, school, and municipal taxes paid within the year, not including those assessed against local benefits; fourth, losses actually sustained during the year, incurred in trade or arising from fires, storms, or shipwreck, and not compensated for by insurance or otherwise; fifth, debts due to the taxpayer actually ascertained to be worthless and charged off within the year; sixth, a reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business, not to exceed, in the case of mines, 5 per centum of the gross value at the mine of the output for the year for which the computation is made; but no deduction shall be made for any amount of expense of restoring property or making good the exhaustion thereof for which an allowance is or has been made: Provided, That no deduction shall be allowed for any amount paid out for new buildings, permanent improvements, or betterments, made to increase the value of any property or estate.

Subsection G. of the income tax provision is practically a re-enactment of the corporation tax now in force. The Conference Committee, however, made important alterations in its terms, leaving it to read in part in the following form:

> G. (a) That the normal tax hereinbefore imposed upon individuals likewise shall be levied, assessed, and paid annually upon the entire net income arising or accruing from all sources during the preceding calendar year to every corporation, joint-stock company or association, and every insurance company, organized in the United States, no matter how created or organized, but not including partnerships; but if organized, authorized, or existing under the laws of any foreign country, then upon the amount of net income arising or accruing by it from business transacted and capital invested within the United States during such year.
>
> (b) Such net income shall be ascertained by deducting from the gross amount of the income of such corporation, joint-stock company or association, or insurance company, received within the year from all sources, (first) all the ordinary and necessary expenses paid within the year in the maintenance and operation of its business and properties, including rentals or other payments required to be made as a condition to the continued use or possession of property; (second) all losses actually sustained within the year and not compensated by insurance or otherwise, including a reasonable allowance for depreciation by use, wear and tear of property, if any; and in the case of mines a reasonable allowance for depletion of ores and all other natural deposits, not to exceed 5 per centum of the gross value at the mine of the output for the year for which the computation is made.

HARRISBURG, PENN.

Members of the Mine Cave Commission of Scranton, have been given a few more days to secure evidence on which will be based whatever action the city finally takes against the Peoples Coal Co. to stop destruction of private and public property through the taking out of coal under the city.

After this evidence is gathered, it will then be decided just what the nature of the action to be brought against the company will be.

Two courses of action are open. The first one is a criminal action against the company under the provisions of the "Davis Mine Cave Bill," passed by the recent Legislature. If the officers of the company are fined or sentenced to jail, nothing can prevent them, after having paid their fines or undergone their sentences from continuing their present methods of mining coal, which methods it is alleged are responsible for the wrecking of many buildings in the city.

The second action open to the city is to bring suit in equity asking that the coal company be restrained from mining coal under the streets. This is the action the citizens want, but it is doubtful if the city does anything more than bring suit under the provisions of the "Davis Mine Cave Act."

If the Mine Cave Commission finds, however, that the coal company is willfully destroying private property while taking out coal, it is possible the city will then make such action the basis for an equity suit.

The City cannot prevent the company from mining its own coal, but the question at issue is, whether or not the city can regulate the manner in which that mining shall be done. If it can, then the city can prescribe the power of the charge of explosive which shall be placed in a vein of coal under any street or private property.

In any event it is certain that some kind of a suit will be brought against the coal company, and that before the suit is finally settled that the constitutionality of the "Davis Mine Cave Law" will be reviewed by the highest court of Pennsylvania.

Efforts are being made to secure an agreement as to the facts in the case. If this plan is successful, both the city and the coal company will agree on a set of facts and the same will be submitted to the lower courts with oral and written arguments by each side in support of the theories which will be advanced by the respective parties to the suit. The decision of the lower court will thus be reviewed by the Supreme Court of this state.

Under this arrangement it will take at least a year and possibly longer before any decision is finally reached. In the meantime the company may or may not continue taking out the coal.

What the city is trying for is some effective action which will prevent the coal company from continuing its present methods of mining, which methods, it is charged are responsible for the destruction of property.

Suits are also being prepared against the Erie Co., and the Kearney & Brown Coal Co., by parties who allege that the coal in the pillars, under their homes after being bought and paid for has been mined by these companies, causing the surface to cave. This is the first time for suits of this nature to be brought up.

The Rescue of Toshesky

On Saturday morning, Oct. 4, at 7:30 a.m., Thomas Toshesky, a Polander, was released from his prison in the Mammoth vein, of the Continnental Colliery, of the Lehigh Valley Coal Co., situated at Centralia. The coal barrier that had held him prisoner since noon on Friday, Sept. 26, had been pierced.

For five days the imprisoned miner was without food. On Tuesday, Sept. 30, a bore hole was drilled through a pillar, after which a 2-in. pipe was inserted into the chamber where he was caught by the rush of coal, and a small quantity of liquid food was sent down. Later came a change of clothing, a blanket, and a rope which he wove into a hammock. These were forced through after greasing them well.

A remarkable spirit of coöperation was displayed by state and company officials and the miners alike. The company issued general orders immediately after the accident that no expense should be spared in the rescue. Throughout the entire coal regions of Pennsylvania there is unending warfare between the Slavs and other races from Central and Southern Europe and the English speaking miners, who are slowly being driven from the region by an influx of non-English labor. But all this race antipathy was forgotten during the present crisis in the effort to rescue a fellow workman of non-English origin.

PENNSYLVANIA

Anthracite

Locust Gap—Great improvements are being made by the Philadelphia & Reading Coal & Iron Co., at the Locust Spring colliery, at Locust Gap. Two new steam dumps have been installed and are proving a great improvement over the old means of dumping the coal into the breakers. A new four-drum Flory friction engine has been placed on the car road, to better facilitate the handling of cars when loading for market.

Pottsville—The cloudburst which flooded this section for a few hours last week furnished only temporary relief from the drought which has prevailed for several months. Another entire week without rain has reduced the water supply lower than it was a week ago, and unless there is a speedy rainfall a number of washeries will again close down. At least a score of towns in this section are short of water.

Wilkes-Barre—The important suit of the executor of Henrietta Baker, et al, against the Keystone Coal Co. and others, tried before Judge Cummings came to a sudden termination this week when the Court gave the jury binding instructions to find for the plaintiffs in the full amount of principal and interest, a total of $14,640. The suit was over the payment of a mortgage of $8000 on the property of the Keystone Coal Co. with interest from Dec. 1, 1899.

Lansford—The Lehigh Coal & Navigation Co. will not only convert the whole of Broad Mountain between Mauch Chunk and Tamaqua into a forest of useful trees to take the place of the present scrub timber, but will endeavor to reforest all its fireswept land, wherever situated.

Bituminous

Brownsville—W. Harry Brown, of Pittsburgh, the well known operator, is preparing to open a new mine near this place. Already work has been started and the plans are to open two slopes and a shaft. The plant will have a capacity of 4000 tons of coal daily. The work of erecting houses for the employees will be started at once. The opening of this mine will make the fourth mine for the Pittsburgh or River Vein of coal in Greene County. The first mine was opened at Rices Landing by the Dilworth Coal Co., now owned by Rice's Landing Coal & Coke Co. The next mine was opened by the Crucible Coal Co., and the third by the Poland Coal Co., and it is expected that the Youngstown Sheet & Tube Co. will soon start operations in this vicinity.

Hackett—An injunction suit has been filed against John Talbot, to restrain him from running water from his mine across the property of Paul Terchek. Terchek claims that the water contains large quantities of sulphur, which is ruining his property.

Brockwayville—The Toby Coal Co. is opening a new mine south of the property of the McKnight Coal Co., on the Shawmut R.R. line near Brockwayville, Penn., where it has a seam about 5 ft. thick. The mine is expected to yield 300 to 400 tons of good-quality coal daily for the next half dozen years.

Punxsutawney—Preparations are being made for opening another mine in the Toby Valley. The Toby Coal Co. has secured a considerable coal acreage out of town near the Pendleton place with the intention of opening it as soon as the Black Diamond Colliery becomes worked out. It is the intention to put in an uptodate plant that will accommodate a large tonnage.

Myersdale—The Huff Coal Co. is pushing two headings into the 7-ft. coal seam that was struck while prospecting last summer. The mine will have a capacity of 1000 tons per day.

WEST VIRGINIA

Charleston—A statement recently made to the effect that plans for purchasing the greater portion of the New River coal field had fallen through has met with emphatic denial. It is stated upon good authority that an American representative has sailed to confer with English capitalists, and it is expected that the deal will be put through in a short time.

Much complaint is being aroused over the car distribution system on the Coal & Coke R.R. It is claimed that the interests of the independent operator are sacrificed for those mines which are connected financially with the road.

War—The Pocahontas Domestic Coal Co. has recently installed an inclined plane to handle its output from a new opening directly to the tipple. This will materially shorten the haulage and increase the output. The company is also installing an electric power house principally for haulage purposes. This with the assistance of a four-ton gasoline locomotive already in operation puts the company in good shape to greatly increase the output of the mine.

Yukon—The Dryfork Colliery Co. is installing an electric plant for the purpose of mine haulage. Power will be supplied by the Appalachian Power Co. to a motor-generator se which delivers direct current to the mine at a voltage of 25

Lex—The Lex Pocahontas Coal Co., recently organized a Lex, West Virginia, with J. H. Hamon, president; R. F. Tay lor, general manager, and C. A. Reynolds, secretary, has com pleted a coal tipple and will soon be in readiness for shipping fuel.

OHIO

Nelsonville—Randall Cable, a mine operator of Nelsonvill filed a petition in the United States Bankruptcy Court wit assets of seven dollars and liabilities of $1505.83.

Columbus—Operators in all parts of Ohio do not fear th announced investigation of Attorney-General Hogan and th Ohio Utilities Commission on the recent advance in coa They say that the present increased circular is brought abou by the car shortage, which is growing worse. When th recent advance was made, Attorney-General Hogan immediately announced an investigation charging that the railroad were in collusion with operators in raising coal quotations He said the railroads were trying to work up sentiment i favor of increased freight rates and possibly increased passenger rates, and that a searching inquiry would be mad to see if the antitrust law was being violated. It wa pointed out to him that the lack of a strong state organization of operators was the best evidence that there was n illegal combination.

KENTUCKY

Greenwood—Captain John A. Geary will shortly begin th shipment of coal from his new mining plant near Greenwood which is in the vicinity of Whitley City, Ky. His mine wil operate one of the finest seams of domestic coal in that section, and is completely equipped. About 100 men will be employed.

Louisville—Coal men throughout the state, operators an dealers alike, are much interested in the Coal Dealers' Fir Insurance Co., recently incorporated at Louisville by Ear Martin, former president of the Continental Coal Corporation K. U. Meguire, president of the Harlan Coal Mining Co., and of the Snead-Meguire Coal Co., and others. The capital stock of the company was fixed at $100,000, but this figure will probably be increased shortly. Mr. Martin has been at work on the organization of the company for some time, having moved some time back from Chattanooga to Louisville, where the principal offices of the company are to be permanently located. The company will confine itself to insuring strictly coal risks, including the yards and equipment of coal dealers and all insurable matter around coal mines. Investigations, which have been conducted in Kentucky, Alabama, Tennessee, Indiana and Illinois, in which five states the company proposes to do business, have shown, according to President Martin, that the kind of business which the company will write can be profitably handled at rates at least one-third lower than those now charged.

INDIANA

Linton—The Little Giant mine has been reopened for the fall trade, giving employment to 300 men.

Princeton—W. H. Rainey, member of the executive committee of the Indiana miners, called out 250 men at the mine of the Princeton Coal Co. He demands the reinstatement of an employee and alleges that he called a strike because he could not get a hearing on the trouble with Mine Superintendent Weir.

Petersburg—After five months' steady pumping following the March and April floods, at a cost of $10,000, both Blackburn mines have resumed operations, giving employment to 200 men.

Terre Haute—Simeon Fermeango, treasurer of the United Mine Workers at Libertyville, was held up and robbed one night recently when leaving the lodge hall by two men. The robbers took $465 and made their escape.

ILLINOIS

Staunton—The Consolidated Coal Co.'s mine No. 7, of this place, which has been idle for the past four years, is resuming operations, and coal will be hoisted this week. The company's improvements involved an outlay of $30,000, and includes a new shaft, tipple, and washer at No. 7, and an electric plant at No. 14, which will furnish power for three mines. Mine No. 1 of the Mt. Olive & Staunton Coal Co., is also starting after six months' suspension, during which its machinery has been completely overhauled.

Belleville—The Hibbard mine south of this place, which has been idle for the past two years, is undergoing repairs, and the operators expect to have it in working order within the next 30 days.

La Salle—The shaft of the La Salle County Carbon Coal Co. that was sunk in 1856, has recently been equipped with electric motors to haul the coal. The above company is at present operating four mines near La Salle and are large producers of Illinois third-vein coal.

Dewmaine—The Madison Coal Corporation will give an exhibition of fire fighting above and below ground, mine-rescue and first-aid work on Tuesday, Oct. 14, at their mine located at Dewmaine. The work will be done by men employed and trained by this company. This exhibition will be instructive and no doubt a success in every way.

Springfield—The Illinois Colliery Co., a $2,000,000 corporation, owning mines in Sangamon, Macoupin, Montgomery, and Bond Counties, will be sold at auction on Saturday, Nov. 15, by Master in Chancery John M. Pfeifer, to satisfy the claims of bondholders. Notice of the sale was issued recently in accordance with an order of Judge Creighton, of the Sangamon Circuit Court. Mines are located at Springfield, Chatham, Virden, Girard, Litchfield, and Sorento, Ill.

MICHIGAN

Bay City—John P. White, international president of the United Mine Workers, has given his decision relative to the trouble in Michigan, where 3000 miners were out, on account of the discharge of three of their number. He holds that the strike was not justified, as the trouble was one subject to arbitration. Mr. White had been selected as arbitrator.

IOWA

Centerville—Poor business management and deals on the Board of Trade are given as the reason for the business failure of the A. Mitchell & Son Coal Co. The assets are given as $26,000, and the liabilities are $36,000.

MISSOURI

Kansas City—The strike situation in Colorado has resulted in a movement of miners eastward, and operators of Missouri, Kansas and Arkansas are now well provided for in the way of help. Full production for the winter is assured by the addition of the strikers. Miners in Colorado demand recognition of the union by operators. This has been refused and probabilities are for a long-drawn disagreement. Most of the mines in Kansas and Missouri are manned by union labor exclusively, and the Colorado miners are seeking this section as a haven of refuge during the storm in the West.

ARKANSAS

Spadra—Lighting struck the top works at the Duck's Nest Mine and destroyed property valued at $75,000.

Denning—The Western Coal & Mining Co. has recently taken options on about 10,000 acres of coal land in the vicinity of Heber Springs.

OKLAHOMA

McCurtain—The mines of the Sans Bois Coal Co., at McCurtain, which have been closed since the disastrous explosion a year ago last March, in which nearly one hundred miners perished, have resumed operations. They will employ about 600 men.

COLORADO

Fruita—Fruita people intend to take advantage of a recent act of Congress permitting municipalities to acquire government coal lands. It is probable that a municipally operated mine will supply the demand if the necessary title or lease can be secured from the Department of the Interior. This matter will be taken up through the proper officials, and Congressman Taylor will be asked to assist in starting the municipal mines.

Crested Butte—The Crested Butte Anthracite Mining Co. has acquired and will operate the old Smith anthracite mine located about four miles northwest of Crested Butte up Slate Creek on Smith hill. This mine has been idle for about six years.

FOREIGN NEWS

Hamilton, Ontario—The Hamilton By-Product Coke Ovens, Ltd., in which American capital is largely interested, is being organized with an authorized capitalization of $1,000,000 to manufacture coke for smelting, foundry and domestic purposes. The contemplated investment is considerably larger than the nominal capital. A site of 33 acres has been secured in Hamilton.

The first unit will consist of 50 ovens each of 16 tons capacity operating on 18-hr. time, and three rows of byproduct apparatus for gas separation; also coal-preparing plant, steam and electric compressing and water-pumping plants, and other adjuncts. The initial cost will be about $1,000,000. There will also be erected a 5,000,000-cu.ft. gas holder at an additional cost of $250,000 and later on another of 3,000,000 cu.ft. capacity. The plant will carbonize 1000 tons of coal per day and will require a high-grade coking fuel, which will be imported from Pennsylvania or West Virginia.

From this coal it is expected there will be produced 700 tons of coke per day and also the byproducts comprising tar, ammonia sulphate and benzol. The tar will be worked up into various marketable products, while the coke will supply the requirements of the blast furnaces of the Steel Co. of Canada, and the foundry industries of Hamilton and neighboring industrial centers, which now import their fuel from the United States. The plant will be electrically equipped, and will use between 700 and 1000 hp. It will give employment to about 300 men, and the subsidiary industries will also require a large number of operatives.

PERSONALS

State Commissioner John H. Page, of Arkansas, has appointed John T. Fuller, of New York City, as state mineralogist and mining engineer.

Raymond D. Clere, of Boyd County, Ky., has been appointed by Governor McCreary an assistant state mine inspector, succeeding H. G. Van Hoose. Inspector Clere took up his duties Oct. 1.

On account of the death of President Cyrus H. Polley, of Buffalo, Harry Yates has been elected president, W. W. Campbell, vice-president, and William H. Nicol, general sales agent of the Seneca and Punxsutawney Coal Mining Companies. Other positions are left unchanged. The Falls Creek Coal Co. will still be managed with the others.

J. B. Atkinson has retired from the position of His Majesty's Inspector of Mines, and begun a practice as consulting mining engineer at 9 Kensington Terrace, Newcastle-upon-Tyne. Mr. Atkinson has had many years of broad experience both as an inspector of mines and while associated with the management of large collieries in Durham and Yorkshire.

Geo. Brymer, superintendent of the Edgewater mine of the Tennessee Coal, Iron & Railroad Co., has resigned his position on account of poor health and will take a six months' rest. His address for the present will be Gwynedd Valley, Penn. Mr. Brymer intends to return to Alabama in the future and is enthusiastic over the climate and business possibilities of that district.

CONSTRUCTION NEWS

Canton, Ill.—Work of repairing the boiler room at the Big Creek mine was begun recently. The rebuilding of the mine has been steadily going on, and indications are that before many weeks it will be possible to ship run of mine coal probably not later than Nov. 1.

Hillsboro, Ill.—The Shoal Creek Coal Co. is preparing to sink a mine on the Woodall farm, about three miles Southwest of Hillsboro. This mine has been under contemplation for the past two years, but even yet all of the arrangements have not been completed. Prospecting is, however, being carried on to determine the most suitable place to sink the shaft.

Middlesboro, Ky.—A number of Eastern capitalists, as well as several prominent coal operators in the Middlesboro district, are interested in a project to construct an electric railway system in and around Middlesboro, to serve the town and also to connect the various mines in that district. It is proposed ultimately to connect Middlesboro and Pineville if the road is successful as first constructed.

Whitley City, Ky.—Work is progressing actively on the operation which is being opened up on the Geary property. Chief Engineer E. W. Vanable, who has charge of the work, has had six crews busy for about three weeks, and recently put on a 24-hr. shift in order to make better progress. It is said that the coal is showing nicely along the river, but Mr. Vanable said recently that the company will probably operate shaft mines along the railroad instead of operating on the river.

Charleston, W. Va.—It is now almost certain that a new railroad will be constructed along Tug River on the south side, a distance of 50 miles or more between Majestic and Turkey Creek. A corps of Norfolk and Western engineers are now on the ground doing preliminary work. No information can be had as to the ultimate plans of the company, but it has been hinted that the activity of the Baltimore & Ohio in the coalfields has caused the Norfolk & Western to take the initiative in further extending its tonnage by acquiring new territory. Whether the survey means immediate building is merely a matter of conjecture.

Bluefield, W. Va.—A scheme is on foot to electrify the coalfields of eastern Kentucky, Tennessee and western Virginia along the lines of the Louisville & Nashville, Norfolk & Western, and the Carolina, Clinchfield & Ohio Ry. Stuart and James, engineers, of Bluefield, are in charge of this work, which will be one of the largest enterprises of its kind in the country, and will probably mean the establishment of at least three steam-operated central plants, located at different mines throughout the section to be traversed. Steel tower transmission lines will run a distance of about 100 miles from Dante, Va., to Jellico, Tenn., passing through the Harlan, Middlesboro, Pineville, and Jellico districts. One of the steam power plants is now under construction, while another now operating has a surplus of power for the immediate feeding of the mines in the districts which will be electrified. Power will probably be transmitted at 110,000 volts and stepped down at the centers above mentioned for local distribution.

Whitesburg, Ky.—It is reported that the Virginia Coal & Coke Co., operating extensive coal-mining plants in the Wise County, Va., coalfields, is starting an extensive plant on the headwaters of Guests' River, a few miles from Whitesburg, on the Virginia border, which will probably be the largest in Virginia. The company has already made good progress in the work, and has established a new town, to be known as Glenmore, which will be reached by the Interstate branch of the Louisville & Nashville, which has been held up at Norton, Va., owing to a right-of-way suit which is pending in the Virginia Court of Appeals.

NEW INCORPORATIONS

Cleveland, Ohio—The M. A. Hanna Dock Co. has increased its capitalization from $210,000 to $500,000.

Cleveland, Ohio—The M. A. Hanna Coal Co. has increased its capitalization from $100,000 to $200,000.

Salem, Ohio—The Deming Co., of Salem, Ohio, manufacturers of mine pumps, has filed papers with the secretary of state, increasing its capital stock from $150,000 to $250,000.

Knoxville, Tenn.—The Catrons Creek Coal Co. has filed amended articles of incorporation increasing its capital stock from $40,000 to $75000, additional capital for development work being desired by the company.

Wilmington Del.—The Pocahontas & Southwestern Coal Co., of Wilmington, Del., was recently granted a charter under the laws of Delaware, with a capital of $200,000; Harry W. Davis, Wilmington, principal incorporator.

Belleville, Ill.—Articles of incorporation for the New Freeburg Coal Co. have been filed at the office of C. A. Sommers, recorder. The capital stock is $6000, and the incorporators are L. Senior, V. M. and John Henderson.

Indianapolis, Ind.—The Linton Summit Coal Co., of Linton, has been organized with a capital stock of $45,000 for the purpose of mining. The directors are J. A. Templeton, W. J. Hamilton, Philip Penna, Davis R. Scott, and J. P. Jeffries.

Pittsburgh, Penn.—The Ozark Bauxite Co. has been organized for the production of coal, gas, and other minerals and ores. The capital stock is $25,000, of which $500 has been subscribed and $50 paid in. The incorporators are W. B. Becher, S. B. Kelly, W. H. Young, J. M. Holliday, and George I. Wolf, all of Pittsburgh.

Kaeferton, W. Va.—The Milburn Coal Co., has been organized to develop 5900 acres of coal land and has already closed a machinery contract. It will install a plant with initial capacity of 2500 tons daily to cost from $200,000 to $300,000 on the Paint Creek division about 18 miles from the main line of the Chesapeake & Ohio R.R.

Denver, Colo.—Articles of incorporation have been filed in the office of the secretary of state for the United Yampa Collieries Co. This is a four million dollar corporation formed to operate large tracts of coal lands in Routt and Moffat Counties. The incorporators are John F. Campion, Fredk. G. Moffat, and Kenneth B. Townsend. The project includes the building of a railroad, 110 miles long, to connect the Denver and Salt Lake at a point near the confluence of the Elk and Bear rivers, and the Union Pacific near Rawlins.

INDUSTRIAL NEWS

Connellsville, Penn.—The Hecla works at Pleasant Unity are turning out about 135 tons of coke per day. Fifty of the 171 new ovens have been completed.

Columbus, Ohio—Notices have been issued for the annual stockholders' meeting of the Hocking Valley Ry., which will be held in the general offices in the Spahr Building. A board of directors will be elected.

Newburg, W. Va.—The Virginia-Maryland Coal Corporation began shipping from its newly opened Scott Hill mine near here on Oct. 2. This mine is one of the most modernly equipped collieries in the state.

St. Clairsville, Ohio—Henry G. Unterzubar, of Bellaire has filed suit in the local court, claiming $15,000 damages for the loss of his arm, which was torn off when he was caught in a cable at the mines owned by the Johnson Coal Co.

Blaine, Ohio—Determining to devote its entire attention to the coal and coal mining business, the Loraine Coal & Dock Co., one of the largest operators in the Belmont County field, has sold its company store at Blaine. The general store sold for something in the neighborhood of $50,000, it is understood.

Belleville, Ill.—Suit has been brought in the circuit court by the trustees for the bondholders of the Royal Coal Mining properties here, to foreclose on the mortgages. They claim that because of financial troubles the mine has been unable to operate for several months, and that the sooner the properties are disposed of the more they will bring.

Whitesburg, Ky.—Announcement is made of the purchase by A. H. McClure, and associates of Frankfort, of the John and Henry Combs coal and timber land tract on Lower Rockhouse Creek at a price which is unusually large although it has not been made public. It is said to be the intention of purchasers to develop the property at an early date.

St. Louis, Mo.—When the Manufacturers R.R. bought the St. Louis & O'Fallon R.R., it was understood that the coal mines at the eastern terminus of the line between Belleville and O'Fallon, Ill., were not included. It has since been announced, however, that the mines also had been purchased and paid for. These produce on the average 135 cars of coal a day.

Owensboro, Ky.—John B. Brasher, representing a syndicate composed of Madisonville, Ky., and Eastern people, recently closed a deal for a coal mine and yard at Owensboro, Ky., and has taken charge of the property as general manager for the purchasers. The property is practically new and is well equipped, its location in Owensboro, a city of 20,000 inhabitants, being particularly favorable.

Springfield, Ill.—On information filed in the Circuit Court by Assistant States Attorney Bernard, a case will be established to determine the constitutionality of the law requiring coal mines, foundries, steel plants, and other factories to provide a wash house for the employees. The information has reference especially to the Cora Coal Mining Co., at Andrew. Here it is said the men are compelled to leave the mine with dust and grime upon their face and hands.

Pittsburgh, Penn.—Fatalities in the coal mines of the United States during the first seven months of the year, numbered 1437 as compared with 1419 in the same period last year, according to the reports of the Bureau of Mines. Pennsylvania leads the list with 763 deaths, an increase of 197 over last year, of these 380 were in the anthracite and 383 in the bituminous fields. West Virginia with 181 deaths shows a decrease of 72 over the fatalities in the first seven months of 1912.

Columbus, Ohio—Attorney-General Hogan has written a letter to Receiver George P. Johnson, of the Detroit, Toledo & Ironton Ry. Co. advising that if steps are not taken at once to improve the service of the road he will ask the Federal Court to annul the company's charter. The same kind of ultimatum was forwarded to the attorney for the bondholders. Of the 20 engines belonging to the road which were condemned recently by the Ohio boiler inspection department 14 have been repaired and returned to service.

COAL TRADE REVIEWS

GENERAL REVIEW

Producers continue in firm control. Market quiet but potency of the situation accentuated with the advancing season. Car supply and weather conditions the predominating influences at the moment.

The coal markets have presented little of additional interest during the past week. In the bituminous situation no uncertainties have developed, and producers continue as firmly in control as at any time during the past few months. The uniformity with which quotations are maintained in all the markets of the country speaks eloquently for the trend of conditions. Where reverses are recorded they are easily traceable to an over-shipping of specialties, principally of the lower grades, into certain restricted markets; their effect on the potency of the general situation may be neglected.

Every confidence is expressed in the outlook, while the general firmness is being accentuated almost daily by the advancing season. One of the most significant features of the situation is the enormous increase in the shipments of the principal coal roads; the September reports for a number of the more important carriers show a continuation of the substantial advance over previous records, while the gain for the year to date is so large as to cause apprehension, were it not known that the coal was going into immediate consumption.

In anthracite, it is becoming increasingly difficult to obtain shipments of nearly all sizes, companies appearing to have more orders than they can take care of for some weeks to come. Concessions by the individuals have now practically ceased altogether. Business is already being turned down, and a little cold weather is all that is necessary to precipitate an active market.

The strong undertone to bituminous continues unchanged, with producers very cautious about future commitments. The improvement is even noticeable in the lower grades. A higher price level has now been definitely established in the Pittsburgh district; contracts for the year can still be closed at the old circular, but, for deliveries up to Apr. 1 only, the new quotations are invariable demanded. Production there has also been seriously curtailed by the car shortage, which is expected to become even more serious before the close of navigation on the lakes.

The car situation in Ohio is the predominating feature in that market. The visible supply of equipment is rapidly diminishing, and production has been seriously curtailed as a result. The Lake shipping is at the maximum, while the steam business is showing good form and the domestic grades are being stimulated by the cool weather. Dumpings at Hampton Roads have fallen off because of the heavy movement to the Lakes, but business, nevertheless, still continues active.

The car shortage in the Middle West has almost reached acute proportions, while one important congestion has already been reported. As a result of the uncertainey in the movement, the market is notably stronger and is now in the most satisfactory condition for the last three years. A sharp fall in temperature is the only thing necessary to make a very active situation in the Middle Western market.

BOSTON, MASS.

Hampton Roads dispatch somewhat improved, shippers holding coal for boats due, and spot market rather light. Georges Creek shortage continues and creates a better demand for certain of the Pennsylvania grades. Dealers waiting turns for anthracite shipments, and broken and stove very hard to get.

Bituminous—Prices at Hampton Roads continue nominal, for there is practically no spot coal available. The agencies are all saving their receipts against transportation that is due to arrive. Dispatch therefore is rather better than a week ago and while this is not regarded as a sign of weakness yet there is not the demand in New England for prompt coal that was expected at this time. Some of the operators are seeking premiums of the various shippers but the latter for the most part are confining themselves to contract obligations. Indeed, it is doubtful if today any considerable tonnage could be sold at $3 f.o.b. There is a strong undertone however with still a considerable anxiety on the part of consumers who have supplies due them on contract.

Thick weather again prevails and should it continue a week or so it will probably put a different face on the distributing market here. At present the supply for inland delivery is ample and on car prices are somewhat easier than a week ago.

On Georges Creek the situation is no better than during September. The bulk of the output is going to fill requisitions from the Government and for export. The loading at Baltimore is still slow and at Philadelphia there is practically none of this grade available for coastwise shipment.

The Pennsylvania coals that can in any way be considered substitutes for Georges Creek are in better demand than for 60 days. Prices are up another five cents on the better known grades and all the shippers are going slow on futures. There is a good deal of inquiry for the Clearfields that are favorably regarded, especially for shipment in conjunction with anthracite from Philadelphia.

Anthracite—The shortage of stove is fast becoming acute. Broken, too, is increasingly hard to get, and dealers are patiently waiting their turns for shipments of any kind. The companies have all the business they can take care of for weeks to come. The recently announced advance in freight rates on anthracite company transportation from New York to points around Cape Cod and on Long Island Sound are apparently in full effect, save only in the case of one or two companies.

At retail, hard coal in Boston was advanced 25c. Oct. 2, making $7.75, $8 and $8.25 respectively the prices for egg, stove and chestnut per net ton delivered. The bituminous market is now quotable as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.60	$1.30@1.70	$1.67@1.77	
Philadelphia*	2.35@2.85	2.55@2.95	2.92@3.02	
New York*	2.65@3.15	2.85@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.90@3.00
Providence†				3.88@3.93
Boston†				3.93@3.98

*F.o.b. †On cars.

NEW YORK

Car supply the controlling feature in the bituminous situation. Business continues heavy and prices firmly held. Anthracite trade a weather proposition. A surplus of egg, but stove coal is in equally short supply.

Bituminous—A sharp restriction in the car supply has caused the local soft-coal market to experience a further and quite perceptible tightening up. There has been no change in the situation on the B. & O., which has been notably bad for several weeks, while the Pennsylvania made an unexpectedly poor showing during the last three days of last week, when the supply amounted to only about 40% requirements. The roads ascribe their trouble to the slow return of equipment from foreign lines. The outlook for the current week is not very favorable at this writing, although the roads claim they are receiving their cars back more rapidly, and there will be a moderately good supply this week. No complaints as yet have been received regarding the situation on the New York Central.

There does not seem to be much surplus coal available, and operators are occasionally being forced into the open market for tonnages to fill out their contracts. A great deal of difficulty is still being experienced with labor, miners at a number of the Pennsylvania operations now flatly refusing to work on any Saturday. The volume of spot business, locally, appears to be a little larger, particularly, in the line trade. There is not much contracting being done, and few operators show any disposition to accept anything now for delivery up to Apr. 1, preferring to keep what coal they have available unless a favorable business is offered for the year. We continue to quote the local market on the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The hard-coal market is showing a tendency to drag, pending a change in weather conditions. Egg coal is particularly heavy and can be moved only at concessions from 15@25c. per ton off the regular circular. Shipments of egg and nut are heavy. The better grade steam sizes are in moderately good demand, while the off grades are slow. Stove coal continues generally strong at all points and is still the feature of the market; indications point to a shortage of this grade all winter. With the exception of egg coal, there are little or none of the other grades going into storage.

As already noted, it is essentially a weather market from now on, although there are some who believe that there will be an active situation this winter, regardless of climatic conditions. The return of warm weather this week seems to have had a softening influence upon the local situation. However, it is believed that all the mines will be working full time from now on and, although the situation at tide is rather quiet, the line trade is showing a good healthy undertone.

We now quote the New York market as follows :

	——Upper Ports——		——Lower Ports——	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	....
Egg	5.25	$5.10@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.50	5.20	5.20@5.45
Chestnut	5.50	5.50	5.45	5.45
Pea	3.50	3.40@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.35@2.70
Rice	2.25	2.25@2.35	1.95@2.20	1.90@2.20
Barley	1.75	1.75	1.50	1.50@1.70

PHILADELPHIA, PENN.

Broken and stove in very short supply. Price cutting by individuals about stopped.

A little cold weather will spur the anthracite coal trade into activity in this vicinity. All the operators are working their mines full time, and claim to be disposing of every ton of their product. As a matter of fact, broken and stove coal are far behind the demand; while it is yet early in the season, there have been cases of business on the former size being turned down, owing to the inability of the operator to fill it when required. Broken coal has been in poor supply ever since the first of April, and does not seem to improve as the season grows. Reassuring reports come from the dealer as well as the operator for a good business from now on, at circular prices, as the individual operators seem to have declined making further concessions. One hears of very little cutting, and this only when there is danger of coal going on demurrage Only one large operating company in this city seems to make the Pennsylvania state tax condition insistent, refusing to depart from its policy adopted at the inception of this tax; with the demand on, it is likely to make little difference.

Retail prices for the winter are announced as follows: Broken and egg, $6.75; stove, $7; chestnut, $7.25; pea, $5.25@5.50, with 25c. per ton added if carried in. This for a ton of 2240 lb.

Slack or screenings seem to be the leader in the bituminous market at the present time, bringing about a complete change of the situation. Prices are anywhere from 25 to 30c. higher than has been quoted for a month or six weeks back, and the increase only seems to enhance the scarcity; $1@1.05 is about the maximum. The market on the other varieties, however, seems to remain unchanged, although, if anything there is a leaning to weakness rather than strength. One still hears of car shortage, both in the bituminous as well as anthracite regions, and with the advent of cold weather, this is likely to occasion trouble.

PITTSBURGH, PENN.

Regular minimum prices for prompt coal announced by operators corresponding to advanced prices recently quoted in open market. Former circular prices nominally in force for yearly contracts, but no demand. Car supply poorer, decreasing production materially at some mines. Connelsville coke market is definitely lower, all demand having been satisfied without cut prices disappearing.

Bituminous—In recent reports we have noted a growing scarcity of prompt coal at the circular prices, and last week noted the absence of any in the market except at advances of 10@20c. This situation has crystallized into definite announcements of higher minimum prices on the part of various operations. On Oct. 1 the Pittsburgh Coal Co. announced the following as its minimum figures for prompt: Mine-run, $1.40; ¾-in., $1.50; 1¼-in., $1.65. Sales have been effected at these prices without difficulty. Other operators have advanced to at least this level, while some have gone to $1.50 for mine-run, $1.60 for ¾-in. and $1.70@1.75 for 1¼-in. and claim to have made some sales.

As to contracts, many operators will contract for regular deliveries up to Apr. 1 at their prompt prices while some refuse to do so. On contracts for a year the old circular prices, based on $1.30 for mine-run, are nominally still in force, but some operators would decline to sell at them, and in general there is practically no demand for such contracts. We quote the nominal season contract market unchanged as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. domestic, $1.55, and quote the prompt and forward market as follows: Slack, $1.10@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Reports as to car supply vary. A large interest reports the supply as much worse than 30 days ago and appreciably worse than 10 days ago, to such an extent that its production is seriously curtailed, while some other operators report the supply as somewhat insufficient, but not measurably worse than 30 days ago. Shortage of labor is a factor but not nearly as serious a one as car supply in determining production. Considering the season, prospects are naturally for a further decrease in car supply during the next 30 days but after the close of lake shipments five or six weeks hence, a good supply should obtain.

Connellsville Coke—The coke market has not been strengthened as hoped by the accretions to the ranks of the "regulars" as reported a week ago. On the contrary the market is now definitely quotable on a lower basis as the October demand for furnace coke has been entirely satisfied without all the cut price coke being absorbed. During the past ten days sales for both prompt and October shipment have been made at $2.15 to $2.25, involving furnace coke of substantially standard grade, while slightly off grade coke has gone at a trifle less. There is now no demand for prompt or October, and only diletante inquiry for November and December, while no interest at all is manifested in next year's deliveries, though quotations of $2.25 could no doubt be secured.

The alignment today is that about 5000 ovens sell through the Producers Coke Co., having a minimum quotation of $2.50, and about the same number sell independently but are adhering to this minimum, while an equal number are controlled by other operators, some of whom are willing to sell at $2.25 or less, and demand is so light that these operators make the market. Unless conditions improve the "regulars" will probably recede to say $2.25 for next year, but for this year they simply stay out of the market. There is a temporary accumulation of coke loaded and awaiting shipping instructions, which points to a special restriction of operations this week by dropping a day or two at the end. We quote: Prompt furnace, $2.15@2.25; contract furnace, $2.25; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 27 at 385,494 tons, an increase of 7057 tons, and shipments at 383,366 tons, a decrease of 6376 tons.

BALTIMORE, MD.

Generally stronger tone to the market, even for lowest grades. Slack continues to show remarkable form. Export business again on the increase. Retail anthracite prices advanced.

The market here continues to be highly interesting; during the past week it showed decided evidences of strengthening. Not only did the good grade coals, already largely out of the market, hold steady at their high level, but the lower grades, that had showed signs of weakening, were in better call and at advancing prices.

Demand throughout the Northwestern territory continues excellent for West Virginia gas coals. Three-quarter in large lots was being sold at from $1.15 to $1.20 Westward, and what was released East was good for from $1.10 to $1.15, a decided improvement over the figures of a short time previous. Low grade run-of-mine was also doing much better, selling in some cases up to the $1 mark. This was from 10 to 15c. better than previous quotations.

Slack was the decided feature again; sales around $1.10 were not unusual. The demand seems to be increasing steadily and still higher figures are expected. Pennsylvania steam coals were much stronger along with the rest of the market; even ordinary grades there were selling at from $1.15 to $1.20.

Car supply was quite short again during the past week in both the Fairmont and Somerset regions. This was in distinct contrast to the previous week when an exceptionally heavy tonnage was handled. Port business is again improving. A large number of foreign charters have been announced for the coming month's loadings.

Interest was injected into the local anthracite situation by a meeting of the Baltimore Retail Coal Exchange when it was decide to add 25c. per ton to the regular winter schedule. This is to cover the 2½% Pennsylvania, state tax which is being tacked on to most bills to local coal men, and the regular increased cost of winter deliveries.

BUFFALO, N. Y.

Production up to the full limit of the car supply. Heavy ipments of Allegheny Valley coal to the Lakes. The out-k when Lake shipping closes. Anthracite picking up pidly.

Bituminous—The coal production is now up to the full nit of the car supply. Operators generally report that eir outputs are entirely covered for several weeks to come d that they are obliged to go into the open market for y coal required on their side trade. The Pittsburgh dis-ct product is almost unobtainable except where one has rect connection with a mine, and Allegheny Valley grades e almost in the same condition. Lake shipments from the tter district have never before been very heavy, but mines nich formerly shipped but little in this trade are now nding their entire outputs there, superseding the Pitts-rgh coal which formerly controlled this business almost clusively.

The heavy shipping in the Lake trade has created the inion among some, that when this closes, Dec. 1, there ill be a sharp slump in the market. It must be remembered this connection, however, that consumption will be heav-y increased by that time, due to the advancing season, hile, on the other hand, the movement will be materially re-ricted by the inevitable car shortage. While the roads are w handling the situation in fairly good form, this is mostly e to the short haul to the Lake shipping ports; when the neral demand opens up all over the country, the haul will much longer, the movement more complicated and the uipment more scattered. Bituminous is already being aded in box-cars, coke racks, or anything that can be ob-tined.

The scarcity of money among the Canadian consumers is eing commented on a great deal in the local trade; it seems be a question as to whether they will be able to meet eir obligations when the returns from the crops come in. owever, money is not easy locally, either, although there is o general complaint about collections as yet.

Buyers are not alarmed over the outlook, however, for, as rule, they are well covered by contracts on which they re demanding full shipments. Generally speaking, good rices were obtained on this business, but not nearly so uch as might have been in the prompt market at the pres-nt time. Quotations are quite as strong as ever at $2.90 for ittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run nd $2.25 for slack, with Allegheny Valley about 20c. lower, xcept slack, which often sells on a par with Pittsburgh.

Coke—While there appears to be a heavy consumption of his product, consumers seem to be in control of the situa-ion, and the market is weak. Reports are heard that vens are to be blown out but there is always still plenty of he coke to meet the demand. Local quotations remain at 4.85 for best Connellsville foundry.

Anthracite—The demand is improving slowly but steadily. great deal of uncertainty is still evident regarding the ew Pennsylvania state tax, and it is the general opinion hat it will be declared invalid by the courts. Stove is in uch heavy demand, that producers are already obliged to orce the buyers to take a certain percentage of egg with all rders. The shipper or jobber not infrequently adds the 25c. er ton to stove.

Anthracite shipments by lake were 532,115 tons for Sep-tember, which is less than the corresponding month of last season for the first time. For the season to October the amount is 3,840,536 tons, as against 2,482,353 tons to the same date last season. With two full months yet this season the shipments are about 115,000 tons ahead of last season. Shipping agents say that they could handle considerable more coal than they are getting and they are eager to keep up their tonnage.

COLUMBUS, OHIO

Increasing car shortage is restricting production seriously. The situation is steadily becoming worse and as a result prices are strong. The demand for all grades is good. Lake trade continues active.

The feature of the coal trade in Ohio during the past week has been the increasing car shortage which is curtailing production to a large extent. This, together with the good demand has maintained quotations firmly; in fact the tendency is upward and there is very little cutting of prices. On the other hand some premiums are being offered for spot shipments. It is believed that the car shortage will grow worse soon and dealers are preparing to increase stocks if possible.

The strongest point in the market is the demand for the domestic grades. Retailers are placing orders for immediate shipment and their business is growing better as the winter approaches; every effort is being made to guard against a shortage of stocks when the first cold spell arrives. Deliveries to customers are being made now and most of the large householders have laid in their winters supply of fuel. Retail prices are advancing and are now the highest in two years. The Toledo docks of the Hocking Valley Railroad have handled 2,300,000 tons since the opening of navigation.

The steam trade is also rather strong for the season of the year. Manufacturing is active, especially in iron and steel and other metal lines. Requisitions for fuel are holding up well and in some cases are being increased. Coupled with that demand is the good freight movement on railroads which requires a larger fuel tonnage. Contracts are being carried out but renewals are being made at higher figures than prevailed last season.

Car shortage has curtailed production. This is especially true of Eastern Ohio and the Pomeroy Bend district where the shortage of cars has been the most pronounced. It is estimated that those districts only produced 55% of normal during the week. In the strictly domestic fields of Massillon and Cambridge the production was also smaller; in the Hocking Valley the output is estimated at 65%.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$1.75 @ 1.70	....	$2.00 @ 1.90	$1.75 @ 1.70
3-4 inch...........	1.60 @ 1.55	$1.50 @ 1.40	1.75 @ 1.65	1.55 @ 1.50
Nut...............	1.30 @ 1.20	....	1.60 @ 1.55	1.25 @ 1.20
Mine-run..........	1.40 @ 1.30	1.25 @ 1.20	1.50 @ 1.40	1.25 @ 1.20
Nut, pea and slack..	0.85 @ 0.80	....	1.00 @ 0.90	0.75 @ 0.70
Coarse slack........	0.75 @ 0.70	0.95 @ 0.90	0.90 @ 0.80	0.65 @ 0.60

TOLEDO, OHIO

Steam business shows good form while Lake shipping continues up to the maximum for the season. Car shortage affecting the situation. Cool weather stimulating the domestic demand.

The shortage in cars has been more marked during the past week than at any time thus far and the effect on the local trade was quite noticeable. Lake business continues heavy although shippers are complaining bitterly of lack of tonnage from the mines which, of course, makes it difficult to take care of cargoes. Steam coal is in splendid demand and the fine grades continue to strengthen both in demand and in price; coal men here generally predict an increase in prices due largely to the difficulty in securing cars and to the labor trouble at the mines. Domestic coal increased materially in demand after the cool weather of last week and the market is in fine shape.

Toledo's shipments both in coal and coke show remarkable increases over other seasons and with the completion of the large new concrete dock of the Hocking Valley next year the business will be still larger. Prices here remain unchanged.

LOUISVILLE, KY.

A sharp advance in steam grades the feature of the market. Domestic demand continues strong and cars are in excellent supply, considering the abnormal activity. Considerable trouble experienced with the new hopper-bottom equipment.

A gratifying change is noted in the local market by a pronounced tightening up of the steam grades. The demand seems to be no better than it has been, for there is little room for improvement in this respect. The previous weakness was due to a heavy oversupply of screening, but this has ceased to exist now, with the result indicated. A petition of the operators to the Illinois Central R.R., requesting the company to switch their orders from mixed coal to straight mine-run, which the road agreed to do, is one of the principal causes for the changed condition. The almost violent fluctuation of the steam market has been the cause of a great deal of anxiety, and the operators are much relievd at the improved condition. No change is perceptible in general industrial conditions, except possibly, the demand is showing further increases and indications point to a higher price level shortly.

The domestic sizes remain in as heavy demand as ever, with the market strong on all grades. The better qualities of block from eastern Kentucky are selling at $2@2.25, f.o.b. mines, with occasional sales of fancy specialties at as high as $2.40. Nut and slack are now steady at 75@85c. for the better grades, with the second qualities quotable at about 50@60c. The car supply is unusually good, considering the heavy movement. The threatened labor trouble also failed to materialize, due, it is believed, to the weakened financial condition of the miners as a result of their long struggle in West Virginia.

The only troublesome feature in the situation at the present time is the large hopper cars of the Louisville & Nashville R.R., reference to which has been made in these columns. Eastern Kentucky operators feel that they are being discriminated against in this respect by an allotment of a larger percentage of the "battleship" cars, and are protesting vigorously. Producers having low tipples, which can only load the smallest cars, are being favored in this respect, but the railroad is assuming an arbitrary position in the matter with the newer operation, while on all new development it is insisting upon the tipple being designed to load the new equipment. In addition to the difficulties encountered in loading at the mines, there is also the further trouble and greater expense of unloading where trestles are not available. However, the new cars have come to stay, and the coal industry would do well to adapt themselves to the new conditions.

HAMPTON ROADS, VA.

Shipments for the week only fair. Government calling for coal to bunker fleet for its European cruise. Hampton Roads dumpings for September fell below August figures, although Virginian Ry. makes a record month.

Shipments from Hampton Roads during the week have only been about fair, the movement not being so heavy either foreign or Coastwise. There is perhaps a little more than the normal supply of coal at tidewater but this is probably due to the fact that a number of the government suppliers are accumulating coal to take care of colliers which will be loading during the next few days. The Atlantic fleet is now in the Roads coaling from steamers and barges and as soon as it is supplied the colliers will be reloaded and accompany the fleet on its European cruise.

Buyers inland are still anxious for coal and prices are therefore remaining firm with indications that they will continue so for some time. Sales of small tonnages of high volatile coal were made during the week at from $2.60 to $2.75. Pocahontas and New River quotations have been from $2.90 to $3 with little selling of at either price, there being very small quantity of free coal.

A total of 988,465 tons of coal were dumped over the Hampton Roads piers, during the month of September just ended. This is a falling off of about 41,000 tons below the August figures. The decrease occurred with the Norfolk & Western and the Chesapeake & Ohio, the Virginian Ry. showing an increase of over 17,000 tons above their record month. This road alone dumped 300,588 tons, over one pier; the C. & O. Ry. at Newport News dumped 256,934 and the N. & W. from Lamberts Point 430,943 tons. The decrease in dumpings over the N. & W. and C. & O. is probably due to the fact that these two roads move large quantities to the Lake at this particular season while the Virginian's shipments west are not so heavy.

DETROIT, MICH.

Possibility of a car shortage having a steadying influence on the situation. Transportation problem a trifle clearer at the moment. Steam grades strong and anthracite active.

Bituminous—There has been a very heavy movement into Detroit during the past week, several hundred cars having been distributed to operators and manufacturers. This would seem to indicate that the railroads are in an excellent position to take care of the heavy fall business, and that the production will not be seriously restricted. The situation is much improved over a few weeks ago, when it looked for a time as though it might become acute. The railroads are cleaning up their yards of any track coal, and are in a better condition than they have been for some time. The cold weather of the past week has had a moderately stimulating effect upon the trade.

The market is now quotable on approximately the following basis.

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.50	....	....	$2.75	$2.50
Egg..........	1.65	....	1.50	....	....	2.75	2.20
Steam lump....	1.45	....	1.10	....	....	....	....
¾-in. lump......	1.25	$1.25	1.25	1.25	1.25	....	....
Mine-run.......	1.15	1.15	1.15	1.15	1.15	1.60	....
Slack..........	0.90	0.90	0.70	0.85	0.85	....	....

Anthracite—The recent cold snap stimulated the local market to such an extent that shippers are falling behind on their requirements. The shortage has been so pronounced that shipments have been made in gondola cars instead of the usual box-cars. Stove coal is in the greatest demand, the situation being almost acute; dealers are insisting upon a certain percentage of egg being taken with any orders for stove.

BIRMINGHAM, ALA.

Steam coal rather quiet. Lump coal fair. Smithing about normal for this season of the year. Car supply shows some improvement. Pig iron for balance of year selling at $12.

The principle operators report that business on steam coal for the past week has been rather quiet. There is a large accumulation on the tracks and in storage bins, and some the large consumers have asked that their shipments held up for the time being. This is due to the fact that th production has exceeded the demand recently, but with th oil mill business starting soon, it will relieve this cond tion.

The demand for lump coal is fair, but it will take a fe days of good cool weather to make any marked improv ment. The higher grade coals advanced 25c. per ton Oct. 1, and the lower grades 10c. per ton. This is following the regular schedule, and operators are not inclined make any reductions from the circular prices in order obtain business.

Smithing coal shows some improvement. Foundry coke about the same as last week, as is also furnace coke. Foun dry is steady at $4 to $4.25 and furnace $2.75 to $3.25.

The car supply on most of the lines shows some improvement, with the exception of the Southern Railway. few mines on the L. & N. report having to close down f two days last week because of the lack of cars, while thos on the Southern, state that it seems to be almost a matter impossibility to secure sufficient cars to keep going at hal time.

The market on pig iron is firm at $12 for the balance this year, with fairly good sales at that figure, while bookings for the first quarter and half of 1914 are 25 to 50c. advance of that figure.

This district is not expected to suffer to any extent due the tariff on pig iron, all coal operators and iron producer looking for a banner year both in tonnage and prices.

INDIANAPOLIS

The car shortage is making itself felt and shipments ar badly delayed. Congestion due to natural causes and ma soon be relieved. Prices hold firm, the tendency being upward. Steam coals improved and the movemnt of domest grades fully up to normal for the season.

The pinch of the car shortage is felt more in the coal industry. There are delays in the transportation of both Indiana and Eastern bituminous coals. A complaint from Muncie manufacturing company was called to the attentio of the Public Service Commission of Indiana and an investigation showed a coal blockade on the Big Four road both a Indianapolis and Terre Haute. The coal operators have als complained and ask for relief. The railroad company say the short cold spell in September resulted in such a deman that the road was swamped and did not have adequate motiv power. It has promised the commission to give special attention to the coal traffic until the congestion is relievd. Th roads in Ohio and Indiana have not fully recovered from th flood devastation of March and April and they are using ma of their cars for gravel hauling.

Prices at the mines hold firm, the car situation having tendency to cause higher bids from those who need coa Some companies say they are having inquiries from buyer they never had on their books, showing that these are no able to get supplies through their regular channels. Mine are practically on full schedule, stopping only when cars ar not to be had. The retail trade continues fully satisfactor Screenings are moving better, showing a gradual improvement in industrial conditions and steam coals generally ar in better demand than had been expected. The general feeling in the trade is optimistic.

CHICAGO

A sharp upturn in practically all branches of the loca market. An advance ranging from 5 to 15c. a ton in th price for screenings. Larger sales of furnace, foundry an domestic coke. The car supply, as a rule, has been satisfactory.

According to operators and dealers, the Chicago coal market is in a more satisfactory condition than it has been at an time during the past three years. There has been a boom in the anthracite business and reports from various quarter indicate exceptionally heavy sales. This is accounted for i part by the fact that buying was delayed by many dealer who ordinarily send in substantial orders during August.

A decided improvement has been noted in the market fo screenings. Prices for the lower grades have advanced 5c a ton and the better grades are selling at an increase of from 10 to 15c. a ton. The demand for furnace, foundry and domestic coke is strong, a number of exceptionally large sale being reported; prices continue to be firm. Franklin Count operators report a heavy trade. Two of the largest firms i that field have advanced the price for lump, egg and No. nut to $2.25 and others are expected to follow. Carterville operators are quoting $2 for lump, egg and No. 1 washed coal, while No. 1 raw nut and No. 2 washed are selling at $1.60 to $1.75 a ton. Prices for Indiana coals remain firm.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.97	2.30	1.87	3.45@3 55
Screenings	1.27@1.32	1.75@1.80	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.35; gas house, $4.65@4.75.

ST. LOUIS, MO.

The coal market did not advance as was anticipated the first of the month. It continued strong but showed a tendency to weaken. Indications this week are that it will hold up and with a drop in the temperature, prices will likely see an advance.

Franklin County lump and egg is strong at from $2 to $2.15; this quotation is made, however, because the mines are sold up. Carterville is down to about $1.80 to $2. On account of the O'Gara operations being shut down for the past few weeks, the screenings market on high-grade coals has been wonderfully active. When these mines resume, screenings will likely tumble again.

The C. & E. I., Iron Mountain, and Illinois Central, are giving their mines about three days car supply a week. The Wabash is in a deplorable state on account of its bad order equipment. The B. & O., L. & N. and Southern seem to be taking pretty good care of their mines, but the Pennsylvania appears to have the most equipment at this time. Standard coals are still being sold at about the cost of production and there seems to be no hope for that field.

Quotations are about as follows:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.15@1.20
3-in. lump	....	....	$1.40	....
6-in. lump	$1.75 @ 2 00	......	1.60	1.40@1.50
Lump and egg	1.50 @ 1.60	$2.25	....	....
No. 1 nut	1.40 @ 1.60	....	....	....
Screenings	0.50 @ 0.60	....	....	0.25
Mine-run	1.50	....	....	0.90
No. 1 washed nut	1.60 @ 1.70	....	1.40	....
No. 2 washed nut	1.25 @ 1.35	....	1.60	....
No. 3 washed nut	1.10 @ 1.15	....	....	....
No. 4 washed nut	1.10 @ 1.15	....	....	....
No. 5 washed nut	0.40 @ 0.50	....	....	....

KANSAS CITY, MO.

Restricted supply of gas stimulating the demand for coal. Fall in temperature will create an active situation in the coal market.

Demand for all lines is opening up briskly, despite the fact that little or no cold weather has yet appeared. The early call for coal is due largely to the fact that natural gas will no longer be available, according to a recent announcement to the effect that there will be less than one-third of the normal supply during the coming winter. This statement coming from an authoritative source naturally had the result of stimulating the demand in this section. Cold weather is all that is necessary to insure an exceptional activity among the operating companies. Last winter was an open one, and coal business was comparatively light.

Prices are inclined to stiffen as a result of the natural gas situation. Kansas coal is held at from $1.50@2.50 a ton, f.o.b. the mines. Deep shaft, fancy lump is bringing the higher price, while deep shaft steam slack is quoted at the lower. Arkansas coal is held at the following prices: Grate anthracite, $4.35; egg, $4.60; No. 4, $5.50; pea, $3.25. Indications are for a higher range early in November, when the first cold wave of the year is expected.

PRODUCTION AND TRANSPORTATION STATISTICS

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to Sept. 1 were 1,809,401 tons as compared with 926,926 tons for the same period last year.

Butuminous Shipments for the same periods were 10,553,201 for the current year as compared with 8,063,094 in 1912, making gross of 12,362,602 for 1913 and 8,990,020 in 1912.

VIRGINIAN RAILWAY

Total shipments of coal over this road for August of the current year were 376,083 tons as compared with 337,366 tons for the same month last year. For the seven months to Aug. 31 of the current year, the shipments were 2,898,742 tons as compared with 2,245,370 tons for the same period last year, showing a substantial increase.

NORFOLK & WESTERN RY.

The following is a statement of the tonnages shipped over this road during August 1913, and for the eight months ending Aug. 31, as compared with corresponding periods of 1912 in short tons:

	August		Eight Months	
Destination	1912	1913	1912	1913
Coal				
Tidewater, foreign	74,964	96,491	1,025,857	1,128,573
Tidewater, coastwise	317,398	372,908	2,437,211	2,597,566
Domestic	1,722,580	1,780,680	11,717,487	12,099,284
Coke				
Tidewater, foreign	2,661	....	52,762	27,199
Domestic	111,801	108,158	901,139	1,032,310
Total	2,229,404	2,358,237	16,134,456	16,884,932

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for August and first eight months of this year and last year in short tons:

	August		Eight Months	
	1913	1912	1913	1912
Anthracite	713,451	927,277	6,851,626	6,452,287
Bituminous	4,562,339	4,032,727	33,396,286	30,207,895
Coke	1,161,484	1,146,390	9,731,462	8,597,730
Total	6,437,274	6,106,394	49,979,374	45,257,912

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for July 1912-13, and for the seven months ending July 1911-12-13, in long tons:

	7 Months			July	
Imports from:	1911	1912	1913	1912	1913
United Kingdom	5,181	2,697	3,464	50	116
Canada	618,807	765,981	678,611	96,284	76,666
Japan	9,221	18,216	63,665	12,105	9,103
Australia and Tasmania	121,995	80,585	77,634	6,109	15,679
Other countries	137	1,924	2,810	150	1
Total	755,301	869,403	826,184	114,698	101,565
Exports:					
Anthracite	1,986,431	1,645,892	2,448,913	514,645	380,974
Bituminous,					
Canada	5,134,007	5,367,821	7,120,245	1,372,490	1,576,481
Panama	305,624	289,825	321,507	32,358	42,725
Mexico	343,142	210,786	350,961	19,737	18,515
Cuba	575,590	646,462	772,366	84,125	88,088
West Indies	313,085	447,769	377,464	54,355	33,236
Other countries	368,521	1,114,514	1,065,469	105,347	217,079
Total	7,039,969	8,077,177	10,008,012	1,668,412	1,976,124
Bunker coal	3,840,183	4,319,514	4,291,801	559,399	597,011

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for August and the first eight months of this year and last year:

	August		Eight Months	
	1913	1912	1913	19 2
Coal	3,295,123	2,919,991	22,899,814	20,588,240
Coke	391,999	409,627	3,231,372	3,063,239
Total	3,687,122	3,329,538	26,131,186	23,651,479

FOREIGN MARKETS

GREAT BRITAIN

Sept. 26—Some men have resumed work, but the Cambrian and Naval men are still "on stop" and it is feared that these pits will remain idle for a few days longer. Very Best Admiralty Large and good second-class qualities are steady for prompt loading, but Monmouthshires are in plentiful supply and prices irregular. Sellers are asking higher figures for prompt smalls, pit stoppages having curtailed supplies. With regard to forward loading, sellers are holding for firm values, but business is slow.

Quotations are approximately:

Best Welsh steam	$4.74@4.92	Best Monmouthshires	$4.02@4.08
Best seconds	4.44@4.62	Seconds	3.84@3.96
Seconds	4.26@4.38	Best Cardiff smalls	2.40@2.52
Best dry coals	4.32@4.56	Seconds	2.22@2.34

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

FINANCIAL DEPARTMENT

The Delaware & Hudson Company

President L. F. Loree of this company reports, in part, for the year to Jan. 1, 1913, as follows:

General Results—The coal-mining department shows a decrease of 842,384 tons in the amount of coal mined, an increase in gross revenue of $42,543, and an increase in net revenue of $469,326. The railroad department shows an increase in gross oper. revenues of $1,058,286, but a decrease of $250,333 in net operating revenues.

Coal-Mining Department—There were mined 6,438,555 gross tons of anthracite coal out of a total of 63,610,578 tons, including product of washeries produced in the region. The amount produced by this company is 842,384 gross tons less than for the year 1911, due to the suspension of work at the collieries from April 1 to May 21, inclusive, on account of strike.

The new agreement entered into by the mine workers on the one hand and the anthracite coal operators on the other, governing the relations of employees and employers in the anthracite region, provides that the terms awarded by the Anthracite Coal Strike Commission and supplemented by the agreements subsequent thereto shall be continued for a further period of 4 years ending Mar. 31, 1916, except in certain particulars [stated seriatim in the pamphlet report], the most important of which is that the contract rates and wage scales for all employees was increased 10% and the sliding scale was abolished.

Other items which tend to cause the cost of producing coal to increase from year to year are: Shafts and slopes are sunk deeper, tunnels extended, and the mined-out area increased, thus lengthening the haul of coal in mine cars, requiring increased transportation facilities, increasing the area to be drained and ventilated, and requiring more employees. Taxes are about four times the amount paid in 1901, notwithstanding the decrease in the unmined coal remaining in the ground. The operating costs of producing coal of this and subsidiary companies, including taxes but excluding sinking fund for depletion of the coal lands, were higher in 1911 than in 1901 by $0.5575 per ton. Some increase in the market price of coal was necessary, even though no increase in wages had occurred, it being impossible to earn a fair return on the investment.

Assuming that in 1912 the mines had been operated under normal conditions, but with the increase of $0.0808 per ton in the cost of mining under the new wage scale, with an increase of $0.0338 per ton in taxes, and with the increase of $0.25 per ton in the market price of pea coal and larger sizes, and with no change in the market price of the smaller sizes (thus making an increase in the average market price per ton of all sizes of $0.1913), there would have resulted an increase over 1901 of $0.6559 per ton in the cost of production and an increase of $0.6231 per ton in the market price, indicating a decreased return to the producer of 3.28c. per ton.

The charges to extraordinary expenses of the coal-mining department amounted to $857,975 (as against $823,654 in 1911, of which $280,323 upon new colliery at Archbald, Penn., which, it is expected, will be placed in operation early in 1913.

Floating Debt—This amounted to $3,500,000 on Dec. 31, 1912, having been increased $2,600,000 in order to finance temporarily addition and betterment work, and to cover advances to sub. companies for construction.

Sinking Funds—There was paid into the sinking fund under the "first & ref." mtge. the sum of $277,040, being 1% on the bonds outstanding May 1, 1912; total paid to date, $896,510, expended in addition and betterments.

The sinking fund under the first lien equipment trust has received $650,000 annually from 1908 to 1912, aggregating $3,250,000, plus interest on balances, etc., $111,968; total, $3,361,968; disbursements, 62 locomotives and 25 cars, etc., acquired, $1,608,494; $306,000 first lien equipment bonds purchased and retired (incl. int.), $312,171; balance, securities and cash in hands of trustees, $1,441,303.

There was also accumulated in the coal department sinking fund $285,486, $11,780 of which was applied toward cost of coal lands purchased in Wyoming section, and the balance to advances to the Schuylkill Coal & Iron Co. and the Shanferoke Coal Co. for acquisition of anthracite coal lands in Schuylkill County, Penn.

BALANCE SHEET DEC. 31

Assets—	1912	1911	*Liabilities*—	1912	1911
Unmined coal owned and controlled...	16,397,241	16,667,697	Capital stock..	42,503,000	42,503,000
Advances on unmined coal	354,033	361,130	Bonds (see "Ry & Ind." Sec.)	58,171,000	58,375,000
Real estate....	*805,850	4,846,119	Loans payable.	3,500,000	900,000
Road & Equipm't—			Int., divs., &c., accrued.....	1,405,209	1,371,744
D. & H. Co..	*65,814,079	58,858,151	Int., divs. and bonds due, not yet collected.......	195,087	210,796
Canadian lines........	6,331,868	6,308,140	Accrued taxes..	157,042	109,645
Marine equipment.......	6,726	31	Spec. reserve fund accts...	9,738	9,393
Coal dept. equip.......	1,303,362	1,263,292	Audited vouchers and payrolls........	3,052,054	2,773,501
Coal-handling and storage plants.......	61,134	95,877	Other accts. payable.....	552,480	707,107
Stocks & bonds	a27,088,094	27,014,189	Additions to property prior to June 30 1907 through income......	6,751,837	6,751,837
Cash..........	1,182,560	1,921,784	Profit and loss.	15,199,924	13,486,598
Fire insurance fund........	373,904	336,724			
Spec. res. funds	9,738	9,393			
Equip. trust fund........	1,441,303	1,196,135			
Special deposits	....	b596,678			
Supplies on hand........	2,781,673	2,885,682			
Bills & accts. rec..........	4,118,197	2,790,469			
Adv., new lines	3,427,608	2,047,129			
Total.......	131,497,371	127,198,621	Total.......	131,497,371	127,198,621

* Decrease in real estate caused by transfer of RR. real estate to "road and equipment."

a The total par value of stocks owned in 1912 was $26,178,283, against $26,128,283 in 1911 (value as per balance sheet in 1912, $22,363,297); par value of bonds, $4,950,716 in 1912, against $4,923,716 (value as per balance sheet in 1912, $4,724,796). The main change in securities is the Hudson Coal Co. stock, $2,500,000 (increased from $100,000) and bonds, the new items of Champlain Transportation 1st income debentures ($250,000), Ft. Wm. Henry Hotel Co., income debentures ($272,000), Bluff Point Land Improvement Co. income debentures ($250,000) and Chateaugay Ore & Iron Co. 1st M. ($281,000).

b Unexpended balance from proceeds of bonds deposited with trustee to defray cost of authorized additions and betterments.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Oct. 4:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products............	....	....	80	87	80
American Coal Products Pref........	....	....	105	109¼	105
Colorado Fuel & Iron..............	31¼	28½	28¾	41½	24½
Colorado Fuel & Iron Pref..........	....	....	155	155	150
Consolidation Coal of Maryland.....	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales..........	210	200	210	....	....
Island Creek Coal Com............	51½	51	51	53½	47¼
Island Creek Coal Pref............	84½	84	84	85	80
Pittsburgh Coal...................	22¼	19¾	21½	24⅜	14½
Pittsburgh Coal Pref...............	92	86½	90	95	73
Pond Creek.......................	22¼	21	21	23¾	16½
Reading..........................	169⅜	165	166¼	171	151⅜
Reading 1st Pref..................	..	..	87	92½	84
Reading 2nd Pref..................	91½	91	91	95	84
Virginia Iron, Coal & Coke.........	45	44	44	54	37¼

Bonds	Closing Bid	Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s.........	95	99½	98	Sept. '13	93½	99⅛
Colo. F. & I. gen. 6s............	103	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.........	81	81½	80¾	81½	77½	85
Cons. Ind. Coal Me. 1st 5s.........	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s.........	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s........	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s.......	..	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s........	91	..	85	85½	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s......	77	79½	78½	Sept. '13	73	80½
Tenn. Coal gen. 5s................	99	..	99	99	98½	103
Birm. Div. 1st consol. 6s.........	100⅝	102½	101⅜	101⅜	100⅝	103
Tenn. Div. 1st g 6s..............	100⅝	102	102	102	100¼	102
Cah. C. M. Co. 1st g 6s..........	..	..	103	July '13	103	103
Utah Fuel 1st g 5s................	..	..	..	.....	..	..
Victor Fuel 1st s f 5s.............	..	75	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s........	92½	..	93	Sept. '13	92	98

DIVIDENDS

Pittsburgh Coal Co.—Regular quarterly dividend on the preferred stock of 1¼% payable Oct. 25 to holders of record, Oct. 15.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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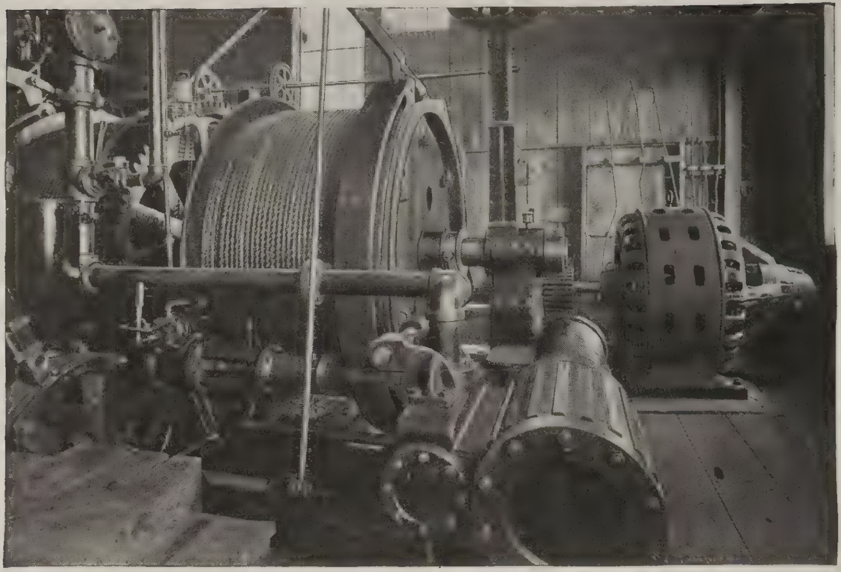

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The conditions surrounding mine hoist service have been carefully studied by the Westinghouse engineers, who will be glad to assist you in converting hoists from steam to electric operation.

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COAL AGE

FLOYD W. PARSONS, *Editor*.

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None sent free regularly, no returns from news companies, no back numbers

Bessemer And Advertising

The Weekly Ad-Talk Page

Sir Henry Bessemer was the inventor of the steel converter.

By his process the price of steel was reduced to $50 a ton, where it had been five times as much, and England's production raised from fifty thousand tons yearly to over a million and a half.

Sir Henry was rightfully the father of the steel age and to his genius as an inventor must be attributed a tremendous step forward in the world's progress.

But to Sir Henry's ability as a *promoter*—a salesman and advertiser—must be attributed more than half of the ultimate success of his invention.

He, like nearly every other inventor and every manufacturer of something new and unusual, ran against that element that balks progress at every step—"human inertia," the inability of people to grasp and live fully up to their opportunities.

* * *

An advertisement or a salesman calls your attention to some new device which, after years of trial and experiment, has been marketed.

Its excuse for existence is that it will save time or money or labor for its user.

What is your attitude toward that advertisement or salesman?

A *negative* one, isn't it? The first thing that comes into your mind or mouth is "*NO!*" spelled in capitals, printed in italics and emphasized.

We all get the wrong viewpoint, a twist in our mental make-up that makes us think that the advertisement is an attempt to put across something "touchin' on and appertainin' to" a lemon.

And, so, advertising must be persistently aggressive and continuous to make us do the things which are good for us to do.

We cannot *buy* all of the machinery or equipment offered us but that is a poor reason for refusing to *investigate* the merits of any of it.

Bessemer had to first convert iron ore into steel and then convert skeptics into believers.

Bell fought opposition left, right and center to get his telephone financed.

Cyrus Field laid the Atlantic cable amid the jeers and hoots of all nations.

The astute Napoleon "turned down" Robert Fulton's steam-propelled vessel—and lost a wonderful advantage to fight England on her own territory.

* * *

The mission of advertising in this paper is to spread information quickly and cheaply to the most men in the coal mining field in the least time—

To make you see that here or there is a piece of machinery or equipment that will enable you to get better results at less cost per result.

We see to it that the crook stays where he belongs—outside these columns.

So that those who do get in have the pass-word, the high sign and the salute.

It is "*Be Square.*"

* * *

It is one thing to read advertising matter and another to benefit by what you read.

What does it avail a man to know that there is a result-getting device on the market which *might* be all that is said for it and do all that is claimed, unless he *investigates?*

COAL AGE

Vol. 4 NEW YORK, OCTOBER 18, 1913 No. 16

"Money calls, but does not stay;
It is round and rolls away."

As poetry, this may pass as a complete picture, but if you reduce it to prose, you'll probably find that a thing can't roll far unless it is furnished with something to roll on.

A tabulation of the average earnings of miners at some camps would suggest that there must be many satisfactory savings accounts at nearby banks. Further inquiry along the same line is apt to start you wondering how all that money gets sidetracked, somewhere between the pay-envelope and the bank. A little investigation as suggested above, is certain to reveal some surprising facts, and if you think these require justification, just remember that any workingman who finds his purse empty at the end of a hard month's labor, is easy prey for the fellow who would exploit him.

One general superintendent, having noticed a conspicuously prosperous looking check clerk from one of his camps, in town pretty often, decided upon a little investigation of his own. The source of the prosperity was soon disclosed.

About once a week, this clerk conducted a raffle: A cow, a gun, a horse, a watch, anything for variety; there was little variation, however, in the final result—he always pocketed about $20. Absurd you say; wait a minute. This clerk was a very obliging fellow. When a miner came to his window for a check, he footed up his debits and credits with painstaking care, and if the case looked doubtful, he gave the miner the benefit of the doubt. Most any other clerk would have said, "You'll have to wait until to-day's sheet comes in." The next time that miner came to the window the clerk would offer him a raffle ticket; of course the miner would not refuse to take it. This clerk was not dishonest—he was only sidetracking some of the dollars.

At another mine, a superintendent began to wonder how one of his mine foremen was able to annex so much real estate to his holdings. A little inquiry uncovered a "loan-shark system," well organized, and growing. The improvident are willing to pay two dollars for the use of one any time, if they really decide that they must have money. This foreman always had the coin, also managed to collect the debt when it became due; the improvident one is generally timid, and is never anxious to fall out with the mine foreman. "Loan Sharks" of this type have been known to accumulate much money, under less favorable circumstances. If you are not familiar with the full significance of the term "Loan Shark," the welfare of your men is in danger.

At some mines, where the commissary is a part of the system, a plan has been devised that makes it possible for the man with ready money to patronize the company store, pay full prices and yet escape any overcharge. The commissary manager allows these customers to buy scrip at a discount from the miners, and use it at its face value in paying for merchandise. By this system, the commissary draws additional trade, the favored few obtain their goods at a most reasonable figure, and the miner—well, he has been permitted to sidetrack about 25 per cent. of his earnings.

We suggest that you do a little investigating yourself, if you have the happiness and prosperity of your men at heart.

IDEAS AND SUGGESTIONS

A Good Coal-Mine Superintendent

By West Virginia Engineer

"Wanted: A good superintendent, capable of producing a large tonnage."

And what constitutes a good superintendent?

Evidently from the want advertisement above, the answer is—a man capable of producing tonnage. However, such a man might fulfill the requisition without being a good superintendent.

We have in mind a fellow who opened a mine, and from the start his tonnage increased rapidly with a correspondingly low cost. To an outsider, and no doubt to the mine owner, this man was a success.

He decided suddenly to resign. The next man to take his place found ample reasons for his predecessor's resignation; the mine was on the squeeze! Inquiry disclosed the fact that in getting out tonnage, this man sacrificed good mining principles to do so. He would go into the mine in case a new man or any man needed a place and order the mine foreman to continue rooms through a barrier intended to protect the next room heading, until he finally had his protection pillars cut to pieces.

A Low-Cost Superintendent

A low-cost superintendent also can get his mine in just as poor condition by lack of judgment in furnishing supplies. This applies particularly to mine props and overhead timbering.

A mine foreman must keep his working places properly timbered, otherwise there will come a time when these same places will need cleaning up and retimbering in order to recover his pillars.

Have you ever noticed that as a general rule the exceptionally low-cost superintendent is always followed by an increased cost with the next man? Either that, or worse follows worse.

The superintendent of today must be a man of judgment. If his mine foreman comes to him with a requisition for supplies he should be familiar enough with the situation to either grant or refuse the request with some degree of wisdom.

He should be a man capable of keeping data on an experimental operation at his mine in order to decide whether or not it is a success. Take, for instance, the laying of wood or steel rail in a room, can your superintendent give you the advantages of one over the other? Can he tell you how many times the driver has been off the wood track while the room was being driven, and how few times he has been off the steel-rail track while driving a parallel room? Can he tell you the car efficiency of his mine, that is, how many trips per car per day are made?

Facts and figures are the most convincing arguments we have; they are the foundation of efficiency. A superintendent need not be an engineer to work out these matters just because they are called efficiency engineering.

Superintendent Must Be a Diplomat

A superintendent is necessarily a sociologist or a diplomat, as you choose to call him.

The foreign element, on whom we must rely principally for our mining population, must be studied and classified. Their whims, ideas, previous environment and many other points about the foreigners must be recognized in order to successfully draw from them the desired results.

It seems to me that the unsophisticated foreigner is much like a small boy. He is not merely a physical organism, but a sentient, self-conscious being; and so he cannot be cut, trimmed, trained and fed to perfection like a plant, with no regard to himself. He should be considered as a bundle of emotions, rather than a physical mechanism, and the point will be clear—that whatever must be done for him, the first thought must be for the effect on his emotions, or the best laid plans will go amiss.

The large coal companies realize that it is not only the acquisition, but the retention of men as well, that they must solve.

The superintendent is the "man on the job," and it rests principally with him to solve these problems.

⁂

Some Remarks without a Moral

By Southern Manager

"You'll be damned if you do and you'll be damned if you don't." The man who first vouched for the truth of that statement probably wasn't familiar with the various pay-roll deductions, familiarly known as cut-outs, that the present-day coal-mine superintendent is expected to maintain if he desires to keep the good will of his management and his men; but he knew human nature pretty well.

Our friend, the superintendent, was just cooling off after partaking of a rather heated interview with his school board, when we butted into his office. Naturally we allowed him to do most of the talking.

"Yes, it's all chargeable to that everlasting bugaboo, the cut-out system. We cut the men for doctor, and blacksmith, and check weighman, and school teacher, and charity lists, and any other old list with their consent, and then let them growl at us—consent or no consent. Take, for example, the physician list and the school-fund list. The men elect the doctor and the school teacher and we deduct a fixed amount from each man's pay envelope to pay them.

"During some of the months when our pay-roll is large, the doctor and school funds assume considerable proportions. If we give all of the collections to the doctor and teacher the men grumble and insist that they do not earn such enormous salaries. If we hold back part of the fund and refurnish our hospital or school house or do similar work for the common good, they grumble louder because we have confiscated their money. If we hold the money in a reserve fund to tide over future lean periods, we are asked constantly to make an accounting.

"Often there are two or more factions to contend with. The doctor or teacher who suits the majority does not suit the minority and the minority lose sleep trying to uncover or discover something that will justify their coming to me with a petition demanding the summary dismissal of the offending party. Even if their efforts along those lines are successful they are not satisfied, but they begin to question the acts of the member of the majority who is unfortunate enough to be acting as treasurer of the funds.

The Superintendent Had to Pay

"Once, in order to settle a row, I was simple enough to volunteer as treasurer myself; it came mighty near costing me $75 per month for 8 months. We had a teacher who was not giving satisfaction and the majority insisted that she be discharged. As the camp was pretty evenly divided into two factions, I decided that harmony could best be restored by getting another teacher, so I prevailed upon most of the men to accept a new teacher. At the close of the year the teacher, whom I had dismissed, entered suit against me as treasurer for breach of contract and her attorney produced a properly executed contract that had been signed by the school committee at the beginning of the school year. The treasury was empty (this had been one of the lean years), so I was mighty glad to compromise the case out of court.

"If it so happens that the men are all satisfied with the presence of a camp physician paid by cut-outs, it more than often happens that the company has cause not to be.

"Take, for example, the ever-recurring fake damage suit. If the testimony of the camp physician is not favorable to the party who is trying to recover damages, he has little trouble in convincing the jury that the physician should be classed as a company employee, drawing a fixed amount every month collected by the company, and as such is more than apt to be prejudiced against one poor man who can be of no further benefit to the physician, if by so doing the latter can strengthen his position with the company.

"What's the moral? I haven't been able to find it."

⁂

Man-Failure

A distressing train of events in the affairs of a big railroad recently led to an exhaustive investigation at the hands of a commission. In making its final report this commission was responsible for the coinage of a new word—"man-failure." To this was attributed the conditions leading up to and allowing of the train of mistakes and disasters which the commission was required to investigate. And although the final report was a lengthy one, the entire chain of deplorable events was attributed to only one general cause, "man-failure."

It is not an everyday thing that so striking a word as "man-failure" is coined or brought so forcibly to our attention. We may wonder how many erroneous polices and serious blunders in operation and management have been explained in some way as due to unfavorable conditions, etc., when "man-failure" was really at the bottom of things. In our own business, coal mining, we do not need to doubt that many ruinous policies have been enforced with serious results, all of which should have been charged to the failure of high officials, directors, etc., because they either did not see that the policies they outlined were safe, or if they knew they were, did not follow them up to see if they were carried out. We can easily recall strikes which were caused by "man-failure" on one side or the other.

Here are a few kinds of "man-failure" in connection with coal-mining work:

A man is made general manager of a company owning several big mines, where pick mining exists. He is a believer in machine-mined coal. Machines are introduced and the men are forced to work them in good places and bad at a rate of differential that is not wholly fair to them. After expending large sums of money on power house, mining machines and other equipment, it is finally found that machine mining is not as profitable to the company as was the pick mining. The "G. M." explains it by showing up the unfavorable attitude of the men and the fact that the inside conditions in some places were against it. And although he may get away with such an excuse, it was really a clear case of man-failure, due to his not studying conditions carefully enough and in fixing the differential incorrectly.

A superintendent allows a "Ring," consisting of perhaps his assistant, one or two foremen, and a few favored men, to exist in his division. They are all capable men, but their ring tactics breed trouble and lead to conditions that the "super" has finally to answer for. It is man-failure on the part of the superintendent to allow rings to exist.

Instructions by Circular Letter

A general superintendent believed too strongly in continually issuing instructions by circular letter and in picking up flaws and small mistakes. He kept his local superintendents so busy answering his letters they could not find time to attend to larger matters of operation, cost, etc. The result was the management finally took up the question of cost, but it was too late.

A mine foreman who had a splendid reputation as a hard worker and all-round good man began work for a progressive company, whose motto was "safety first." But the foreman didn't like "new-fangled notions." He looked after his mine faithfully, the output was good and the cost was right; but he would not follow safety instructions, so finally lost out. It was man-failure on his part in not keeping abreast of the times.

It is all too common for a wealth of instructions to be issued by officials in charge who do not follow up their work to see if rules and instructions are being worked out. Dead rules are dead weight. We should all remember that only 10 per cent. of the work is done by issuing instructions, 90 per cent. is getting them carried out.

We can't afford to overlook the significance of man-failure. In future it will more often be given as a reason for failure because we are growing more frank in our explanation of mistakes.

Do you give instructions? By all means follow them up and make sure they are carried out. Do you receive instructions? Don't fail to study them carefully to find their meaning. Then, be sure to carry them out. These two simple rules will go a long ways toward avoiding man-failure.

The Coal Fields of British India

SYNOPSIS—The coal fields of India while not covering a large area have in places many superposed seams of great thickness, and the fuel is low in sulphur, which, on the whole, is generally true of Asiatic coals.

⁂

The coal seams of India occur in deposits more recent than those in which the principal coal fields of Europe are found. With one or two unimportant exceptions the peninsular fields are confined to the great Gondwana (Permo-Triassic) system of Indian geologists. It is thought that the rocks of this period were almost entirely deposited in fresh water and probably by rivers. As a rule they are found occupying basin-shaped depressions in the older formations, and such depressions frequently coincide with the existing river valleys.

In general the coal of peninsular India may be described as a laminated bituminous coal, in which dull and bright layers alternate. Much of it does not coke freely, while a not inconsiderable portion will not do so at all. However, from the coal of particular seams in the Raniganj, Karharbari and Jharia fields, fairly good qualities of coke can be made. In the Raniganj field the best coke has been made from the Sanctoria coal and in the Jharia field from Nos. 14, 15 and 17 seams.

Incline, Dishargarh Colliery, Raniganj Coal Field, Bengal, India

Fixed Carbon, Ash and Moisture

The average proportion of fixed carbon in the coal of the Raniganj field is under 55 per cent., while in the Karharbari and Jharia fields it is probably about 10 per cent. higher. There is no case of a true anthracite having been discovered in any of these fields; but the crushed and powdered coal at the foot of the Darjiling Himalayas approximates in character to anthracite on account of the removal of its original volatile constituents.

The percentage of ash in Bengal coal which is brought to market averages from 10 to 15, that is to say, that coal with less than 10 per cent. ash does not commonly occur, and coal with more than 15 per cent. does not, as a rule, find a ready sale. In the producing fields of Hyderabad, the Central Provinces and Central India, the ash content is much higher, particularly in the latter provinces, where the ash varies from 15 to 25 per cent.

The moisture or hygrometric water varies much in the coals from the different fields. In those of the Godavari and Wardha areas it is exceptionally high, being often 14 per cent., while in the Raniganj field it varies from 1 per cent. in the Barakar or lowest formation to 3.81 in the lower Raniganj seams and 6.86 per cent. in the upper seams of the Raniganj formation. A similar proportion appears to obtain in the corresponding stages of the Jharia field.

Sulphur and Phosphorus

The quantity of sulphur and phosphorus varies much from seam to seam, and though large quantities of these impurities are often found some of the coal is sufficiently free of them for the manufacture of iron and steel. The average of 31 analyses of coals from Raniganj made by Tween gave sulphuric acid 0.07 per cent.* and phosphoric acid 0.14 per cent.

Dunstan gives the following analyses of Raniganj, Jharia and Giridih coals:

Coalfield	Phosphorus, per cent.	Sulphur, per cent.
Raniganj (average of 34 samples)	0.088	0.74
Jharia (average of 12 samples)	0.143	0.80
Giridih (average of 6 samples)	0.019	0.62

Coals above the Permo-Triassic System

Coal of Upper Jurassic age occurs in Kutch. The workings at Trombow are apparently the largest, where a seam, measuring 16 in., contained only 8 in. of good coal, the remainder being shale. The seams appear to be so thin and inconstant and the coal so brittle and intermixed with shale that they cannot be considered of any economic importance.

Coalfields of Cretaceous age are found in the Khasia and Garo hills in Assam. Coal of Tertiary age is found in the foothills throughout almost the whole of extra-

---

Note—Abstracted from "Memoirs of the Geological Survey of India" written by V. Ball and revised and largely rewritten by R. R. Simpson, inspector of mines.

*This figure appears to be very low and possibly should be 0.7 per cent., the value given in the table below for the sulphur only.

Fierce Fire in the Raniganj Coal Field, Bengal, India

Underground Fire, Charanpur Colliery

Burning Coal Shaft, Charanpur Colliery

peninsula India, from Baluchistan on the northwest to Assam on the northeast. It also occurs in Sind, Rajputana, Burma and in the Andaman and Nicobar Islands. In upper Assam, however, important deposits of true coal are found, which are considered to be of middle Tertiary, probably Miocene, age.

Generally speaking, the Tertiary coals are bright, jetty and non-laminated, and they contain a larger proportion of volatile matter than the coal of the peninsula fields; many of them are extremely friable and susceptible to disintegration under exposure; they do not cake as a rule and the proportion of ash is usually small.

Distribution of Coal

In 1873, T. W. H. Hughes made the following estimate of the extent of the known coal-bearing rocks in India:

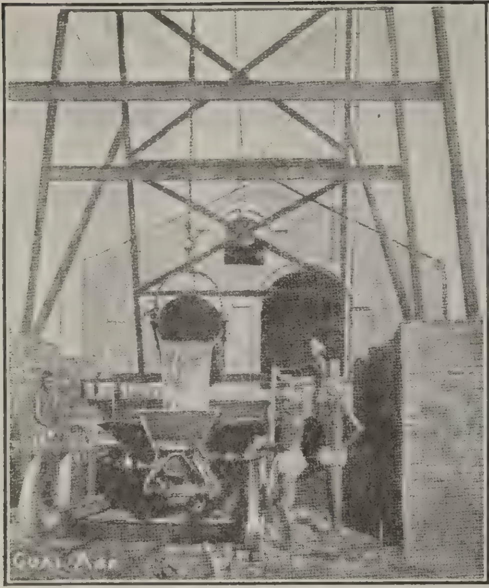
Name of area	Square miles
Godavari and its affluents	11,000
Son	8,000
Sarguja or Gangpur	4,500
Assam	3,000
Narbada and its affluents	3,500
Damuda	2,000
Rajmahal	300
Unsurveyed and uncomputed	2,700
	35,000

This estimate is probably somewhat in excess of the truth, but the additional evidence to date does not permit of a much closer approximation. Over a considerable portion of the area the coal-bearing rocks are covered by younger deposits and must lie at unworkable depths.

Coal Too Far from Coasts

Although the coal-mining industry has now been in operation in India for more than a century, and although there has been a steady increase in production and consumption, which has been especially notable in the last decade, still it must be stated that the development of the coal resources of the country is as yet in an imperfect condition. Of the numerous coal fields of proved value in India, 18 are actually being worked, but only 7 are of any considerable importance, while 89 per cent. of the total output is produced in the Raniganj and Jharia fields. The reason for the relative importance of the various regions is easy to understand. Most of the coal fields are too remote from the ports and centers of manufacturing industry to render it possible for their product to be carried to places where it would have to compete with fuel from the best coal fields of Bengal, which fields,

Loading Wharf, Coal Washer and Coke Ovens, Namdang, Makum, Assam



Drawing Water in Sinking Pit at Jelgora Colliery, Jharia

Head Gear and Screening Plant, Ballarpur Colliery, Central Provinces, India

from their strategic position, within easy reach of the coast, practically command the middle-eastern market. That a lively spirit of enterprise is abroad is, however, evident from the fact that coal-prospecting operations are in progress in nearly a dozen separate coal regions.

THE RANIGANJ COAL FIELD

The Raniganj field is the largest of the coal fields now being worked in India. It is situated from 120 to 140 miles northwest of Calcutta, and the East Indian Railway Co.'s line passes through it centrally. The Bengal-Nagpur Railway Co. also has access to the coal field, and besides these trunk lines there is a growing network of branch lines and sidings for the service of the collieries.

The extent of the exposed coal field is approximately 500 square miles, within which area the Panchet, Damuda and Talchir groups attain an aggregate thickness exceeding 11,000 ft. The general dip of the beds is toward the south at angles of from 5 deg. to 20 deg., and the measures are abruptly cut off at the southern boundary by a fault the throw of which must, at the least, be equal to the full thickness of the beds. On the east the coal measures dip under the Gangetic alluvium, and the boundary of the field is unknown. Recent borings, however, point to their extension eastward to a very great distance, but overlain by the higher beds of the series, and at a considerable depth.

There are numerous faults and dikes, most of which are obscured by the alluvial cap which covers so much of the coalfield, so that their presence is, as a rule, only disclosed during the course of mining operations.

The thickness of the coal at Jharia in measures Nos. 10 to 18, inclusive, aggregates 163 ft., seam 10 being 45 ft. thick and there being two other thick beds which are 23 and 26 ft. thick, respectively. A section taken between Katras and the Jamuni River totals 198 ft. of coal found in 19 seams numbered from No. 1 upward to No. 18, No. 16 being absent, and Nos. 8 and 15 being each in two benches. The thickest beds, Nos. 3 and 4, are not worked, but each measure is 20 ft. thick.

Charanpur Colliery, Raniganj Coal Field, Bengal, India

Handling Fine Dust at a Coal Washery

By J. Drummond Paton

SYNOPSIS—The operation of washeries would be greatly improved if no sludge were formed, and by passing the finer coal, if naturally dry, over a fine wire-cloth screen adapted for the removal of the dust, this end could be attained. This dust is not markedly, if at all, cleaned in the washer, and, if clean, could be sold for many purposes, or, if dirty, could be used at the coal plant. It generally contains more impurities than any other size of coal.

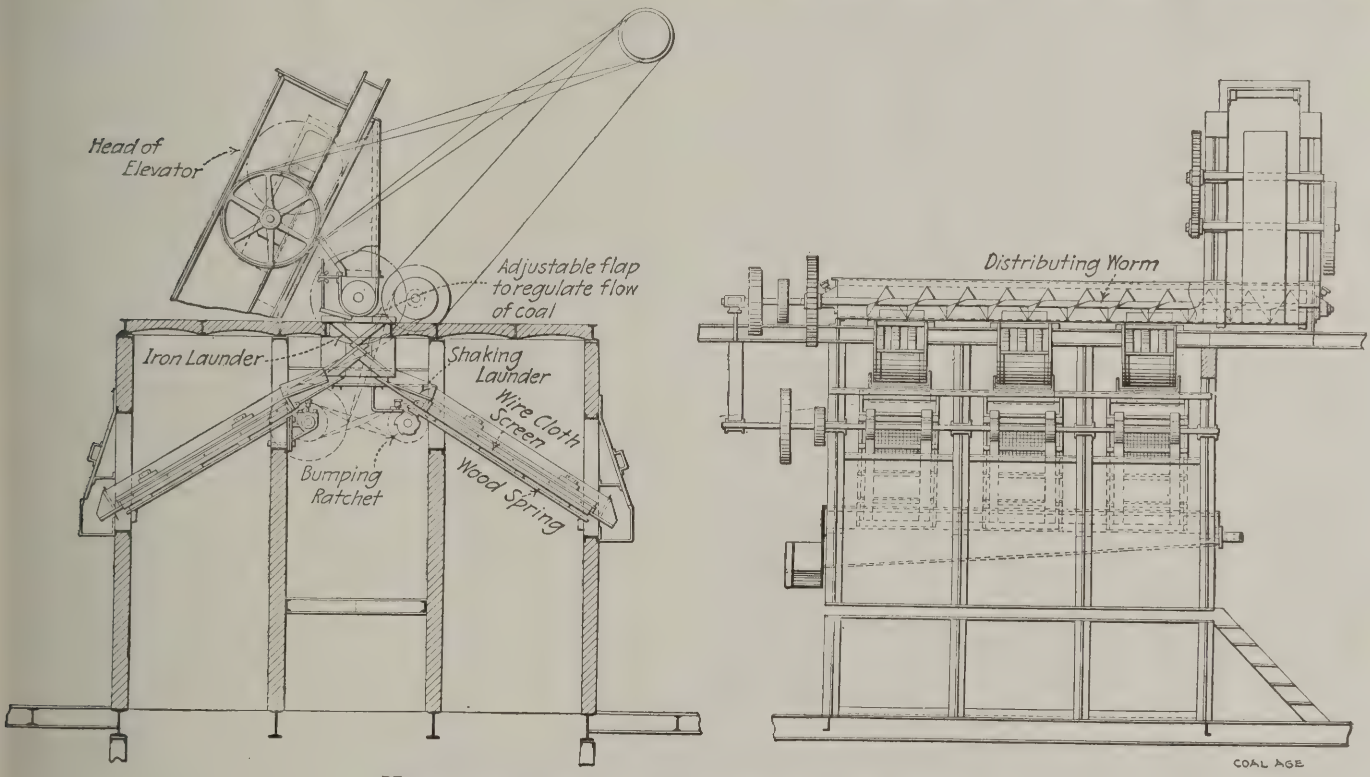
⁂

The method of handling small coal and dust at the surface of the mine is the keynote to successful washing and to allow all the small coal under 1 mm. ($\frac{1}{25}$ in.) cube to pass into the washery is radically wrong. Where the moisture percentage is not over 5, the small dust which is as finely comminuted as that described may as well be removed by "percussive" screens as subjected to any other treatment. Trials and experiments prove that small coal from 0.5 mm. ($\frac{1}{50}$ in.) cube downwards cannot be cleaned in a washer. If the dust together with the coal in grains goes into the jig, the formation of sludge is unavoidable, making the operation of the washery difficult, as it is hard to dry the washed fine coal.

Owing to the sludge with which it is mixed, the mass is so dense that water can only slowly pass through it. Further, the fine sludge, on account of its larger surfaces, can take up an immense quantity of water.

Water Will Not Drain from Sludge

It is a proved fact that a piece of coal of 30 or 50 mm. (1¼ to 2 in.) cube, if taken out of water, contains, after only a few minutes, 3½ to 4½ per cent. of moisture, whereas a quantity of sludge of a similar weight still contains 20 to 25 per cent. of water after several hours' draining. It is, however, most essential to have the fine coal as dry as possible for briquetting and coking purposes; especially is this the case if coal with only 17½ to 18 per cent. of volatile matter is employed. A large number of mines which produce such coal do not succeed in obtaining coke from washed coal when the latter contains more than 11 per cent. of moisture, because the ovens are too slow in reaching the required temperature.



Humboldt-Weissmann Percussive Dust Screen

The screens are jolted 600 times a minute by a bumping cam and will screen out all dust under 1/25 in. in diameter.

How the Coal Is Screened

The Humboldt-Weissmann percussion or bumping screens will extract coal dust below 1 mm. cube from a dust of larger size. The important features in the screens are (1) a continuous feed onto a large screen surface so that the wire cloth may not choke from overloading, and (2) a multiple cam at the upper end of the screen, which, as it revolves, drops the end of the screens resting on it 5 mm. ($\frac{1}{5}$ of an inch) 580 to 600 times a minute. This constant vibration of the screen prevents clogging unless the moisture content in the coal exceeds 4½ per cent., when the wire-cloth openings must be increased to 1.2 or 1.4 mm. The screens give a large output with minimum power consumption at small initial cost and low maintenance charge.

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*Abstract of paper on "Small Coal and Dust; Its Production, Prevention, Treatment and Utilization (Dry Mines)," presented at meeting, Apr. 13, of the Manchester Geological and Mining Society.

The power consumed by one battery of 18 shaking screens, amounts to only 1 hp., and only 4 hp. is required for driving the screw by which the coal is distributed over the screens.

Coal Dust Is Wetted but Not Washed in a Jig

By using these screens in connection with washers, the sludge is reduced to a minimum, the water can be used again and again without sludge tanks or funnel boxes, and there is no mass of wet coal to handle which will neither drain nor otherwise dry. The impossibility of cleaning the extremely fine dust which forms sludge in the washer is well known. Coal-washing bosses often say "The sludge is too dirty and must be removed from the washery."

Sludge tanks are therefore provided, and they are drained occasionally and the contents sold or used as boiler fuel at the mines. It can easily be proved that coal sludge contains about the same quantity of ash as crude coal of the same size, in some cases even a little more, since soft shale and clay are levigated and tend to disintegrate in water and mix with the finest part of the coal. If my assertions prove correct, the ash contents of a mixture of washed fine coal and dust cannot exceed that of washed fine coal mixed with the whole sludge.* But, unfortunately, the ash contents of the dirt sometimes debar the addition of the whole quantity to the washed coal, if the desired percentage of ash in the briquetting or coking coal is to be obtained, and so in many cases we cannot add all our dry dust to the washed coal and obtain a satisfactory coal product.

It is interesting to note how the quantity of the ash varied with the size of a certain Lancashire coal:

ASH IN A LANCASHIRE SMALL COAL

Size, In.	Weight of ash, per cent.
1¼ to ⅞	14.43
⅞ to ⅝	16.50
⅝ to ⅜	14.43
⅜ to ¼	11.34
¼ to 0	43.30

As an alternative, the fine coal ¼ in. to zero was further classified into the sizes: ¼ in. to 1 mm., of which there was 35 per cent., and dust 1 mm. to zero, forming 65 per cent. of the whole.

The following is the result obtained after washing the various sizes:

ASH IN A LANCASHIRE SMALL COAL AFTER WASHING

	Coal: 70.51 per cent†		Refuse: 29.49 per cent.	
Sizes, in.	Per cent. of size	Per cent. of ash	Per cent. of size	Per cent. of ash
1¼ to ⅞	11.75	4.52	1.65	70.00
⅞ to ⅝	13.61	3.45	2.47	60.00
⅝ to ⅜	11.75	5.37	1.86	75.00
⅜ to ¼	8.66	5.41	1.86	75.00
¼ to 0	23.92	11.18	9.48	68.00
Sludge	......	......	12.17	29.51

The slack divided into sizes between ¼ in. and 1 mm. and 1 mm. and zero yielded the following results:

ASH IN A LANCASHIRE SLACK AFTER SCREENING DUST AND WASHING GRAINS OF COAL

	Coal		Refuse	
Size	Per cent. of size	Per cent. of ash	Per cent. of size	Per cent. of ash
1¼ in. to 1 mm.	26.29	5.81	6.18	75
1 m.m. to 0 mm.	10.82	32.74	Unwashed	

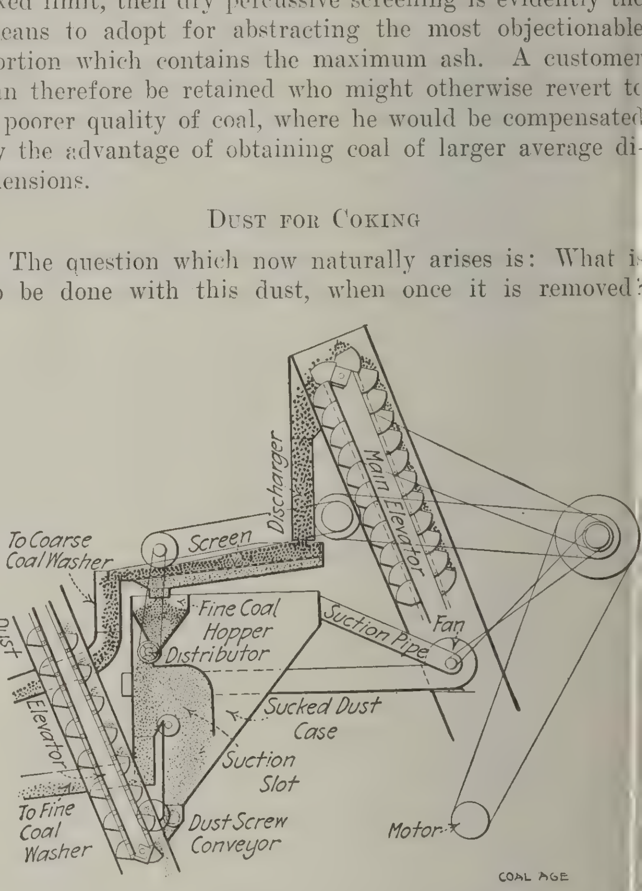
Screening versus Washing

The total final coal of ⅜ in. to zero averaged an ash content of about 10 per cent.; while the fine coal from ⅜ in. to 1 mm. only showed an ash content of about 5.7 per cent., so the great advantage in screening away the dry dust below 1 mm. diameter is confirmed.

If slack is to be sold without washing, and trouble is experienced in keeping the ash percentage within a fixed limit, then dry percussive screening is evidently the means to adopt for abstracting the most objectionable portion which contains the maximum ash. A customer can therefore be retained who might otherwise revert t a poorer quality of coal, where he would be compensate by the advantage of obtaining coal of larger average dimensions.

Dust for Coking

The question which now naturally arises is: What i to be done with this dust, when once it is removed



Suction Method of Dust Extraction

A fan separates the fine dust from the slack by suction This falls into a small hopper and is conveyed to a bin by an elevator.

The quality of this product must first be determined The impalpable coal dust to which reference has jus been made contained 32.74 per cent. of ash, but not a dust between 1 mm. and zero would be equally bad.

The following analysis of another sample shows wha possibilities occasionally lie in that part of the coal whi is called dust:

SAMPLE NO. I

Products	Per cent.	Products	Per cen
Coke yield	74.10	Moisture	0.6
Sulphur salts	1.30	Ash	16.8
Volatile matters	25.90	Coke yield (muck method)	74.8
Tar	3.20	Coke yield (distilling test)	74.1
Benzol	0.83		

SAMPLE NO. 2

Products	Per cent.	Products	Per cen
Coke yield	75.10	Moisture	0.7
Sulphur salts	1.20	Ash	16.
Volatile matters	24.90	Coke yield	75.
Tar	2.90	Coke yield (distilling test)	75.1
Benzol	0.72		

It must be borne in mind, however, that samples and 2 had not been over percussive screens, but nevert less would be regarded as dust by the purchaser and caus him to condemn a shipment if too much of it were prese in his slack.

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*It is not by any means unlikely that the author of these remarks is justified in his conclusions, but his figures later quoted for the washed sludge of a Lancashire coal show 29.51 per cent. of ash and the same coal screened through a 1-mm. screen shows 32.74 per cent. ash. So in the case he quotes washing was not entirely ineffectual.

†An inexplicable error as the percentages of the various sizes total to 69.69 and not 70.51.

It is impossible to install a coking plant for the sole purpose of disposing of the fine dust formed at a single mine, but it might be well for collieries to establish a plant to which this material might be sent and coked with a saving of byproducts, for development of power or for the manufacture of illuminating gas. The plant of Messrs. Koppers at Joliet, Ill., is making coke out of coal of which 85 per cent. passes through a 1/8-in. screen. If the coke would not prove of the best quality it could be sold for domestic purposes.

The price of such coal in the past has been by no means proportional to the calorific output it delivers when used with suitable stokers or dust-firing appliances under steam boilers.

Dust coal of 1 mm. diameter and under finds a ready market at foundries as a medium to produce blackening for the faces of molds or for reforming foundry sand. Various compounds for this purpose consist almost wholly of just such dust and sell at as much as $43.45 per ton. If the coal has a low ash percentage it can be used for many chemical purposes for which coal is now ground.

If collieries took up the utilization of their own dust for the distillation of oils, etc., the modern market would provide a consumer for the "coalite" coke which would be produced. The following table shows the temperature at which the various oils are distilled.

TEMPERATURES OF DISTILLATION

Temperature, Degs. Fahrenheit	Products
0 to 338	Water, ammonia-liquor, light oil, benzol, naphtha.
338 to 446	Medium oils, naphthalene, carbolic acid.
446 to 518	Heavy oils, creosote.
518 to 572	Anthracene, pitch.

Coking plants have cleared from $10,000 to $15,000 per month on byproducts alone, apart from coke sales, and this on a basis of 200 to 300 tons of coal carbonized per day. On an average, the returns available by coking approximate for each ton of coal carbonized as herewith:

AVERAGE RETURNS FROM COKING ONE SHORT TON OF COAL

Coke, in tons	0.6
Tar, in pounds	89.3
Ammonia salts, in pounds	26.8
Light oils and crude benzol, in U. S. gallons	27.
Available gas, in cubic feet	4500

Undeveloped Markets for Dust

Had the money which has been spent in investigating the effects of coal dust and gas been applied to the collection of dust in the mines and elsewhere, the operators would have been compelled to find a market for it and would have educated the consumer to appreciate its value, but, of course, such dust would have to be collected with a due regard to the necessity for keeping it free from extraneous substances.

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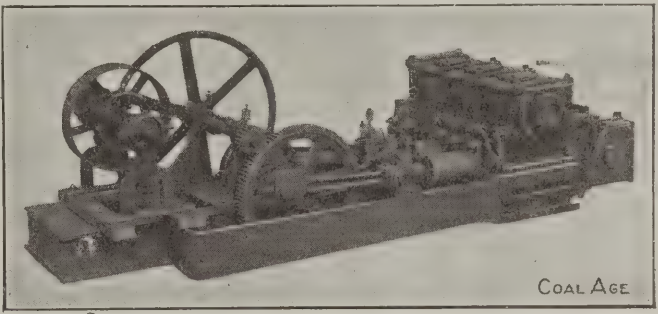
A New Acid-Proof Mine Pump

Perhaps one of the most vexing problems which confronts the mine operator is successfully handling comparatively small quantities of highly acidulous mine water. The destructive action of this fluid upon pumps and pipe lines is well known. From time to time various expedients have been adopted to circumvent this evil.

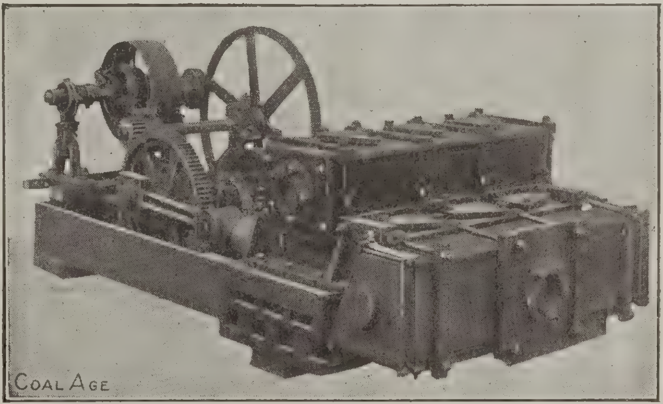
About the most successful material which has been found for resisting the corrosive action of acidulous waters is wood. This material excels even the so called acid-resisting bronze, and under proper conditions will last longer and give more satisfactory service than lead.

It will be readily understood that it is the parts of a pump which come into direct contact with the acidulous water which suffer most from corrosion. It is not uncommon for even brass- or bronze-lined cast-iron pumps to be destroyed by acid water in a comparatively short time. In some mines even a very few shifts are enough to practically destroy the working parts of the pump, particularly the valves, valve seats and valve springs.



Front View of Pump Arranged for Belt Drive

With the foregoing considerations in mind, George Robson, of Murray, Hocking County, Ohio, has invented and is about to place upon the market a type of mine pump wherein practically the only metal coming in contact with the mine water is the plunger. As may be clearly seen from the accompanying illustrations, this pump does not differ materially in principle of operation from the ordinary, horizontal, triplex, outside-packed plunger variety. The cylinders, valve chests and valves are, however, all of wood.



Rear View of Pump, Showing Wooden Construction

In the construction of this pump, all wooden parts which are subject to pressure are thoroughly reinforced with castings upon the outside. The valves operate by gravity, and consequently no valve springs are necessary. In order to effectually prevent the valves from splitting, they are heavily banded around the edge with cast iron. This, however, does not come in contact with the valve seat, and consequently any pitting which may develop in the metal does not interfere with the efficiency of the pump.

This pump, built in a capacity of 250 gal. per min., to work against a 600-ft. head, has been in operation for 28 months in an Ohio coal mine, with an expense for repairs of 85 cents. This record is the more astonishing when we consider the fact that this machine took the place of two bronze-lined, cast-iron pumps, which failed after two weeks' operation.

Determination of Water in Coal

SYNOPSIS—The determination of water in coal has hitherto been a summation of the effects of four separate actions, though the outcome of only one was sought. Mr. Teed's method gives the actual water expelled at the temperature of desiccation.

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In a paper at the meeting of the Institution of Mining and Metallurgy in London, England, P. Litherland Teed refers to the simple drying method universally employed for determining the percentage of moisture in a fuel, in which he says that sources of inaccuracy exist due to the following reactions:

(a) Oxidation of the pyrites making the result too low; (b) Oxidation of the coal itself making the result too high; (c) Volatilization of matter contained in the coal which also gives too high a result.

Mr. Teed claims to have devised a method for the determination of water in coal which gives a high degree of accuracy, is quick in operation and employable in many cases where simple drying would be impossible.

MOISTURE ABSORBED BY LIME

His apparatus consists of a 100-cc. pressure flask, a "U" tube of about ½-in. bore and a sulphuric-acid drying tube, all of which must be capable of withstanding atmospheric pressure; besides these, sound rubber corks and some form of vacuum pump are necessary. With regard to the latter, the Sprengel water vacuum pump worked by the main water-supply has been found to give a reduction in pressure equal to about 725 mm. (28.5 in.) of mercury and to be in every way satisfactory.

The illustration shows the apparatus used and needs no further explanation except to state that the right beaker is filled with boiling water, and the left with a boiling aqueous solution of common salt or calcium chloride.

The pressure on the coal is reduced and its temperature raised to that of the boiling water surrounding the flask in which it is contained. Thus the water content of the fuel, together with some volatile matter varying in quantity and character with the nature of the coal, distil off and pass into the lime tube. In accordance with the following equation

$$CaO + H_2O = Ca\ (OH)_2,$$

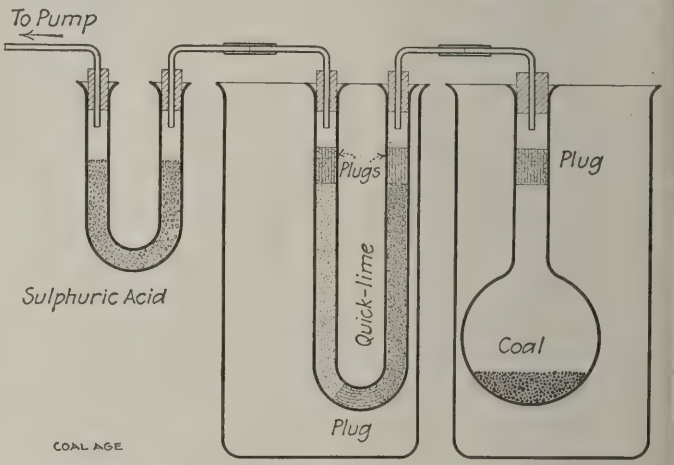
the water originally in the coal is chemically retained, while the other volatile matter because it has no chemical affinity for the lime, and because the temperature of the lime tube is too high for condensation, passes through to the sulphuric-acid drying tube, where some of it is retained, discoloring the sulphuric acid, while other portions pass through to the pump.

At the end of about half an hour, the whole of the water having passed from the coal to the lime tube, the tap adjoining the vacuum pump is turned off, the beaker of boiling water surrounding the coal flask is removed and the air gradually allowed to pass back through the sulphuric-acid drying tube to the vacuum beyond. Then the apparatus is dismantled, the lime tube washed externally, wiped, placed in a desiccator to cool, then weighed, and the increase in weight noted. As this increase is solely due to the water absorbed from the coal, the percentage of water in the fuel is easily calculated.

NO ERRORS DUE TO OXIDATION OR VOLATILIZATION OF HYDROCARBONS AND SULPHUR

In the new method, the author claims that the two errors due to oxidation no longer exist because the water is distilled from the coal in the absence of air, and consequently no oxidation can occur. The volatilization of hydrocarbons and sulphur still takes place, but since the temperature of the quicklime tube is higher than the coal itself, no condensation can occur in this tube unless chemical action takes place.

Mr. Teed says one physical error undoubtedly exists, for the lime tube is attacked with loss in weight by the boiling solution of calcium chloride, and therefore for the most accurate work a correction must be applied, which is dependent on the strength of the calcium chloride solution and the time of immersion. Using the solution employed by the author it was found that the drying tube lost in weight 0.0030 gram per hour. The following table of results of three representative coals examined, shows that the results are independent of the time that the coal is under the influence of heat and reduction pressure.



APPARATUS BY WHICH THE MOISTURE IN COAL CAN BE ACCURATELY DETERMINED

TABLE SHOWING THAT TIME DOES NOT AFFECT RESULTS

Nature of Coal	Weight of Coal Grams	Apparent Increase in Weight of CaO Tube Grams	Time Min.	Correction Grams	True Weight of Water Grams	Water Per cent.	
Anthracite	9.4305	0.2600	30	+0.0015	0.2615	2.77	2.78
	5.2244	0.1427	30	+0.0015	0.1442	2.77	
	3.1360	0.0860	30	+0.0015	0.0875	2.79	
Bituminous....	4.0800	0.2618	45	+0.0022	0.2640	6.46	6.45
	4.3442	0.2784	30	+0.0015	0.2799	6.44	
Lignite	10.4042	1.0588	60	+0.0030	1.0618	10.21	10.20
	3.7666	0.3832	30	+0.0015	0.3847	10.21	
	8.2526	0.8390	30	+0.0015	0.8405	10.19	

DRIED ANTHRACITE HAS LARGE POWERS OF OCCLUSION

The author draws attention to a discovery he made in the course of his investigations in the following terms: When investigating the percentage of moisture in an anthracite, it was found that the increase in weight of the drying tube was greater than the loss in weight of the anthracite in the coal flask, by an amount far greater than would be accounted for by the fact that the aqueous vapor in the air originally in the apparatus would be absorbed by the drying tube. Naturally, it was at first supposed that there must be some leak in the apparatus between the coal flask and the quicklime, but this, on performing a blank experiment, was not found to be the case.

The experiment was repeated, still using anthracite in the coal flask, and it was found that, while the increase in weight of the drying tube was equal to 2.78 per cent. of the anthracite employed, the decrease in the weight of the anthracite in the flask was equal to 2.52 per cent. So striking was this result, Mr. Teed adds, that this experiment was repeated ten times in all, when it was found that the mean increase in weight of the drying tube was equal to 2.78 per cent of the anthracite employed (these results did not differ by more than 0.04 per cent.), while the mean decrease in weight of the anthracite in the coal flask was equal to 2.54 per cent.; however, these results differed from one another by as much as 0.17 per cent., but no result was higher than 2.62 per cent.

In regard to this Mr. Teed can only conclude that when the water left the coal under the influence of the reduced pressure and heat, it left it in the physical condition of charcoal, capable, like that substance, of absorbing many times its own volume of gas.

⁂ ⁂

The Electric Mining Locomotive

By Geo. M. Kennedy

SYNOPSIS—A general description of the features common to practically all electric mining locomotives. The path of the current is traced through the machine from trolley wire to rail both when the motors are operating in series and in parallel.

⁂

We are all familiar with the general appearance and work that is performed by the electric mine locomotive. This machine in its present stage of development embraces many different types and classes, but all of them regardless of make or size have many features in common.

General Construction of the Machine

The side frames are usually made of cast iron and the ends of either the same material or of cast steel. These members are securely bolted together in a thorough and substantial manner, and are designed and constructed for hard service.

Most electric locomotives are equipped with two motors, one suspended from each of the two axles. Movement along the track is obtained by means of pinions on the armature shaft meshing with gears mounted on the axle.

It should be remembered that the locomotive does not generate power in itself, but through its motors transforms electrical into mechanical energy, and thereby does useful work.

The purpose of the trolley wire is to conduct current to the locomotive from a source of supply. The rails upon which the machine operates also perform the function of carrying this current from the locomotive back to the origin of electrical energy. To do this efficiently they must be bonded at every joint and cross-bonded at certain intervals, say, every 200 to 400 feet.

If efficient service is to be obtained, it is important to have the trolley wire, rails and bonding in as good condition as possible. They must be free from leakage and poor joints, for either of these will cause an unnecessary drop in potential, that is, a loss in the driving force required by the locomotive, which results in decreased speed or failure to pull a normal load. In other words, every leak and every poor joint, whether it be in the track or the trolley wire or in fact anywhere in the circuit, dissipates energy, which under good conditions would be utilized by the locomotive in performing useful work.

The locomotive is equipped with a trolley pole which, for various reasons, is made of wood. This supports the pole head, which in turn carries the harp, within which is mounted a deep-grooved wheel by means of an axle.

The Route of the Current through the Machine

This trolley wheel rotates along the trolley wire, making electrical connection therewith. It is here at the contact between wheel and wire that the current enters the locomotive. From the wheel it flows through the harp to the pole head, and from a terminal mounted thereon down a flexible-rubber insulated cable attached to the trolley pole to a movable cable contact block on the locomotive proper.

This contact block fits into and forms a connection with one of two stationary cable contact blocks. These are installed merely for the purpose of furnishing a convenient means of detaching the cable in case of any damage to the trolley pole or parts which are mounted thereon, for without these blocks or couplings loss of time would occur in case a trolley-pole equipment required changing, either due to breakage or some other cause.

Locomotives are usually equipped with two or more of the stationary cable blocks. This permits the pole to be placed in any one of two or more positions according to the number of blocks, or two separate trolley poles may be carried, one on either side of the locomotive. The contact blocks are connected together electrically by means of a suitable insulated cable and also to either a fuse block or to an automatic circuit-breaker, which is mounted on the locomotive close to the motorman's seat.

The fuse block is composed of some insulating material such as slate with suitable clips mounted thereon, into which is inserted a holder containing a fuse wire, which has a certain fixed current-carrying capacity depending upon the size or power of the machine.

The automatic circuit-breaker is a self-operating mechanism which opens the circuit when the current passing through the breaker exceeds a certain predetermined volume, at which the instrument is adjusted to operate.

Function of Fuse or Circuit-Breaker

The fuse, or automatic circuit-breaker, as the case may be, opens the circuit when an excessive current flows. Either of these devices is, therefore, exactly analogous to the safety valve on a steam boiler. From fuse block of circuit-breaker the incoming current flows through a suitable conductor to the controller which governs the speed and direction of travel of the locomotive.

It consists of two drums which are sometimes called cylinders. The first, or main drum, is that by means of which the current is switched on or off, and the resistance, as will be explained later, is cut out step by step. The other is the reverse drum or cylinder. By a proper rotation of this drum by means of a handle provided for that purpose, the direction of flow of current in the motor armatures may be changed, which will in turn reverse the direction of travel of the locomotive.

This drum also connects the motors either in series or parallel as desired. This is accomplished by means of a group of stationary fingers and a group of contacts mounted on the cylinder, which as the latter is turned forms electrical contact with the fingers, making and controlling the circuit.

How Contact Blistering Is Reduced

When an electric connection is broken while current is flowing an arc is formed. In order to reduce to a minimum the blistering and burning of contacts and fingers, due to arcing, a blow-out coil is placed in the controller and is connected in series with the line. All the current used by the locomotive passes through this coil. The result is the existence of a magnetic region which has the effect of blowing out the arcing caused in shutting off the main controlling drum.

The resistance on a locomotive is for the purpose of obstructing or retarding the flow of current. It is made up of a series of cast-iron grids mounted in a suitable frame but insulated therefrom. This resistance reduces the electro-motive force or voltage to a point such as to permit the locomotive to accelerate moderately, which means that the motors will have a chance to speed up and not become damaged. This will be discussed later on.

Taps are taken from the stack of grids at different points to the controller. This permits the resistance to be cut out or reduced step by step until the full line voltage is impressed on the motors, either in series or parallel, depending on the position of the reverse drum.

The current after having passed from the controller to the resistance and back to the controller, now flows to the motors. If the reverse cylinder is set for the series connection, the current passes through one motor, back to the controller and then to the other motor and thence to the casing, axle, wheels and rails.

If, on the other hand, the reverse cylinder is set for the multiple or parallel connection, the current passes through both motors simultaneously, thence as before to the rail, or ground as it is often termed, due to the fact that the negative is of the same potential as the earth.

The controller in feeding the current should never be moved more than one point at a time, since when the motors are not in motion, the feeding of several points at once reduces the resistance to such an extent as to allow an excessive current to flow, causing the deterioration of the insulation and eventually burning out the field, armatures, etc.

Whenever possible, the serious position of the controller should be used in starting the locomotive from rest. Every time this is done with the controller in the multiple position there is an excess of current flowing at the start, or until the locomotive is accelerated. In shutting off the controller it should always be moved to the off position and never held on any intermediate point.

When the Circuit Is Interrupted, Seek the Cause

When a fuse burns out or the automatic circuit breaker is thrown, there is some reason for it and before replacing the fuse or closing the breaker, search should be made to ascertain the cause. Perhaps the trip is too heavy, or an armature has a ground, or a field is short-circuited. A thorough investigation may save the locomotive from more serious damage. Sometimes copper wire is substituted for fuse wire. This should not be allowed under any consideration.

The locomotive should be examined regularly. A general inspection should be made twice each week, when the electrical connections may be examined to make sure that all parts are tight. Frequently controller contacts may be unduly burned, due to the fingers requiring a little more tension.

The air gap is the space between the armature and the field poles. As the shaft bearings wear down, this air gap becomes less, and if not attended to sooner or later the armature will rub on the pole faces, which results in the destruction of its winding and possibly that of the entire motor. The armature cap bolts sometimes work loose with the same results.

The motor bolts rarely work loose if a proper lock washer is provided, but there is a tendency to use this part over and over again. When the tension of the washer is gone, it is virtually flat, and if used in this condition will invariably result in damage to the equipment.

At the begining of each shift the trolley pole equipment should be lubricated. A drop of oil in the hole on the trolley wheel for that purpose reduces the wear on the bushing considerably. The grease cups, both armature and axle, should have a few drops of oil at the same time. A hole can be made to the axle through the grease in these cups by means of a screw driver. A little oil should then be poured into this hole and the grease pressed down again or the cup refilled. This procedure will save considerable wear on the bearings and a great deal of labor and expense. This is a fairly satisfactory method of securing proper lubrication of these parts.

BY THE WAY

F. N. Cameron, general manager of the Castle Valley Coal Co., the Consolidated Fuel Co., the Castle Gate Coal Co. and the Black Hawk Coal Co., all in Utah, has just gotten out a little booklet for free distribution, suggesting and advocating a campaign of "safety first" on the part of all the employees of his companies. As a basis for the printed matter in the booklet, Mr. Cameron has taken a poem on "Safety First," recently published in Coal Age. This interesting little pamphlet has been printed in three languages, and there is no doubt but that considerable good will result from this unique campaign for greater safety in mining.

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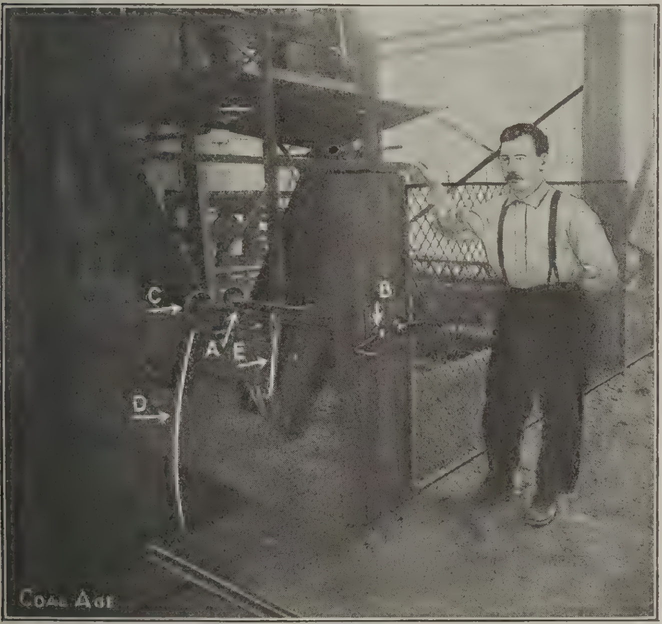
Thomas Badger (South Yorkshire coroner), addressing the jury summoned to inquire into the cause of deaths of persons killed in the Warren Vale explosion, in 1852, suggested the desirability of establishing a school of mines to teach elementary chemistry and physics to miners and their boys. Fifteen years later the Department of Science and Art, connected with the South Kensington Museum, commenced to send out teachers to coal mining and manufacturing centers, for the purpose of giving technical instruction. One of the best known and most highly successful of these teachers was Mr. Buckmaster, whose district covered the Midland coal field of England. Many readers will remember Mr. Buckmaster.

Safety Lock for Shaft Gates

The accompanying engraving and plans illustrate a safety gate fastener for mine and elevator shafts. Such a device had become imperative because of numerous fatal accidents occurring through persons walking into an open shaft under the impression that the cage was at the landing. This device makes it impossible for the safety gates to open except when the cage is in that position.

The illustration shows the device in position at the surface of the No. 1 mine of the Jenner-Quemahoning Coal Co., at Jerome, Penn. It consists of a shaft *A* supported by two angle irons having circular openings at the top in which the shaft revolves. At the outer end of the shaft is attached a crank *B*. At the inner end is fastened a circular metal disk *C*. On the circumference of this disk is cut a notch. *D* is an arc-shaped spring 14 ft. long, fastened at its lower end to the shaft timbers below the landing, with the curved portion extending into the shaft compartment.



The Safety Device in Position at Shaft Entrance

The object in having the spring arc-shaped is to allow the side of the cage traveling in either direction to strike it at nearly a tangent. At its upper end the spring is bent horizontally to allow it to pass under the disk *C*, the extremity being turned up in a vertical position, to engage the notch in the disk in the manner of a "dog" or pawl on a ratchet, thus preventing movement of the disk either to right or left. *E* is a lever fastened to the shaft *A*, which enables a person standing on the cage to operate the gate lock.

The plan of operation is as follows: When the cage is either above or below the landing, the crank *B* extends horizontally across the movable end of the gate, keeping it closed. The vertical end of the spring prevents the shaft from being revolved by locking the disk *C* in position.

As the cage approaches the landing either ascending or descending the side of the platform strikes the spring *D*, forcing it outward. This removes the dog from contact with the disk, permitting the shaft to be revolved and the gate to be opened.

The commendable features of this device are its simplicity of construction and operation and the effectiveness of its action, it being absolutely impossible to open the gate (except by breaking the mechanism) unless the cage is in position at the landing. The inventor, Mr. D. G. Alsop, of Jerome, Penn., who has patented the device, has also perfected an automatic gate closer as an attachment to the above.

A Large Concrete-Lined Shaft

A new shaft was recently sunk to bed rock at St. Albert, Alberta, eight miles northwest of the business district of Edmonton. This shaft is 29 ft. in diameter, with thick walls of reinforced concrete. It will be used in reaching a bed of coal 8 ft. thick.

The sinking of this shaft was no small task. The earth was dug by a clamshell dredge. When the hole was a few feet in depth, a ring of concrete was poured and permitted to sink. As the dredge dug the excavation deeper, more rings were poured, the construction being continued day by day until the bottom edge struck bed rock. This concrete casing was then cemented and sealed to keep water out of the shaft.

It has been announced that this mine will be equipped with modern machinery, and as soon as the hoisting apparatus is installed the work of drifting through the coal will be begun. The ultimate daily output is placed at 2000 tons. The shaft below the concrete lining is sunk through the rock, the top of the coal vein being 337 ft. below the surface of the ground.

Boiler and Engine House and Temporary Headframe

The company financing this enterprise is a French syndicate of capitalists. It owns in fee a large area of land about a mile from the municipality of St. Albert, and also has extensive leases. The present equipment of machinery and buildings will be enlarged when the mine is putting out its full capacity, and 500 men will be employed as soon as development work is completed.

This coal field was located in 1910, and development work was started a year or so later. The shaft was begun in 1912, the sinking occupying about 10 months. It is expected that work at this mine will be sufficiently advanced so that shipments will begin in a short time.

The builders of this shaft affirm that it is the largest and deepest of its kind in the world. The owners have invested in the neighborhood of $1,000,000 in the enterprise, which is expected to pay handsome dividends from the start of operation. The stock is held by a small group of people, and not a share is on the market.

German Timbering Methods

From a report on mining practice in Prussia during the year 1912, contained in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1, the following notes are derived:

At the King Ludwig mine in the East Recklinghausen district, iron* timbering is extensively used. In some parts, especially when the coal contains much gas, the posts and cross-pieces of "timbering sets" are curved so that each is about 3.2 in. out of a straight line at the middle; see Fig. 1. This method has proved satisfactory. The members being fixed firmly at their ends by the incrushing action of the roof and sides serve to convert bending stresses into thrusts, which the material is better fitted to resist.

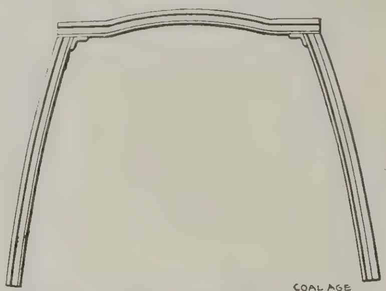


FIG. 1. CURVED "TIMBER SETS" IN GERMAN MINES

At the Recklinghausen I mine in the Herne district, iron and timber sets are cushioned against roof and side pressures by inserting at the joints of post and crosspiece, wooden blocks which, by their elasticity are said to increase the durability of these to a considerable degree (see Fig. 2).

In the Lietstolln region of the Obernkirchen general mining department, South Hanover district, it has been the practice to point the props in order that on subsidence of the roof they may penetrate the soft shale of the floor. In many parts of the workings, however, hard concretionary bodies in the clay oppose the entry of the props, so that they and the cross-pieces break under the roof pressure. Experiments have, therefore, been made with the yielding posts made by Hermann Schwarz, in Kray, Rhineland.

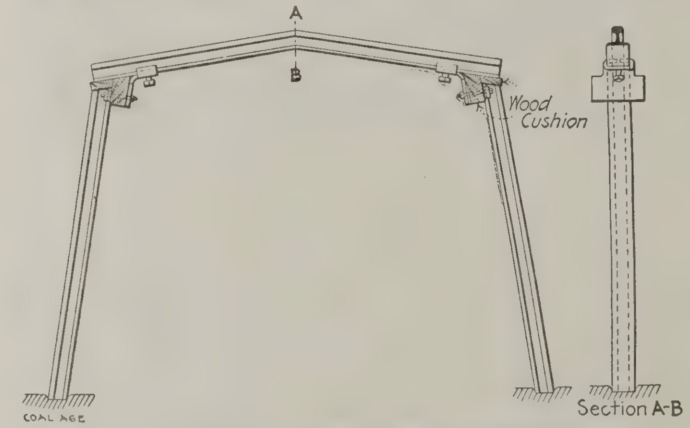


FIG. 2. A CERTAIN DEGREE OF ACCOMMODATION TO ROCK MOVEMENT IS PROVIDED BY WOOD CUSHIONS

A POST WITH A CERTAIN DEGREE OF "GIVE"

Inside of the channel-iron side post of a "timbering set" a T-iron is caused to slide. This sliding member is shaped like a wedge at the bottom and conformed at the top so as to support the cross-piece. When the T-iron has been slidden up in the post so as to protrude above it as high as is required, it is clamped there by means of a strap and wedge. This rectangular strap, which surrounds the post, has an eccentrically arranged screw bolt, which bears against the back of the U-frame opposite the T-iron, so that the strap does not press against the post directly. A wooden wedge is then driven between the strap and the wedge bottom of the T-iron, so as to clamp it.

Under pressure of the roof the wedges gradually slide together and allow the T-iron to settle. When the roof above the entry has subsided to the packing and no further retraction of the T-iron is observed, the composite iron post is removed elsewhere, being replaced by a weak prop of about 5.2 in. diameter and 6 ft. long. The iron posts are removed by a quarter turning of the bolt, thus loosening the wooden wedge and T-iron in the frame till the headpiece can sink. The experiments with these posts are not yet concluded.

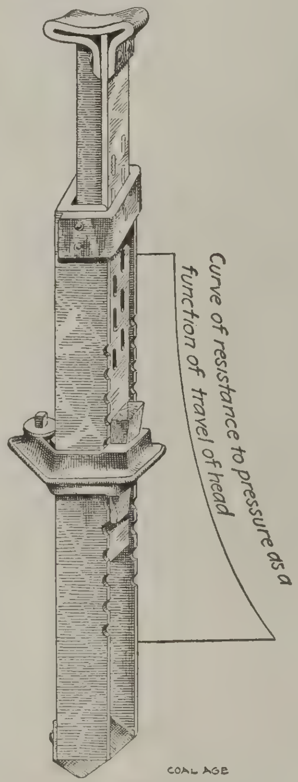

Curve of resistance to pressure as a function of travel of head
COAL AGE

FIG. 3. STEEL ROOF SUPPORT

[This post is illustrated in the accompanying drawing. The curve on the right shows the resistance to compression by horizontal ordinates. It will be seen that the post resists almost four times as large a pressure when at its shortest length as it will resist unyieldingly when fully extended. By changing the wood wedge for one less compressible, the resistance of the post to compression may be increased at will and the adjustment of the position of the wood wedge relative to that of the moving part of the post provides a similar choice in compressive resistance.

These posts are also made by R. Centner Fils, of Verviers, Belgium, and the makers assert that several thousand of them are in actual service and that they save about 6c. per ton, in the cost of the coal at ruling prices of wood posts in Europe.—ED.]

A New Type of Colliery Fan

Although in a good many departments, colliery practice appears to have become standardized, improvements of a radical description frequently arise which open up new possibilities to the colliery engineer. An instance of this kind is to be found in a new type of fan which has recently been introduced in South Wales and which possesses some very distinctive features. This fan, which is produced by the Turbon Patent Fan Co., Ltd., of Llanelly, is here illustrated with the casing removed.

It will be seen that the runner is of peculiar design. In general outline it resembles the usual drum-shaped, multi-blade type, but instead of being made up of a large number of narrow blades of great axial length secured by rivets, the new runner consists of rings pressed into a corrugated shape, and made to interlock with each other in such a way that no rivets are required.

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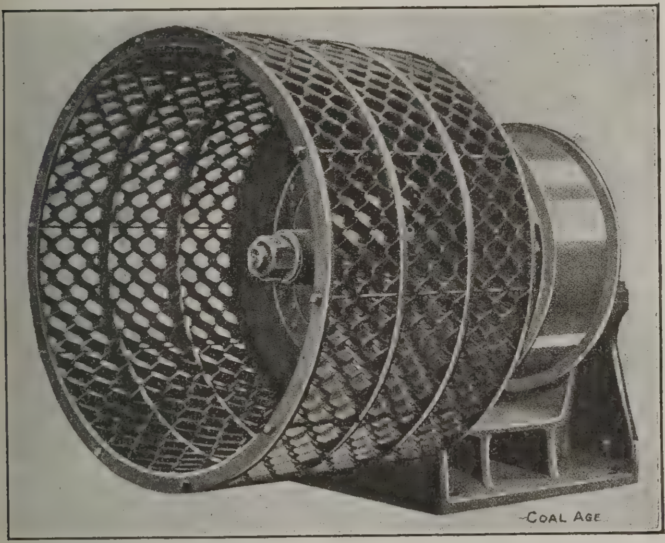
*The word "iron" may be used here in a broad sense to cover steel.

The corrugated rings are secured between the driving disk and a holding ring by means of stay-bolts binding the whole construction firmly together. In this way it is impossible for any ring to move out of place, because at every corrugation it is locked into the adjoining rings, and since all the rings are pressed from the same dies, they are perfect duplicates. Hence the runner is self-centering and self-balancing. The importance of this property in connection with the high fan speeds which are employed in connection with fans direct connected to electric motors cannot be overestimated.

It will be seen that this method of construction gives exceptional torsional strength to the fan. The rings are much better fitted to withstand the driving strain transmitted to them than the usual type of blade which is secured by a short lip bent at right angles and riveted to the disk.

The runner can be easily taken apart by unscrewing the nuts from the stay-bolts and drawing off the rings. Hence in case of accidental damage it is an easy matter to replace one or more of the rings. Another important feature is that the rings can be reversed so that the runner is suitable for revolving in the opposite direction and when required the casings can also be made reversible, so that the same fan is suitable for conditions which require either clockwise or counter-clockwise rotation. The casing is, of course, of the spiral type and does not differ materially from that of the ordinary inclosed fan.



New Fan with Casing Removed

Another important point is that the form and construction of the blade rings makes the runner especially suitable for use with high temperatures. The blades being formed of a series of curves, makes them sufficiently elastic to allow of expansion in all directions without the slightest strain on any part of the runner. Hence the fans are useful for a large number of factory processes such as the production of induced draft for boilers. Under these circumstances they can be worked at temperatures up to a dull-red heat.

As regards silence, in operation, it must be remembered that the ordinary fan has a sort of paddle-wheel action, the blades passing the outlet in a series of beats tending to cause vibration and noise. With the new runner, the movement of the blade rings past the outlet is a continuous one, the pulsations being smoothed out, resulting in a continuous output of air. The turbine-like construction assumed by the blade rings when assembled, gives an exceptionally high yield in volume and pressure, while the hold obtained on the air is more effective than in the series of oblong passages.

The capacity compared with overall dimensions is extremely high, and efficiency is maintained over a wide range of conditions. The fan has a high manometric capacity, maintaining high pressures at low blade-tip speeds. On the other hand, owing to the fact that holding rings can be placed between the blade rings in high-speed fans, any required strength to resist centrifugal stress can be easily obtained and hence the fan is well adapted for running at excessive velocities.

The particular runner shown in the illustration, having two inlet holding rings, is designed for water gages of 6 in. and over. Hence the claim can be made that these fans are useful for either high, low or intermediate pressures. Owing to its great adaptability to varying conditions, its strength and simplicity of construction, this new type of fan appears to offer great possibilities, and it will be interesting to watch in further practice how these are realized.

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Explosion in a Welsh Colliery

Special Correspondence

One of the worst mine disasters in British history occurred Oct. 4 in the Universal Colliery at Senghenydd, Glamorganshire. The day shift comprised 935 men. Of this number 489 have been rescued alive, and 12 miners were brought out dead. This leaves 434 men still entombed in the workings.

The explosion occurred about two hours after the men had descended into the mine. The force of the explosion demolished the headframe at the shaft and shook the entire town.

Rescue work was started immediately, and it was due to this prompt help that so many men were brought to the surface uninjured.

Owing to the tremendous falls of roof and the effects of afterdamp and flame, rescue work was abandoned temporarily, and all attention was turned to an effort to control the fire that had resulted from the first explosion. All the men remaining in the mine cannot be reached until the fire has been overcome.

The Universal mine is known as a gaseous colliery and it is stated that on the day before the explosion occurred (Monday) certain portions of the mine were so gassy that they were closed off and no one was permitted to work in these dangerous sections. An explosion in this same mine in 1901 caused the loss of 81 lives.

The violence of the present explosion is clearly indicated by the fact that one man who was working on the surface, 20 yd. from the pithead, was decapitated by the force of the blast. The rescue party was composed of miners belonging to the night shift. They entered the mine by way of an adjacent shaft, and in this way saved the 489 men who were found huddled together in those parts of the workings where the ventilation was still good. The 12 men who were brought up dead had been killed by being dashed against the sides of the entry.

Convention of American Mining Congress

The First National Mining Exposition to be given in Philadelphia, Oct. 17 to 25, under the auspices of the American Mining Congress, has gone far beyond the expectation of its promoters, and promises to be a trade gathering of much importance.

The American Mining Congress, which is to hold its convention at the same time, will bring to Philadelphia a large number of the leading mining men of the country, and these will attend the exposition in addition to those who will come solely for the exhibit. Considering the short time that the exposition has been under way, it promises to be a most interesting show.

A number of the exhibitors and their exhibits are as follows:

Westinghouse Electric & Manufacturing Co., Pittsburgh, and Baldwin Locomotive Co., Philadelphia, mine locomotives; Western Electric Co., New York, mine telephones; Milwaukee Locomotive Co., Milwaukee, Wis., gasoline mine locomotive; Universal Portland Cement Co., Chicago, Ill., use of cement in mining; Streeter-Amet Weighing & Recording Co., Chicago, automatic weight recorder for mine tipple scales; the Lobdell Wheel Car Co., Wilmington, Del., car wheels and axles as applied to mining cars; J. S. McChesney & Co., Chicago, mine supplies; Williams Patent Crusher & Pulverizer Co., Chicago, a coal crusher; Atlantic Refining Co., Philadelphia, lubricating oils; Hirsch Electric Mine Lamp Co., Philadelphia, miner's cap and lamp; Henry Troemner, Philadelphia, assay and analytical balances; West Virginia Rail Co., Huntington, W. Va., steel rails; Keuffel & Esser Co., Hoboken, N. J., mathematical and surveying instruments; C. O. Bartlett & Snow Co., Cleveland, Ohio, working model of a complete coal-handling plant; American Tempering Co., Springfield, Ill., a system of welding; Hyatt Roller Bearing Co., Newark, N. J., mine-car wheels with roller bearings; Roessler & Hasslacher Chemical Co., New York, the sodium compounds used in mining; Link-Belt Co., Chicago, elevating, conveying and transmission machinery; Fairmont Mining Machinery Co., Fairmont, W. Va., portable electric mine pumps, etc.; Draeger Oxygen Apparatus Co., Pittsburgh, Penn., life-saving apparatus; General Electric Co., Schenectady, N. Y., electric machinery and appliances; Jeffrey Manufacturing Co., Columbus, Ohio, storage-battery locomotive, etc.; John A. Roebling's Sons Co., Trenton, N. J., wire ropes and cables; the Alexander Millburn Co., Baltimore, Md., carbide lamps, etc.; Main Belting Co., Philadelphia, belting; Electric Storage Battery Co., Philadelphia, storage batteries designed for mine locomotives; Goodman Manufacturing Co., coal-mining machinery; John G. Scott, Girardsville, Penn., patented transmission rope clip; Edison Storage Battery Co., Orange, N. J., storage batteries and electric mine lamps.

In addition to the above, there are twenty or more representative mining concerns that are just closing up negotiations for space in the exposition.

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Bells or Kettles

By H. D. Easton*

Nearly all coal miners are more or less familiar with the so called *bells* or *kettles* that so often occur in the roof above the coal. These bells are the fossil remains of tree stumps, and being larger at the bottom than at the top, they slip out of their sockets in the roof in a deadly manner; upon being sounded they may appear to be perfectly solid and safe, yet they will fall suddenly without giving the slightest warning to the men working beneath or near them. These bells are invariably coated with a thin skin or layer of coal which permits them to fall out of the roof, the origin of this thin coating of coal always being a source of wonder to the miner.

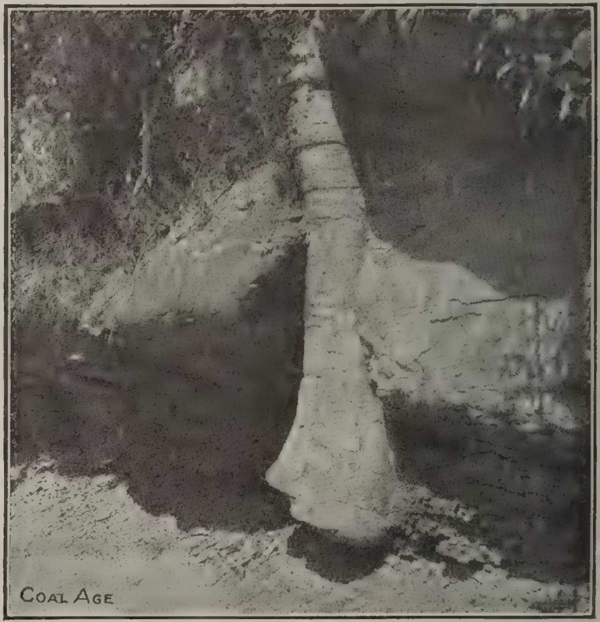
The Fossil Tree at Harlan

The accompanying photograph furnishes the best illustration of one of these fossil stumps that I have ever seen. This bell is in a soft shale beneath the Hazard coal on the bank of Greasy Fork, in Harlan County, Kentucky, and is on the property of the Pine Mountain Settlement School. It measures 26 in. in diameter at the base, 10 in. at the top and is 8 ft. in height. It carries the thin covering of coal wherever it is in contact with the shale, but the exposed surface has nearly all of the skin of coal removed.

These trees have their modern representatives in our common horsetails. The *Lepidodendra* trunks rose fully 50 ft. in the air, and the genus *Sigillaria* grew equally tall. The roots of these trees are among the fossils most generally found in the coal fields; the pitted and tubercular roots, so often uncovered are known as *Stigmaria.*

How the Coal Skin Forms around Bells

The theory regarding the formation of these bells with their thin skin of coal is well illustrated by the conditions now existing at Reelfoot Lake, in northwestern Tennessee, where, in 1911, an earthquake caused a subsidence which destroyed many large trees. It is reported that the trunks of the trees in this lake are wholly decayed except the outer ring of sapwood. It is readily seen that the core of such a stump could become filled with clay or sand which, under proper conditions, would change into rock, while the sapwood, still remaining, could form a skin of coal covering the core. In some cases these hollow stumps might not be filled until the sediment outside reached their tops, and the core, thus made subsequent to the deposition of the surrounding material, would then be composed of a material corresponding more closely with the strata at the top of the stumps rather than with that immediately surrounding them. It is usually true that these fossil trees are of a different composition from that of the strata in which they are found.



A Fossil Tree Trunk in Harlan County, Ky.

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*Professor of mining engineering, Kentucky State University, 430 Transylvania Park, Lexington, Ky.

POWER DEPARTMENT

A Big Electrically Driven Air Compressor

Special Correspondence

SYNOPSIS—Although many mines have made installations for electric generation, transmission and utilization of power, some have, for various reasons, seen fit to use compressed air at the working face. This article describes a large electrically driven air compressor in use in South Wales.

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Since the introduction of electricity into colliery operations, there has been a certain amount of rivalry between the new means of power production and transmission and older forms, such as compressed air. Each method has its advantages. Electricity, of course, is capable of transmission with the minimum amount of loss, the cables are flexible and can be led anywhere, and when due provision is taken as regards good installation and maintenance, its safety is fully equal to all colliery requirements.

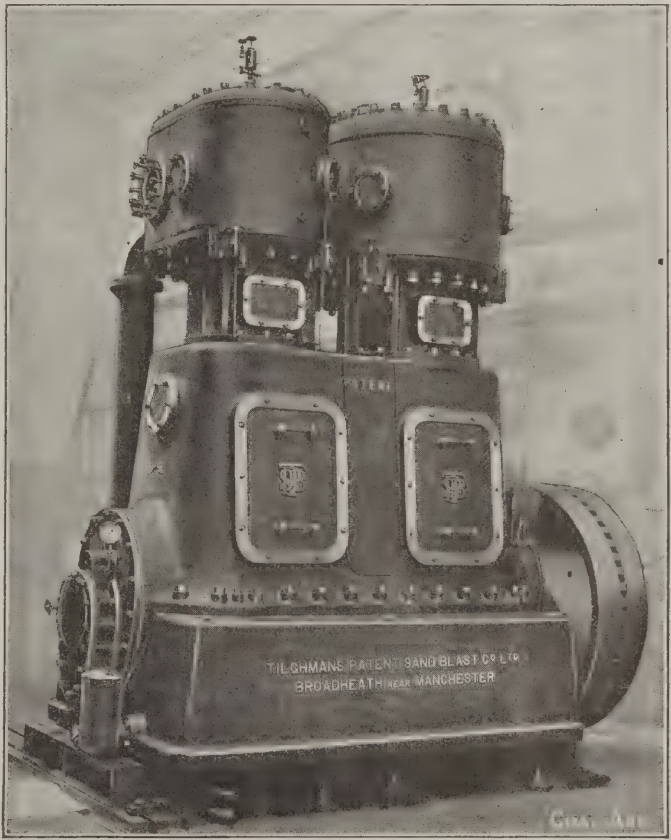
On the other hand, compressed air is much in favor, especially for drills, coal cutters and similar portable equipment. The exhaust provides a quantity of pure, fresh air at a low temperature, which greatly assists the conditions of operation at the working face. The chief disadvantage with regard to compressed air is the high cost of an efficient system of transmission and the inevitable loss of power which occurs due to leakage and temperature changes.

As colliery workings become more extended, electricity comes more and more into use. Obviously in those plants where a small central station is installed to operate the power-consuming appliances throughout the mine, the question arises as to whether it is not advisable to combine the advantages of the two systems, by installing electrically driven air compressors which can be operated at high efficiency, the compressed air thus obtained being then utilized in standard power-consuming appliances.

In a good many instances, this course has been adopted and attention may therefore be drawn to what is probably one of the largest installations of electrically driven air compressors for mine purposes which is at present in existence. This is to be found in the mines of the Great Western Colliery Co., Ltd., of Pontypridd, South Wales, and consists of two compressors of the type shown in the illustration. Each of these machines has a capacity of 2000 cu.ft. of free air per min., when running at a speed of 290 r.p.m. The diameter of the low-pressure piston is 28 in., while that of the high-pressure piston is 17 in., the length of the stroke being 12 in. They are suitable for a working pressure of 100 lb. per sq.in., and are each driven by an electric motor of 400 hp. One of these sets is installed at Llantwit Vardre, and the other one at Maritime colliery, Pontypridd.

The machines are of the vertical, high-speed, two-stage, double-acting type, inclosed and thoroughly water-jacketed. They were constructed by Tilghman's Patent Sand Blast Co., Ltd., of Manchester. The air cylinders are fitted with valve chambers, arranged at the back, these being water-jacketed together with the cylinder heads. The pistons are of the box-pattern type, fitted with cast-iron packing rings.

The cylinders are fitted with automatic multiple-plate valves. In the valve chest an independent inlet and outlet valve is arranged at each end of the cylinder and the common trouble of carbonized oil on the valves due to the heating of the air during compression, is prevented by the thorough water-jacketing previously mentioned. Each valve consists of six plain, thin steel plates or rings working on a removable cast-iron seat, a suitable guard plate being provided to control the lift of the valve.


TILGHMANS PATENT SAND BLAST Co LTD
BROADHEATH NEAR MANCHESTER
COAL AGE

The Air Compressor on Builder's Testing-Floor

The two plates next to the valve seat are made perfectly flat and the remaining four are slightly buckled, forming a simple and reliable spring, which, owing to its length, is not liable to break. The number of plates and the degree of buckling is arranged to suit the air pressure and speed at which this type of compressor operates. Each valve and spring, together with its seating and guard, can be removed as a whole for inspection. The four seatings are held in position by one through bolt, rendering the removal of any of the valves a simple and easy matter.

On the inlet or discharge sides of the machine, an automatic unloader is provided, which throws off the load when the air pressure in the receiver exceeds that required and allows the compressor to run light until the pressure drops to normal. The discharge unloader is provided with a back pressure valve, allowing the compressor to be started up from rest against no-load with the full working pressure in the receiver.

Pressure Lubrication Is Employed

Lubrication of the bearings and slides is effected by oil under pressure, while the cylinders are lubricated through a forced sight-feed lubricator on the front of the center box. The intercooler is of cast iron and is placed in a vertical position at the back of the machine, the cooling tubes being of brass secured in position in packed glands in the tube plates in the same manner as with ordinary steam condenser tubes.

The photograph shown was taken in the shops of the manufacturers before shipment to the colliery, but since installation, it has been found that these compressors run in a satisfactory manner, thoroughly fulfilling the purpose for which they were installed.

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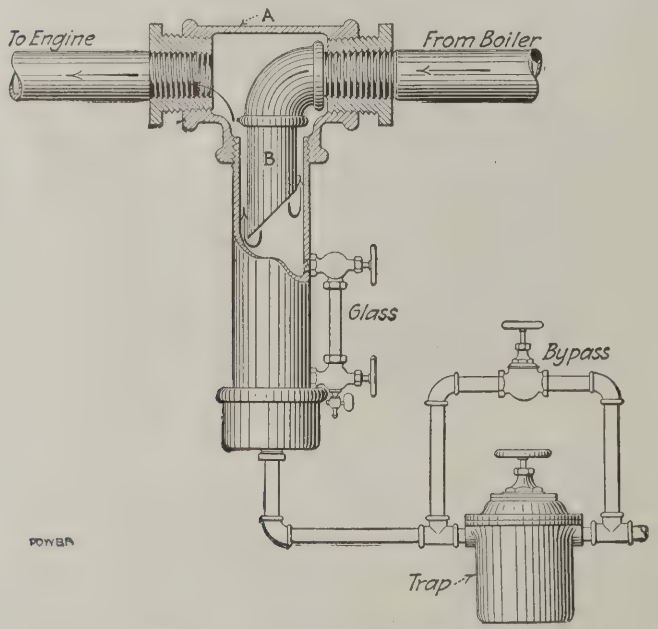
An Improvised Steam Separator

The illustration clearly shows the construction of a steam separator made of pipe fittings, says Martin McGeery, in *Power* of Oct. 7, 1913. The size of the fittings used will, of course, vary with the size of line on which the separator is to be placed.

The tee *A* should be much larger than the steam line to allow sufficient steam to get through the separator.



Construction of the Separator

By cutting the nipple or short length of pipe *B* on an angle, as shown, turning the long side toward the direction of flow, I believe more water can be taken from the steam than if the nipple is cut straight across.

A gage-glass is fitted to the drop leg and a steam trap is placed in the line draining this leg. This type of separator can be easily and quickly made and gives fairly good results.

Home-Made Emery Wheel for Grinding Valves

I have heard and read of many ways of grinding valve seats, says E. E. Thompson, in *Power* for Oct. 7, 1913, but never heard of a method like my own: Remove the disk holder from the valve stem and cut out the composition disk and fill up with emery with just enough thin glue to make the emery damp. Smooth off the top and set away for a few hours; when the mixture hardens it makes a good emery wheel of the proper size. Place it in the valve and turn with a brace. If it is desired to use the disk holder in the valve, submerge it in warm water for a few minutes and scrape out the softened emery.

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Recent Legal Decisions

Nondelegable Duty of Coal Operators Toward Miners in Washington—The duty of coal operators under the laws of Washington to provide sufficient ventilation in their mines for the safety of employees is absolute in the sense that the operator is liable for failure of one to whom the duty has been delegated to perform it. **(Washington Supreme Court, Davies vs. Rose-Marshall Coal Co., 134 Pacific Reporter, 180.)**

Rights of Purchasers of Corporate Stock—One who buys shares of stock, without notice of any claim existing in favor of the corporation against the person from whom he purchased, is entitled to compel the company to register the transfer on its books, or to recover damages resulting from its refusal to do so, and, hence, cannot recover against the seller on the theory of a breach of warranty as to his title. **(Arkansas Supreme Court, Bankers' Trust Co. of St. Louis vs. McCloy, 159 Southwestern Reporter, 305.)**

Actionable to Induce Breach of Contract—It is an actionable wrong to induce another to break a contract with a third person. **(Maryland Court of Appeals, Cumberland Glass Mfg. Co. vs. DeWitt, 87 Atlantic Reporter, 927.)**

Scope of New York Coal Sales Law—The law enacted in New York in 1911, making it a misdemeanor to deliver coal sold, without delivering a scale ticket to the buyer, applies to sales to retail dealers, as well as to ultimate consumers by dealers. **(Onondaga County, New York, County Court; People vs. Delaware, Lackawanna & Western Ry. Co., 143 New York Supplement, 159.)**

Duty to Keep Mine Roofs Safe—Kansas coal operators are bound to use a reasonable degree of care to keep the roofs of their mines in a reasonably safe condition for miners who are required to work under them. **(Kansas Supreme Court, Reynolds vs. New Century Mining Co., 133 Pacific Reporter 844.)**

Liability for Injury to Minors—A West Virginia coal mining company is liable for injury to a boy miner put to work by the company's mine boss, without being instructed against dangers not appreciated by him. But a boy more than 14 years old is presumed to know the ordinary dangers of his employment, though this presumption may be rebutted. **(West Virginia Supreme Court of Appeals, Sprinkle vs. Big Sandy Coal & Coke Co., 78 Southeastern Reporter 971.)**

Validity of Employment Contract—An agreement to employ plaintiff to do certain work in digging a slope and in driving an air course in defendant's coal mine, until defendant should begin shipping from the mine, was not unenforceable as being uncertain as to the duration of the contract. **(Alabama Court of Appeals, Barney Coal Co. vs. Davis, 62 Southern Reporter 895.)**

Injury Caused by Defective Appliance—A coal company is liable for injury to an employee caused by the company's failure to provide suitable blocks for his use in blocking cars as they descended a gravity switch to a shaft. **(United States Circuit Court of Appeals, Second Circuit; Lehigh Valley Coal Co. vs. Shondalla; 205 Federal Reporter 715.)**

Use of Dockyard by Public—A fuel company which maintains a dockyard does not impliedly dedicate any part of the premises as a public street, by merely permitting use by persons not transacting business with the company; it is necessary to show an express intent to dedicate land as a street before an implied dedication will be declared by the courts. **(Georgia Supreme Court, Savannah vs. Standard Fuel Supply Co., 78 Southeastern Reporter 906.)**

EDITORIALS

Comparatively few mining men realize the growing demand for technical knowledge and fair acquaintance with the theory and principles relating to mining, on the part of all mine officials. The man who thinks he has nothing to learn is the one, in truth, who has the most to learn. Whether we believe it or not, the man who ceases to study and read will retrograde, and must give place to his fellow worker who keeps more abreast of the times.

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The suggestion that the eyesight of miners is injured by the burning of inferior oil in mine lamps, is a good one. While it cannot be doubted that certain diseased eyes develop what is known as miner's nystagmus; and that this disease is, perhaps, more common in districts where safety lamps are used exclusively, than elsewhere; it has not been proven that healthy eyesight is at all affected by the constant use of this lamp. Indeed, the evidence is to the contrary. There are too many contributory causes, in mining work, to regard the safety lamp as having any positive ill effect on the healthy eyesight of miners.

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Retrospect and Prospect

THE PAST

One brief glance backward into the past of coal mining is sufficient to convince even the skeptical mind that the interests of the operator are those of the miner. These two factors in the coal-mining industry are indissolubly associated. It was the deepening and growing realization of the practical need of the HUMAN FACTOR in the operation of mines, two years ago, that gave birth to COAL AGE. Since that time no effort has been spared by the editors to foster the growth and encourage the development of all that pertains to humanizing the operation of coal mines.

THE PRESENT

Today, the recognized cornerstone of all effort for improving conditions in coal mining is the *practical training and education of mining men.* We are glad to say that this work has received the hearty indorsement and coöperation of all the larger coal-mining companies. Many of these have organized independent educational agencies, in the mining camps and at the mines in their charge. To further this work is the constant aim of COAL AGE. That we are succeeding is clear from the increasing interest of readers, and the earnest endeavors of writers for the paper, to engender an atmosphere that will, at once, help the miner and benefit the employer. The many articles written and questions discussed are encouraging men to write who never wrote before for publication; and, as a result, the "human element" in the coal-mining industry today is the recognized link that binds the operator to his employees; and the miner to his employer.

THE FUTURE

The future is bright. It promises more earnest, intelligent and united efforts on the part of all who honestly desire to improve the condition of mine workers, and establish a more safe, sound and equitable basis of operation. In that work, we, of COAL AGE, hope to play our humble part.

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Cancer, A Coal-Smoke Disease?

Two weeks ago, we read that tuberculosis carried away more miners than were killed by the coal industry. This we considered a severe criticism, for have we not been taught that our accident death rate was an offense against Christendom?

And now a new charge is brought against the coal industry and we learn on excellent authority that cancer is caused by the burning of coal. Charles E. Green, of Edinburgh, is first sponsor for the idea, and Sir William H. Bennett, an eminent surgeon and president of the Coal-Smoke Abatement Society, at its recent meeting, indorsed his views, as being conclusive. To quote the message:

> Sir William said that investigation had shown that the incidence of cancer was limited to those areas where coal was a staple fuel, while it was almost nonexistent where ordinary peat alone was used. The only exception yet discovered to this rule, he declared, was in districts where the peat was a hard black substance which crackled like coal and was quite unlike the ordinary smoldering peat. Sir William in conclusion spoke strongly in favor of gas as a substitute for coal.

On such flimsy evidence do the smoke abaters base their claims as if a sufficient indictment could not be drawn without resting on such clouds. The peat countries are not successful industrially; they are, therefore, largely occupied by farmers, cattle raisers, and those engaged in manual trades. Probably this has more effect than smoke on the infrequency of cancer.

As a matter of fact, if statistics are to be taken as of their face value, smoke abatement will increase rather than diminish cancer. We will not compare Arcadia with Babylon, but will balance some industrial communities, using smoky fuels, with some of those which are using anthracite, which gives no smoke.

CANCER IN 1900

City	Deaths	Population	Deaths per million people
Philadelphia	806	1,293 697	6.23
New York City	2060	3 437,202	5.99
Scranton	40	102,026	3.92
Pittsburgh	117	321,616	3.64
McKeesport	8	34,227	2.34

Note how Philadelphia, New York City and Scranton, which all use large quantities of anthracite, have higher cancer death rates than cities using smoky soft coal. We cannot say that anything definite is proved, however, because into Scranton a large percentage of foreign adults is constantly entering, and Philadelphia and New York are both augmented yearly by grown persons, native and foreign. In consequence of that, the disease which attacks adults more than youth, may have a better chance to get in its fatal work.

The same exception may be taken to another table. Those who die by violence or consumption in their youth cannot die of cancer in their age, for death by the former is a sure preventive of a later decease by the latter. We give the table, however:

CANCER AND OCCUPATIONS PER 100,000 IN 1900

Sailors, pilots, fishermen and oystermen	113.1	Miners and quarrymen	33.4
Blacksmiths	107.3	Steam railroad engineers	30.9
Clergymen	102.2	Bookkeepers, clerks and copyists	28.0
Brick and stone masons	98.0	Saloon and restaurant keepers	28.0
Farmers, planers and farm laborers	87.7	Draymen, hackmen and teamsters	22.6
Carpenters and joiners	77.7	Compositors, printers, pressmen	22.1
All occupied males	57.1	Plumbers, gas and steam fitters	8.2

The following facts, however, will show, we think, how careful we should be in accepting the strange conclusion that clear air promotes cancer. The first three classes as a whole, live to more than the usual span of life. At 65 years of age, 55 per cent. of the clergymen are alive, 36.8 per cent. of the sailor group and 44.2 of the blacksmiths. So they live till cancer can attack and kill them. On the other hand, there are but 8.2 per cent. of the plumber group who live till 65, so they die too young for a high cancer death rate.

We are not disposed to believe that smoke causes cancer or destroys it. The imagination of the blue-sky advocates, commendable as it is, has repeatedly driven them to sensational and impossible statements.

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The Element Sulphur

The lithosphere is the name given to that *outer* part of the earth of which we have knowledge. Of the inner part we can only hazard the most uncertain guess, while of the outer ten miles, we can form a reasonably correct idea.

F. W. Clarke says that one-tenth of one per cent. of that outer ten-mile shard, called the lithosphere, is sulphur, and he estimates that about eleven-tenths per cent. of that element is found in the igneous rocks. Hence it is clear that he believes that the sedimentary masses forming 5 per cent. of the whole lithosphere contain an inappreciable amount of sulphur.

And to a certain degree that is true; though the coal-mining engineer who nearly always finds 1 per cent. in his coal and may discover nodules and flakes of pyrite which will bring the percentage up to 10 per cent., is sometimes disposed to think that sulphur is somewhat generally disseminated through the earth's sedimentary rocks. In fact not a few engineers will declare that the pyrite in coal arises from solutions which entered after the coal was formed, forgetting that if these nodules and flakes were mere sedimentations, they would probably be found with almost equal frequency wherever there were cavities in roof or floor. It is true they might not be sulphides because of the absence of methane in bituminous rocks to convert the sulphates into unoxidized bodies.

Peat and all the other forbears of coal, oil, and bituminous shale, had a power of absorbing sulphur, which element is, like carbon, a marked constituent of living bodies. It is consumed by some bacteria just as is nitrogen. It is found in all vegetation and is a component of albumen. It is found abundantly in all hair. When fecal and other matters putresce, the evil odors may be largely traced to mercaptans, of which sulphur is an important element.

In purified Trinidad bitumen also may be found 6 per cent. of sulphur, and some asphalts contain as much as 10 per cent. The natural gases of Ohio and Indiana show 0.17 per cent. of sulphur and those from California and Canada are also sulphur-bearing. The same is true of petroleums, the oils of Texas, California and Syria being sulphurous.

When discussing the presence of sulphur in sedimentary rocks, it must be remembered that easy as its presence is to determine, important as are its effects in the clay-manufacturing industry, many chemists do not seek to determine its quantity in the rocks they analyze, and their failure to list it in their reports does not prove its absence. Nevertheless the fact that it is almost never found disseminatedly present in nonbituminous sedimentaries in percentage over unity in recorded analyses shows that it is not nearly as prevalent in nonbituminous rocks as in those which are bituminous.

It is not often found in the United States even in limestones. In Pennsylvania, 110 analyses of that mineral quoted in the Pennsylvania State College report 1899-1900, averaged 0.08 per cent. of sulphur, or less than one-tenth of 1 per cent., and there were 163 analyses which ignored the element entirely. The highest analysis showed 2.43 per cent. and the next 0.314 per cent.

A careful perusal of E. C. Eckles "Building Stones and Clays" will show a like absence of sulphur. We have tabulated the analyses which he quotes, as follows:

SULPHUR IN SEDIMENTARY ROCKS

Number of Samples	Kind of Material	Average Per Cent.	Maximum Per Cent.	Number of Samples with Sulphur Undetermined
48	Slates	0.202	0.92	127
628	Sandstones	0.032	......	0
6	Molluscan shells	0.177	0.324	....
843	Limestones	0.102	......	39
...	Marbles	......	......	1
...	Clays	......	......	24

A. C. Fieldner's analyses have shown how modern peat bogs are as full of sulphur as ancient coals. And this is not hard to believe, for there is, according to Warrington's "Chemistry of the Farm," almost as much sulphur as lime in the reaped part of a wheat plant. However, while the albuminous parts of all plants, the seeds, are richer in sulphur than in lime, the stalk and leaves are much richer in lime than in sulphur, so that hay, having small seeds, has 5 to 10 times as much lime as sulphur.

It is quite possible that the large beds of coal ceased growing not so much because of unfavorable atmospheric conditions and prejudicial earth movements, but from soil depletion and among the salts removed may have been those soluble sulphates necessary for plant life. The metabolism of the plant had made the sulphur in its make-up unsuited for further use in the vegetal economy.

Though the sulphur appearing as pyrite in coal is largely segregated, it does not follow, though the supposition is not wholly impossible, that it entered from the outside *after* the coal was formed; in fact, it probably entered the plant as part of its juices, remained as a sulphate or later became one, and was dissolved and deposited as a sulphide in cavities, the methane in the coal being able to achieve this chemical reaction.

BOOK REVIEW DEPARTMENT

THE COAL RESOURCES OF THE WORLD. An inquiry made on the initiative of the executive committee of the Twelfth International Geological Congress. Canada, 1913. Edited by W. McInnes, D. B. Dowling and W. W. Leach of the Geological Survey of Canada, 3 volumes, 8⅜x11¼ in., in all 1266 pp. with atlas, 13½x19½ in. with 48 maps, of which 19 occupy two pages. The reading volumes also contain several maps. Morang & Co., Ltd., Toronto, Can. Paper boards. Price $25.

This authoritative work completely covers the coal resources of the world as now known and does it, with exceptions, in a truly well balanced manner. One of the marked exceptions is the United States which receives only 16 pages for the description of its continental resources. Compared with Japan which occupies 70 and China which has 81 and Canada 86, the showing is somewhat meager but perhaps the citizen of the United States would rather buy a volume which tells him about foreign countries than one which gives him, in regard to his own, at a considerable price, what he can get for little or nothing and in more detailed form from the Geological Survey. British India is most inadequately treated in a bare 12 pages. However, as we have said, every country containing coal has its deposits described and their areas estimated in these volumes.

J. M. Gordon has severely criticised the method of classification adopted in the preparation of this book, but we cannot say we agree with his remarks. A division of coal had to be adopted such as would permit a report to be issued within reasonable time. Probably there is no country in the world where a classification could now be made on the basis of the plant life of which the coals are made up, and even if it were done, we think, it would be less useful and less instructive a classification than one based on fuel ratio or volatile content, despite all the valid objections to these methods of defining fuels.

Does Mr. Gordon seriously believe that in the future, the man on the street will order his merchant to send him ten tons of lepidodendrous or equisetaceous coal or a power user specify a fuel with a large percentage of asterophyllites? As a matter of fact, do not the age of the coal, the flow of sediments, the action of thrusts, the intrusion of dykes, the pressure and imprisonment by sediments and perhaps even the ground on which the peat-bog grew, modify the fuel more than the plant life of which it is composed?

Probably the lower Kittanning coal in Cambria County, Pennsylvania, is composed of precisely the same vegetation as the same seam in Jefferson County of the same state because the conditions under which it was produced were essentially similar and the growth in the two areas synchronous; but one is a high-carbon fuel and the other a coking coal; one is reasonably free from sulphur, the other a fuel with much sulphur impurity; one is clean, the other dirty; one smokeless, the other smoky; one disposed to break into small columnar bodies, the other large and blocky, one has no marked cleavage, the other has a well marked face and butt.

Paleobotany will never explain and delimit all these differences any more than a family tree will determine the occupation and annual income of a man. So many later influences arise that a description of a man or a chunk of coal as they now are will always be more explicit of actual qualities than a pedigree of these things can ever hope to be.

It is true, the fuel ratio does not divide coals into all the divisions the public would wish to have recognized, does not indeed separate coking from noncoking coal with precision, nor valuable from valueless fuel, but we feel that paleobotanical divisions would be far less satisfactory even if supplemented by the keenest petrographic subtleties.

We confess that we believe the classification used for this monograph is the best now available, as it does not rely wholly on fuel ratio but recognizes the effect of moisture.

The reader will be surprised to learn how generally coal is found and mined. Turkey is rarely regarded as a coal country, yet Leon Dominian states that Heraclea in Turkey produces about 827,000 short tons a year, a quantity larger than is credited to Brazil, Switzerland and Turkey in the Geological Survey Report of 1911.

Coal is found also in several parts of Ireland notably Leinster, Tipperary, Antrim, Sligo and Tyrone. Everywhere the beds appear to be badly tilted and broken by faults. Especially interesting to the coal men of the United States are the deposits of coal along the west coast of the Pacific in Japan, China and the Philippines. The coal appears to be of good quality, often containing less than one-half of 1% sulphur and not much ash. Even after the Panama canal is completed it is likely that countries of eastern Asia, will supply their own coal and may send much fuel to the United States, when their resources are thoroughly developed.

EXCAVATING MACHINERY. By A. B. McDaniel, assistant professor of civil engineering, University of Illinois. 329 pp. and index; 6x9⅜; copiously illustrated. McGraw-Hill Book Co. 239 W. 39th Street, New York. Cloth boards. Price $3.

This book will fill an important place in modern engineering libraries. It is a preëminently practical treatise on the art of excavating by machinery and gives the costs of handling by different methods and in some cases also the cost of the machinery used.

No form of excavator seems to have been overlooked. Beginning with drag and wheel scrapers, it goes on to describe graders of various kinds which push the earth before them. It then describes various forms of steam shovels including traction shovels which load by dragging along the surface.

Part II gives details relative to dredges, dry-land and floating excavators. Drag line excavators and templet and wheel ditchers are then discussed and some pages are devoted to the tower excavator and to walking dredges. The floating types treated are dipper and ladder dredges; the Löbnitz rock excavator and hydraulic dredges are also considered. Then follow the trench diggers with traveling derricks, cable conveyors and trestle tracks. Notice is also taken of the traction type of ditchers which simultaneously place the tile and backfill the ditch excavated. Levee builders also receive a chapter.

It may seem that this information is somewhat remote from the needs of mining engineers but any one who has observed the methods adopted around mines will realize that the pick, shovel and cart occupy too prominent a part because modern methods of dirt removal have not received due attention from the mine management.

Reservoirs, spurs of railroads and ditches have frequently to be built by mine engineers and in many places extensive stripping has to be done. The data in this book will serve to indicate how such work can be performed with economy and speed.

THE MINERAL INDUSTRY, Its Statistics, Technology and Trade during 1912. Edited by Charles Of. xv + 1090 pp. 6¼x9½ in., several illustrations. McGraw-Hill Book Co., 239 W. 39th St., New York. Cloth boards. Price $10.

This is the twenty-fifth publication of this comprehensive work, the first volume of the long series being produced by Richard P. Rothwell when he was editor of the "Engineering and Mining Journal." The list of contributors is so extensive and the men so well chosen for the services they render that the work merits the confidence so freely placed in it.

Every material quarried or mined is included in the list of subjects except clay and building stone. Such products of the mine as fuller's earth, gypsum, chalk, cryolite, bauxite, borax, garnet, glass sand, mica and diatomaceous earth are all considered. Coal and coke receive 38 pages beside their part in the chronology, the production tables of various countries, and the records of imports and exports. Moreover, R. H. Richards and C. E. Locke deal on the "Progress of Ore Dressing and Coal Washing in 1912" in a 67-page article, most of which is devoted to the separation of ores however. There is a 20-page bibliography treating extensively of coal and coke and general mining considerations. This bibliography is supplemental to those prepared for each mineral treated in the report.

The coal and coke division of the book was intrusted to A. T. Shurick of "Coal Age" but as no single person, however well informed can write a complete and balanced report of the whole industry in the United States, his work is supplemented by reports from their own states written by 17 separate authorities. The record of two states during 1912 is taken from the U. S. Geological Survey's advance sheets. Where new estimates of coal resources have been made, these facts are recorded under their proper headings. The coal markets are covered by three undoubted authorities. It should also be noted that the statistics and trade in foreign countries are treated with thoroughness.

SOCIOLOGICAL DEPARTMENT

Rescue Work of the Madison Coal Corporation

By James Taylor*

The Madison Coal Corporation, of St. Louis, Mo., has a mine at Dewmaine, Williamson County, Ill., which is more than usually well equipped for rescue work.

Fig. 1 shows the mine-rescue station, which is of brick and covered with a reinforced-concrete roof. The room containing the rescue apparatus measures 6x8 ft. and the first-aid and observation room covers 16x17½ ft. There is also a bathroom.

At all five plants of the Madison Coal Corporation there is an efficient rescue and first-aid corps composed of six men, who are thoroughly drilled and trained by the best of first-aid instructors. In the first-aid rooms underground, as well as in the rescue buildings, are kept Red Cross outfits, army blankets, stretchers and rubber pillows. The rescue-building equipment includes Fleuss helmets and a pulmotor.

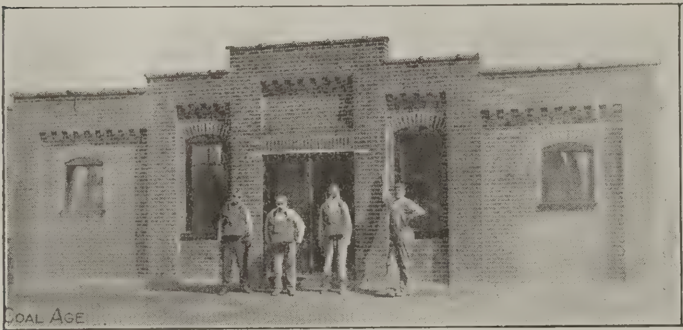

Fig. 1. Mine-Rescue Building

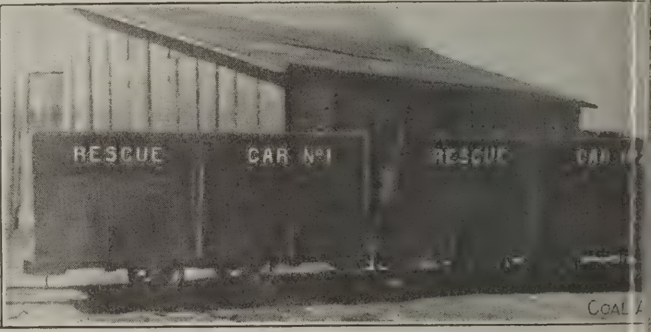

Fig. 2. Cars for Mine-Rescue Men

The cars shown in Fig. 2 are kept for rescue work only, having two seats on the inside running the full length of the car. The spaces beneath these seats are utilized as tool boxes and contain all the supplies needed by rescuers, including a life line, hatchets, hammers, wire cutters and other tools and instruments of like character.

The following rescue rules have been formulated:

1. It will be the duty of the mine manager to know
the breathing apparatus in all its parts is complete
properly cared for, and by actual test, not less than
every 14 days, in the gas room of the mine-rescue build
determine whether the rescue apparatus is in safe and eff
tive condition.

2. It will also be the duty of the mine manager
know that the mine-rescue building is kept in a clean
orderly condition, that all safety lamps are properly
for and ready for immediate use; furthermore that all
plies required in connection with rescue work are kept
ample quantities.

3. In case of fire, whether from the result of an
plosion or not, stop the fan only long enough to deter
the quantity of air and proper direction in which to force
ventilation so as to provide for the safety of those who
be in the mine.

4. Upon hearing the alarm of fire or the warning of
explosion, the regularly organized rescue parties will
mediately go to their respective places and make prepa

Fig. 3. Hospital Building at Dewmaine, Ill.

Fig. 4. No. 1 First-Aid Team

Fig. 5. Tenement Having Best Yard

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*State mine inspector, Fourth Inspection District, 517 Bigelow St., Peoria, Ill.

tions to enter the mine under the direction of the district superintendent and mine manager, who will be governed by the rescue rules prepared by the manager of the Illinois Mine-Rescue Stations.

5. When the danger signals are given because of fire or otherwise, the foreman of the first-aid corps must immediately telephone to the company's physician and other doctors if necessary, and see to it that his force is ready to care for the injured.

6. Immunity from accidents in general can only be secured by all employees thoughtfully performing their duties as required by the mining laws of the state and the company's rules for the government of its mines. It is furthermore necessary that there be complete coöperation between the employees and the management in maintaining an efficient fire-fighting and rescue organization coupled with a well trained first-aid corps.

The knowledge that complete efficiency in this respect exists should bring immeasurable satisfaction to the mine workers and their families and in the most complete way possible compensate all employees for their full and active support in making this feature of the service a complete success.

A. J. MOORSHEAD,
President and General Manager.

The hospital shown in Fig. 3 is provided with all modern appliances, including an X-ray machine for locating fractures. The building is heated with hot air and will accommodate six patients at one time.

Prizes have been given for the yards making the best appearance. Fig. 5 shows the yard drawing first prize in the 70-lot village.

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H. C. Frick Coke Co.'s Finals

We described, in the issue of Oct. 4, one of the preliminary meets of the H. C. Frick Coke Co., held at Trotter mine, near Connellsville, Penn., Sept. 25. The victorious team at that meet nearly succeeded in getting first place at the finals, only being ⅛ per cent. from second place and ¼ per cent. from the winning team.

The finals were held at Continental No. 1, on Thursday afternoon, Oct. 9. There were eight contesting teams, representing all the H. C. Frick Coke Co.'s mines in the Connellsville region.

The following percentages were obtained by the competing teams:

Lambert	96¼	Whitney	93$\frac{3}{10}$
Phillips	96⅛	Redstone	93¼
Coalbrook	96	Colonial No. 1	93¼
South West	95$\frac{3}{10}$	United	92¾

The teams were given the four following problems:

First or One-Man Event—First and second fingers of the left hand torn off, and compound fracture of the nose.

Second or Two-Man Event—Compound fracture of the right forearm, incised wound of the left lower leg, and contusion above the eye.

Third or Full-Team Event—Compound fracture of the left thigh and burns of the face, neck, arms and chest. Place on a stretcher and carry 50 ft.

Fourth or Full-Team Event—Fractured skull, patient injured and unconscious. Fracture of four ribs on the right side and dislocation of the right ankle, and a crushed left foot.

The following are the members of the three leading teams:

Lambert—G. A. Millward, captain; Casper Schucler, Andy Hizaney, John Hatala and Samuel Rooneck.

Phillips—William Shaw, captain; Andy Secoskey, Elmer Moody, Sylvester Modjesky, Walter Kuhns, and John Donohue, substitute.

Coalbrook—Lyell Buttermore, captain; Earl Henderson, William Howe, Walter Trader and Charles Stinger.

The judges were not affiliated in any way with the competing teams and thus the contest was adjudged with complete impartiality.

Wages in Alberta, Can.

The following are the wages paid in the province of Alberta as recorded in the Annual Report of the Department of Public Works:

Outside Wages

Fire bosses . . $110.00 to $115.00 per mo.

	Per day	Hr.
Bottom man	$2.89	10
Slate pickers (boys)	1.37	10
Slate pickers (men)	2.47	10
Car oilers (men)	2.47	10
Car oilers (boys)	1.65	10
Tally boys	1.37	10
Teamsters	2.89	10
Blacksmith	3.85	10
Blacksmith's helpers	2.90	10
Power-house engineers	3.85	12
Power-house engineers	3.40	8
Fan-men	2.90	12
Hoisting engineers	3.20	8
Hoisting engineers	3.78	10
Hoisting engineers	4.40	12
Tail rope engineers	3.63	8
Tail rope engineers	3.85	10
Endless rope engineers	3.30	10
Box-car loader engineer	3.40	10
Tipple engineer	3.40	10
Screen engine tender	2.65	10
Locomotive engineer	3.40	10
Locomotive switchman	3.00	10
Fireman	2.89	8
Fireman	3.85	12
Fireman's helper	2.65	10
Railway-car helper	2.60	10
Tipple dumper (man)	2.89	10
Tipple dumper's helpers	2.64	10
Tipple dumper (boy)	1.65	10
Top cage	2.64	10
Car repairer	3.40	10
Car repairer's helper	2.90	10
Breaker engineer	3.40	10
Fan fireman	3.40	12
Machinists	$3.40 to 3.85	10
Machinist's helper	2.90	10
Ashman	2.50	10
Ashman	2.89	12
Wiper (man)	2.89	12
Coupler (man)	2.47	10
Coupler (boy)	1.65	10
Breaker oiler	2.89	11
Washer or tipple oiler	2.89	11
Breaker picker boss	2.89	10
Timber framer	3.40	10
Timber sawyer	2.64	10
Box-car shoveler	2.89	10
Breaker platform boss	2.89	10
Breaker platform men	2.60	10
Breaker screen men	2.47	10
Rock bank men	2.47	10
Dirt bank men	2.47	10
Finisher after box-car loader	2.47	10
All other outdoor labor	2.47	10
Lampman (depending upon number of lamps and skil! of man	$2.47 to 2.89	8
Lampman (depending upon number of lamps and skill of man)	$2.47 to 3.40	12

Beehive Coke Ovens

Leveling and drawing (6½ ton charge) per oven	$1.00
Leveling and drawing (5 ton charge), per oven	0.80
Loading into box or open cars (over 200 tons per month), per ton	0.17

Beehive Coke Ovens (Continued)

	Per day	Hr.
Loading into box or open cars (less than 200 tons per month), per ton	....	0.16
Seam locomotive engineer	$3.40	10
Motorman	3.18	10
Larryman	2.47	10
Plasterers	2.47	10
Carters and cleaners	2.47	10
All other labor	2.47	10

Belgian Coke Ovens

	Per day	Hr.
Ram engineman	$3.40	10
Chargers	2.89	10
Clayers	2.89	10
Drawers	2.89	10
Loaders	2.60	10

Briquette Plant

	Per day	Hr.
Engineer	$3.86	12
Briquetter	3.97	12
Briquetter's helper	3.40	12
Tar melter	2.89	12
Laborers	2.89	12

Inside Wages

	Per day	Hr.
Shotlighter	$3.30	8
Bratticeman	3.30	8
Bratticeman's helper	2.75	8
Timberman	3.30	8
Timberman's helper	3.75	8
Tracklayers	3.30	8
Tracklayer's helper	2.75	8
Motorman	3.05	8
Motorman's helper	2.75	8
Locomotive engineer	3.05	8
Locomotive switchman	2.75	8
Drivers	3.03	8
Drivers (wet places)	3.30	8
Drivers (spike team)	3.50	8
Couplers (men)	2.75	8
Couplers (boys)	1.65	8
Switch boys	$1.37 to 1.65	8
Door boys	1.10	8
Rope riders	3.03	8
Main and tail rope riders	3.30	8
Pushers	2.75	8
Buckers	2.75	8
Loaders	2.75	8
Miners	3.30	8
Miners (wet places)	3.75	8
Rock miners	3.75	8
Timber handlers	3.03	8
Laborers	2.75	8
Cagers, slope and incline	2.75	8
Cagers, shaft	3.30	8
Machine men	3.75	8
Machine men's helper	3.30	8
Pumpmen	2.75	8
Pumpmen (Dept. Nat. Res. C.P.R.)	3.20	8
Hoistmen	$3.03 to 3.30	8
Drivers (boys)	$1.65 to 2.75	8
Grippers	2.75	8
Grippers (boys)	$1.65 to 1.75	8
Pipe fitters' helpers	2.75	8
Pit carriers	$1.37 to 2.75	8
Clutchmen	3.30	8
Rollermen	2.75	8
Miners on contract average	$3.50 to 6.00	8

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Development of Rescue Departments in State of Washington

The Washington Union Coal Co. has built a training station and equipped it with four Draeger Oxygen Apparatus and one Pulmotor and all other equipment necessary to train the men in helmet and first-aid work. They have also built and fully equipped an emergency hospital.

The Carbon Hill Coal Co. has added two more apparatus to their other equipment. This makes six appliances in all. The Northwestern Improvement Company has taken up the work of organizing and training rescue and first-aid teams with a greater measure of success than any of the other mining companies.

This company sent a team to the First National Mine Safety Demonstration held in Pittsburgh, Penn., Oct. 30-31, 1911. This team was made up of the following members, John Hutchinson, James Bagley, James Pascoe, John Parker and Robert McCollough, D. C. Botting, former mine inspector, acted as their subject. They were accompanied by Dr. E. G. Stimpson, chief surgeon of the Roslyn-Cle Elum Hospital Association, who is in active charge of the first-aid work for the company.

DISCUSSION BY READERS

Collapsible Stoppings

Letter No. 3—The proposition to build collapsible stoppings as a means of preventing extensive mine explosions is apparently based on the conclusion of the suggested preventative effect of increased room in the mine workings, for the expansion of the gases produced. In my opinion, such an expansive area is not always desirable or beneficial.

Under certain conditions, high and wide places in the path of the explosion, such as occur on entry turnouts or partings, have frequently checked the progress of the explosive wave by permitting the expansion and cooling of the gases. On the other hand, instances have occurred where conditions favoring the rapid expansion of the heated gases had no deterrent effect whatever on the initiation and extent of the explosion; but seemingly contributed materially to its development and force. Again, there are instances where the absence of such expansive area, under certain conditions, instead of favoring the development of the explosion, proved a potent factor in its suppression.

To illustrate this point, I would refer to the preliminary explosion tests made at the Federal Bruceton mine.* In these preliminary tests, the ignition of the coal dust was effected in an exterior steel gallery outside of the mine but connected therewith by a movable section. When this movable section was rolled to one side, thus providing unlimited expansion for the flaming gases, within 100 ft. of the initial point of explosion, there was no difficulty in obtaining a violent explosion of the coal dust in the gallery. This explosion gallery was similar, in all respects, to the one used at the Pittsburgh Testing Station. When, however, the movable section was in place, connecting the gallery with the mine and thus preventing the early and rapid expansion of the heated gases, there being no other change in the surrounding conditions, the flame was projected but feebly through the gallery and died away on entering the mine.

These facts suggest, at least, that the presence of ample room for the expansion of the heated gases, at the point where the explosion is started, may not always prove beneficial; and, on the other hand, the absence of such expansive area may not always be detrimental. The Bruceton tests would seem to indicate that the expansive area, at the point where the explosion originates, may act to increase instead of to decrease the initial energy of the blast and that greater safety is to be sought in the avoidance of such expansion, as far as practicable.

Another consideration is the fact that many of the most disastrous and extensive explosions originated in room entries where the stoppings between the entries were of a more or less temporary character and were readily destroyed by the initial blast. In many instances, a number of wide rooms connected by open crosscuts, the mouths of the rooms being unobstructed, afforded ample opportunity for a rapid expansion of the gases. But these did not prevent the development of an extensive explosion.

If there is any practical value in the suggestion of building collapsible stoppings, the theory should have received some support from the results in these instances. On the contrary, it seems that the fact is fairly well established that the easy destruction of stoppings at the point where an explosion occurs has no appreciable depressing effect on the development of the explosion.

JOHN VERNER.

Chariton, Iowa.

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Letter No. 4—I have been much interested in the letters so far published on this subject. In my opinion, while it may be possible for thin collapsible stoppings to localize an explosion of gas or dust, in some cases, their effectiveness will depend upon conditions in respect to the force of the explosion, the strength of the stoppings, and the amount of space made available for expansion, by the destruction of the stoppings. The condition of the workings and the gaseous condition of the atmosphere would also affect the results.

There is no question but that the concussion of a heavy, windy or blownout shot would throw down a stopping that is built too light or flimsy. Should this occur the dust thrown into the atmosphere would possibly be ignited by the flame of succeeding shots. Moreover, the short-circuiting of the air would allow gas to accumulate at the working face, which would give trouble, later, unless the danger was averted by an efficient fireboss. My belief is that it is better practice to build the stoppings in all parts of the mine of suitable strength that they cannot be damaged by blasting operations or falls of roof caused by pillar drawing.

It is the practice in the most uptodate mines, where the coal is from 3½ to 4 ft. in thickness, to build concrete stoppings 6 in. in thickness on butt headings, while those on the main cross-entries are 8 in. thick and the main-entry stoppings from 10 to 12 in. thick. In order to provide the greatest protection from falls of roof and coal, these stoppings are built at the center of the crosscut. All overcasts are made extra strong to withstand the force of a possible explosion. The thickness of stoppings, in any case, must be determined by the kind of material used, the character and height of the coal and the nature of the roof and floor, considering, also, the expected life of the stoppings. The inclination of the seam and the position of the stopping with respect to the pitch may also vary the required thickness.

As a preventive of explosions I consider it of more importance to ventilate the mine in sections, giving to each a separate split of air properly conducted to the working face; to keep all places and roadways free from gas and dust; to drive all crosscuts of ample size at equal distances apart; to use nothing but permitted explosives; and finally to inspect all shots before firing.

BENJAMIN HARTILL.

Johnstown, Penn.

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*Bulletin No. 56, Bureau of Mines, p. 39.

Starting Fan after Explosion

Letter No. 4—Success in any operation depends on the extent and accuracy of the information available at the time. Since the Draeger and other types of rescue apparatus, and portable mine telephones have been brought to their present state of perfection, it is possible to ascertain more or less definitely the condition of the interior of a mine, with respect to fire and gas, shortly after an explosion has occurred. These means of making a rapid exploration of portions of the mine that are accessible afford the opportunity to extinguish any fires that may exist and to short-circuit any air currents that may be in circulation and which wisdom suggests should be diverted and not allowed to pass through the unexplored workings.

Speaking of this condition, following explosion in a mine, J. W. Paul, one of the most practical of the Federal Bureau's mining engineers, says:

> In the event of an explosion occurring within a mine generating large quantities of methane and containing highly explosive coal dust and plenty of dry timber, there is every probability that mine fires will be started in the timber and the coal, in different parts of the mine. Under these conditions, if the ventilating system of the mine be destroyed, there will naturally exist a real danger in starting the ventilating current through the mine. It may be assumed that the explosion originated at some point near the working face and that the stoppings in the vicinity are blown down, which will cause an accumulation of gas in the workings. * * * *"

Continuing, Mr. Paul states:

> The writer, in directing work in a mine of this character, immediately following an explosion, proceeded to advance the ventilation in stages; that is to say, by restoring the circulation only in those parts of the mine that had been previously explored by men wearing breathing apparatus. In this manner, when making the exploration, several fires were found and extinguished before the fresh air reached them.

The recent National Mine Rescue and First Aid conference, held at Pittsburgh, Penn., Sept. 23-26, 1912, adopted a number of resolutions, among which was a method of procedure in case of a mine explosion. One of the statements in this resolution reads as follows:

> (b) There should be a man in charge of outside arrangements who should see that ventilating appliances are put in readiness for operation when required.

It is evident that it was the opinion of this conference that occasions might arise when the ventilating fan should not be started immediately after being repaired, following an explosion in the mine.

Most mining men are familiar with W. E. Garforth's Rules for Recovering Coal Mines after Explosions and Fires. Mr. Garforth says, p. 41:

> Parties wearing apparatus will act chiefly as scouts, advancing ahead of the ventilation to prove the existence of and to deal with fires. Their principal and foremost duty will be, however, to relieve survivors cut off from the pit by afterdamp. * * * *

Again, on p. 44, he says:

> When the whole of the underground workings have been wrecked by an explosion it will generally be found to be the safest plan to recover the workings, in sections, by temporarily shutting off the air from all districts except the one being explored and those already recovered. * * *

And again, p. 45:

> Remember that there is likely to be fire about the point where the force of an explosion ceased, if there is any inflammable substance such as brattice cloth, doors, timber, tubs, or a feeder of gas in the vicinity.

As I understand the question under discussion, it assumes that the fan has been damaged and is stopped for repairs and there is an accumulation of gas in the mine. Referring to this question of the circulation of air in a mine, immediately following an explosion, Mr. Garforth goes so far as to say (p. 32), assuming, apparently, that the fan has not been stopped or gas allowed to accumulate in the mine:

> Having regard to the loss of life at Thornhill (139 lives lost) and Hamstead (25 lives lost) the course to be pursued seems in favor of stopping the fan, for a limited period, while an exploration is attempted; but only a knowledge and consideration of local conditions can determine the actual procedure.

Miners' Circular, No. 10, published by the Bureau of Mines, says, pp. 5 and 6:

> If the mine liberates explosive gas do not restore the ventilation in the advance workings until they have been explored by men using breathing apparatus. Any fires found should be put out before ventilation is restored, unless tests of the atmosphere within the mine indicate the absence of explosive gas.
>
> If the mine does not liberate explosive gas, it is better to restore the ventilating current at once for the benefit of any persons who may be alive within the mine.

The conditions assumed in this question call for a cool head and the exercise of good judgment on the part of the men in charge. Nevertheless, judging from the above quotations, the weight of authority appears to be in favor of not starting the fan until a preliminary examination of the mine has been made.

RALPH W. MAYER.

Roslyn, Wash.

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The Safety Lamp and the Eyesight

I have noticed a number of references to the injurious effects produced on the eyesight, by the continuous use of the safety lamp, which must, if true, materially diminish the producing power of the miner. The question has been asked: Does the safety lamp injure the miner's eyesight?

As a miner who has worked in the mines for 24 years, 22 of which have been marked by the use of safety lamps of the most approved type, I want to answer this question in the affirmative. I have read carefully what each one has said, but want to suggest that anyone who believes there is no injury to the eye produced by the use of the safety lamp, should spend his next vacation in visiting a safety-lamp district in the old country. Let him go to a mine worked entirely on safety lamps and ask the superintendent if his men suffer from nystagmus, as the result of the continuous use of the safety lamp. He will certainly answer "yes," and will probably show you quite a number of men working in the yards who suffer from this disease and have had to quit the mine for good. A few only recover from the effects.

In England, the disease became so serious that the British Government placed those suffering from its effects under the Compensation Act. A miner in England who is suffering from nystagmus and unable to follow his employment is thus able to draw compensation from the company, in the same manner as though he suffered from some bodily injury received in the mine and disabling him for work. To my mind, this is conclusive evidence that the eyesight is injured by the continued use of the safety lamp and that the producing power of the miner is diminished thereby.

A MINER.

Wylam, Ala..

Building a Mine Overcast

Mine overcasts should be built of incombustible material, and in such a manner as will guarantee that they will properly perform their duty for the length of time they are expected to remain in service. No practical mine foreman or superintendent would think of erecting an overcast that will be required to last but a single year, on the same plan as he would adopt when building one expected to serve during the life of the mine.

The method of constructing a mine overcast, described in Coal Age, Sept. 20, p. 428, is well enough when there is plenty of material at hand, such as is there mentioned. I want to describe how a mine overcast can be built cheaply of such material as is commonly at hand. At most of the mines, in this state, located on the mountains, stone is not handy, and brick and sand are almost out of the question, owing to the freight rates which forbid the use of these materials, for mine use. Necessity is the mother of invention; and, at our mines, the practice is to build overcasts in as cheap a manner as possible, using nothing having a market value, except when absolutely necessary. Iron rails, bricks and stone can be sold for other purposes, which, therefore, prohibits their use in the mine.

It is of the utmost importance that mine overcasts should be substantially constructed, in order to avoid the annoyance and trouble that are sure to develop when the air bridge leaks, allowing a portion of the ventilating current to short-circuit at this point, which would greatly impair its efficiency.

After the excavation has been made for the overcast by blasting down the roof, the space is cleared to the proper width and a dry wall laid up with the material blasted from the roof. Such a wall is built on each side of the roadway and the face of the wall coated with a mixture of cement and sifted ashes, the latter taking the place of sand. When the two sidewalls are complete, old boiler flues, that have no market value, are taken for the floor of the overcast. After these have been laid in place, they are covered with a coating of cement and ashes, to a sufficient thickness to form the floor of the overcast. When this is complete, a form is made and a sidewall built of boiler ashes and cement, on each side and above the floor of the overcast. These sidewalls are carried up to the overhanging roof. This style of overcast can be cheaply built and avoids the necessity of purchasing brick, stone or sand, which are important items in this district, since all these materials must be transported up the mountains, at a considerable expenditure of time and labor.

R. Z. Virgin, Supt.,
West Virginia-Pittsburg Coal Co.
Colliers, W. Va.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

DEFINITIONS

Numbers—A number is the expression of one or more units or things. Numbers are classified according to their character or kind and may be defined as follows:

A Whole Number or Integer is a summation of exact units, or will contain 1 an exact number of times; 1, 9, 16, 153, etc., are whole numbers or "integers," as they are called.

A Fraction expresses a part of a unit or thing, in distinction from an integer, which always expresses the whole of anything, in units. This will be explained more fully later. Thus, ½, ⅝, ¾, etc., are simple fractions.

A Mixed Number is composed of a whole number and a fraction; as 1½, 2¾, 12¼, etc.

An Even Number is one that is exactly divisible by 2; or when divided by 2 leaves no remainder. The even digits are 2, 4, 6, 8. Any number that ends with a cipher or an even digit is an even number; as, 140, 2368, 3516, etc.

An Odd Number is one that cannot be divided by 2 without a remainder. The odd digits are 1, 3, 5, 7, 9. Any number that ends in an odd digit is an odd number; 141, 2369, 3517, etc. Beginning with 1, every other number is odd and the intermediate numbers are even.

A Prime Number is one that cannot be divided by any number, except 1, without a remainder; or, as we say has no divisor except 1. Thus, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, etc., are all prime numbers.

Numbers are said to be "prime to each other" when they cannot be divided by the same number without a remainder. In other words, they have no common divisor. Such numbers may or may not be prime numbers. For example, 4 and 9, although prime to each are neither of them prime numbers; so also, 6 and 35; 18 and 25; etc.

A Composite Number is one formed by multiplying two or more numbers together. The numbers multiplied together are called "factors."

A Denominate Number is one of a given kind or denomination that is named; as 1 in., 10 miles, 3 yd., 25 ft., etc.

A Simple Number is one that is expressed in like units only. The numbers last named are simple denominate numbers.

A Compound Number is one that is expressed in units of different denominations; as 8 ft. 6 in., 3 hr. 20 min., etc.

A Factor of a composite number is any exact divisor of that number; thus, 3 and 5 are factors of 15, because each of them is an exact divisor of 15.

A Prime Factor of a number is any prime number that is an exact divisor of the number; thus 5 and 6 are factors of 30; but the prime factors of 30 are 2, 3 and 5.

A Multiple of a number is the product obtained by multiplying that number by another, or the result of taking the same any number of times. Thus, the multiples of 7 are: 14, 21, 28, 35, etc.

The Coal Age Pocket Book

FRACTIONS

A Fraction is a part of a whole. When a unit is divided into any number of equal parts a single part is called a "fractional unit"; and any number of those parts taken together, except the number of the division is a "fraction." Thus, a fraction is the summation of any number of like fractional units. For example, $^{1}/_{3}$, ¼, ⅛, etc., are each fractional units; while $^{2}/_{3}$, ¾, ⅝, etc., are fractions. A fractional unit is, at the same time, a fraction.

How Expressed—The division of a unit into parts is expressed by writing the number indicating the division, below a short horizontal line (—) or immediately after a diagonal line inclined upward to the right (/), the unit being written above or before the line, as the case may be. Thus, the division into 2, 3, 4, etc., equal parts is expressed as:

$$\tfrac{1}{2},\ \tfrac{1}{3},\ \tfrac{1}{4},\ \text{etc.; or } ^{1}/_{2},\ ^{1}/_{3},\ ^{1}/_{4},\ \text{etc.,}$$

which are all fractional units.

The number written above or before the line is called the "numerator"; the number below or after the line, the "denominator." These are called the "terms" of the fraction.

The Denominator of a fraction shows the number of equal parts into which the unit is divided.

The Numerator of a fraction shows the number of parts taken or expresses the number of fractional units intended.

A Proper Fraction is one whose numerator is less than the denominator, and whose value is therefore less than 1; as, for example, ½, ¾, ⅞, etc.

An Improper Fraction is one whose numerator is greater than the denominator and whose value, therefore, is greater than 1; as, for example, $^{3}/_{2}$, $^{5}/_{4}$, $^{13}/_{8}$, etc.

A Simple Fraction is one whose terms are both whole numbers; as, for example, ½, ⅞, $^{10}/_{3}$, etc.

A Complex Fraction is one that contains a fraction in one or both of its terms; as, for example

$$\frac{2\frac{1}{8}}{3};\quad \frac{5}{1\frac{1}{2}};\quad \frac{3\frac{1}{4}}{6\frac{1}{2}}$$

A Compound Fraction is a fraction of a fraction; or where several fractions connected by signs are expressed as a single fraction; as for example,

$$\frac{2\frac{3}{4} + \frac{1}{2}}{3 - \frac{7}{8}}$$

REDUCTION OF FRACTIONS

The Lowest Terms—In order to simplify the work, fractions should always be reduced to their lowest terms by dividing both terms of the fraction by any number that is an exact divisor of both. A fraction is in its lowest terms when the numerator and denominator are prime to each other. The fractions ⅝, $^{9}/_{4}$, $^{13}/_{7}$, etc., are in their lowest terms and cannot be further reduced, because the terms in each case are prime to each other.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

ues.—There are 40,000 cu.ft. of air traveling in an vay, at an average velocity of 800 ft. per min.; what is area of the airway?

ns.—The circulation in a mine or airway is always en in cubic feet per minute; it is, in this case, 40,000 t. per min. Dividing this air volume per minute, by velocity in feet per minute, gives the sectional area the airway in square feet. Thus,

$$40{,}000 \div 800 = 50 \textit{ sq.ft.}$$

ues.—The area of an airway is 80 sq.ft. and the ount of air traveling, 60,000 cu.ft. per min.; what is velocity of the air current?

ns.—In this case, the air volume in cubic feet per nute, divided by the sectional area of the airway in are feet, gives the velocity of the air current in feet minute. Thus,

$$60{,}000 \div 80 = 750 \textit{ ft. per min.}$$

ues.—What velocity of the air current would you ommend at the working faces to properly ventilate eous and nongaseous mines?

ns.—The velocity of the air current passing the work- face should always be sufficient to sweep away the ses that would otherwise accumulate at the roof or in d places. In nongaseous mines, the complaint is somees made that the air is too strong for comfort; while, gaseous mines, there is danger of the flame being blown ough or against the gauze of the safety lamp and heat- it sufficiently to pass the flame and ignite the gas tside of the lamp. In either case, the velocity of the current may be reduced and the gases removed eftually, by erecting suitable brattices, so as to deflect the against the roof or into the void places.

The present anthracite-mining law of Pennsylvania reicts the velocity of air currents in gaseous mines, to 0 ft. per min., in all air passages except the main ine and return airways (Art. 10, Sec. 7). This is a rly safe velocity where bonneted lamps are used at face. The unbonneted Davy should not be subtted to a velocity greater than 360 ft. per min. In ngaseous mines, the velocity of the air at the working e may vary from 200 to 450 or 500 ft. per min., acrding to the conditions existing in the mine.

Ques.—(a) A certain airway, in a coal seam 6 ft. thick, 8½ ft. wide at the roof, and 9½ at the floor. When e fan is running at 80 r.p.m., the anemometer shows a ading of 450 revolutions in two minutes. What is the antity of air passing in this airway in one-half minute?) If the speed of the fan be increased to 100 r.p.m., at should be the quantity of air passing per minute?

ns.—The average width of this airway, or half the m of the top and bottom widths, is 9 ft. The sectional ea is, therefore, 9 × 6 = 54 sq.ft., assuming that the ight of the coal is the clear headroom in the airway. e anemometer is calibrated so that one revolution of e vein corresponds to 1 ft. of air travel. At this speed (450 rev.), no correction is necessary, in a good instrument.

(a) The velocity of the air current, in this case, is 450 ÷ 2 = 225 ft. per min. The volume of air passing is then 225 × 54 = 12,150 cu.ft. per min.; or, 6075 cu.ft., in one-half minute.

(b) It is commonly estimated that the volume of air passing is directly proportional to the speed of the fan, which would give, in this case,

$$12{,}150 \times \tfrac{100}{80} = 15{,}187.5 \textit{ cu.ft. per min.}$$

In practice, however, the quantity of air increases in a less ratio than the speed of the fan. The fourth power of the speed varies as the fifth power of the quantity. According to this rule, the quantity of air in circulation at a speed of 100 r.p.m. would be, practically, 14,500 cu.ft. per min.

Ques.—The anemometer makes 120 r.p.m. in an airway that measures 8 ft. 6 in. at the top and 10 ft. 6 in. at the bottom, and is 7 ft. high; what is the quantity of air passing per minute?

Ans.—The average width of the airway is half the sum of the top and bottom measurements, or, in this case, 9 ft. 6 in., and its area is, therefore, 9.5 × 7 = 66.5 sq.ft. Except in particular cases, it is common mine practice to disregard the correction for the instrument that is sometimes used; and, in that case, the number of revolutions per minute indicates the velocity of the air current in feet per minute, if care has been taken to obtain an average reading for the airway. The volume of air passing, in this case, is 66.5 × 120 = 7980, say 8000 cu.ft. per min.

Ques.—Is it a fact that the pillar coal, in a well regulated mine, costs less per ton than the coal mined from the faces of the chambers, in the first working; and, if so, what is the reason?

Ans.—The coal extracted in the first working or at the faces of the chambers must generally be undermined, or side cut, or both. Under these conditions or when the coal is shot off the solid, the same weight of powder will break less coal than in pillar work; also, a greater proportion of fine coal and slack is produced, which increases the cost of production. In pillar work, when the workings have been properly planned and executed, the roof pressure can be made to greatly assist the extraction of the coal. Less powder is required and the coal is taken out in larger sizes. Much will depend on the conditions and the way in which the work is carried out.

Ques.—When extracting a range of pillars of an average thickness of 20 ft., how would you proceed with the work to insure the safety of the workmen and the security of the mine?

Ans.—Care should be taken to keep the pillar work in line and not permit the work on certain pillars to advance more quickly than that on others. It is also necessary to draw all standing timber as the work on the pillars progresses, so as to cause a uniform settlement of the roof behind the line of pillar work. The purpose of this is to relieve the pressure on the pillars and make this as uniform as possible.

COAL AND COKE NEWS

Harrisburg, Penn.

Steps will soon be taken at the auditor general's department of Pennsylvania to prepare for the enforcement of the anthracite coal tax in accordance with the act of 1913. Before Jan. 1, 1914, when the new act takes effect, every coal operator in the state will receive blank forms on which to report output to the auditor general, who is charged under the act with the collection of the tax.

The coal tax will be 2½ per cent. ad valorem prepared for market, and the reports of output must be made in January annually, covering the output for the previous calendar year. This must be made under oath, and there is a fine of $500 and imprisonment up to a year, either or both for intentional failure to make such a report, and 10 per cent. is to be added to the tax in case of such neglect or failure.

If the auditor general and state treasurer are not satisfied as to the report they are empowered to have an estimate made and to make a settlement of the tax. One-half of the tax is to be returned to the county where originating.

In order to ascertain if they had any authority to inspect the quality of the coal served customers in the state, county sealers of weights and measures sent an inquiry to Chief Inspector Sweeny at the capitol at Harrisburg and received a reply that the law does not give them any authority to inspect the quality of coal, their duties being simply to insure full weight.

A conference of sealers is being held here on the question of shrinkage. A recent law was passed giving the chief of the sealers authority to fix the limit of such shrinkage as will be tolerated.

The complaint of York manufacturers against the Pennsylvania R.R. for carrying coal from the Clearfield region to York was withdrawn at the Public Service Commission this week, and it was stated that the complaint from Lancaster along the same lines would also be withdrawn. The present rate from the Clearfield region to Harrisburg is alleged to be $1.30 per gross ton, and it is $1.50 to either York or Lancaster. The rate from the same district to Baltimore, which is 85 miles south of Harrisburg, is given as $1.60, and the same rate applies to Philadelphia. The associations from York and Lancaster claimed these rates discriminated against the towns.

There came another turn to the bitter struggle of the regulars and insurgents of the United Mine Workers of America in the anthracite section this week, when the insurgents made an appeal to a committee from the international executive board for a special convention in District No. 1. James Moran, D. A. Frampton and William Harrison, the committee that is representing the international board in hearing the appeal, is listening to both sides of the case. The insurgents alleged that the last regular convention held at Wilkes-Barre was not conducted according to the terms of the constitution and that they desire another convention. The district officers denied that there were any violations of the constitution, and in opposing a special convention, they called attention to the fact that such a session would cost the union in the district anywhere from $10,000 to $20,000. It is being whispered about that the main reason for the insurgents desiring a special convention, is that they may make a fight for the division of District No. 1 into two districts.

That the life of the anthracite industry in Pennsylvania is only 81 years, if the various estimates upon which he bases his average are correct, was the conclusion reached by M. S. Hachita, chemist of the Lehigh Valley Coal Co., in a speech made before the New York and Western Pennsylvania Coal Merchants' Association. The first estimate he quoted was that of the Geological Survey of Pennsylvania, according to which there were approximately 19,500,000,000 long tons in the ground prior to mining operations in the state. Taking an average of 40 per cent. as the proportion which can be extracted, this would leave 7,800,000,000 tons as the initial supply. Since 1820 the total tonnage mined has been 1,982,961,263, which would leave 5,917,038,737 tons still available.

T. S. Harris, in the "Forum," estimated there were originally in the ground 14,453,379,600 cu.yd., which is equivalent to 16,766,000,000 tons. By taking 40 per cent. as the proportion which can be extracted and deducting the total amount mined 4,823,438,737 tons are left available.

A. D. W. Smith, one of the commissioners of the coal-waste commission, estimated the available supply of anthracite in 1892 at 6,898,000,000 tons. Since 1,141,684,910 tons have been mined, there remains 5,564,715,090 yet to be mined.

In 1896 William Griffith estimated the available coal yet to be mined at 5,073,786,000 tons. Since then 1,096,963,6[illegible]5 tons have been mined, leaving 3,976,832,305 tons in the ground.

The average of these four expert estimates is 5,070,506,217 tons.

The average annual production of coal for the last ten years has been 62,817,910 tons. If this annual average production continues until the exhaustion of the coal, the life of the anthracite industry will be only 81 years, but hard-coal production this year bids fair to reach 70,000,000 tons, and it is reasonable to believe it will increase at a normal rate in future time.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Negotiations are under way for settlement outside of the courts of one of the most exceptional and unique lawsuits that has ever been brought to the attention of the courts, namely the famous case of Kingston Townshi against the Lehigh Valley Coal Co., to recover adequate payment for coal mined from under the surface of land in Forty Fort, which was dedicated for educational and religious purposes 145 years ago, in 1768, eight years before the outbreak of the American Revolution. This case was tried some years ago, and a verdict of $100,000 was rendered the township, but an appeal was taken to the supreme court, and it was sent back to be retried, so as to decide certain points.

Shickshinny—Failure on the part of twenty men employed at the West End Colliery of the West End Coal Co., to provide themselves with monthly buttons as called for by the United Mine Workers of America, caused a strike at the operations. District mine officials are trying to adjust the matter. Another button strike, affecting a larger numbe of men, is in progress at the Bliss Colliery of the D. L. & W Coal Co., at Nanticoke, and was called when the local investigation committee started an examination of union buttons at the mouth of the shaft and found a hoisting engineer without a button. The men reporting for work refused to be lowered by this man, and as a result the colliery was thrown idle. This is the first button strike to be called at this colliery, and it is said that the union officials are backing it.

Plymouth—By a decision handed down by Judge Fuller o Luzerne Co. in the equity case of Elizabeth Sweitzer agains the Plymouth Coal Co. the defendant company is enjoined from mining in the Bennett and Cooper veins within tw hundred feet of the plaintiff's property. The case wa brought in order to prevent the settling of the plaintiff' premises by reason of the mining operations of the defendant The borough of Plymouth is also interested in a similar suit and claims that as a result of the operations of the defendant its streets are sagging and its business places an homes are being ruined.

Philadelphia—Suit has been instituted for the possessio of 240 shares of stock of the George B. Newton Coal Co which recently absorbed several smaller companies in thi city. Samuel B. Crowell and Jonathan P. Edwards, forme owners of the firm of Roland & Bro., together with the Henr Hudson Estate, also owners of the firm of Robert Henderso & Co., contend that 240 shares of stock are due them, in addition to the $466,000 paid them for the assets and good wi of their companies. The shares in dispute are on deposi with the Philadelphia Trust, Safe Deposit & Insurance Co

Parsons—An announcement has been made that the Delaware, Lackawanna & Western Coal Co. will, in a short while operate a new mine at Parsons, Penn. The mine will be located on the mountainside to the southwest of the town where a hundred acres of virgin coal is still unmined. branch road will be run from the Delaware & Hudson track to the new colliery.

Bituminous

Clearfield—The Madeira Hill Coal Co., which is making extensive improvements and opening a new mine in the Clover Run district of Clearfield County, expects to be able to ship coal in a short time. This firm owns 7000 acres of coal in this region.

Pittsburgh—A warrant for $218,774.50 received by the Board of Education on Oct. 10, completed the three-cornered property deal by which the testing station of the government bureau of mines, obtained the Magee High-School site. In return the school system received three sites for day schools and a cash bonus. This property deal has been in contemplation for several months past.

Windber—It has been announced that the Berwind-White Coal Mining Co. will not buy power for its new McGregor Mine in the Reitz region, but will use its enlarged power plant at mine No. 35 for this service. Additional equipment has been purchased with a view to filling the needs of the company in this region.

Brownsville—That the Vesta Coal Co. is going to start operations on the west side of the Monongahela, several miles above West Brownsville, seems to be a certainty. Recently there have been officials of the Vesta company in the vicinity of the latter location, and indications point to this place as the scene of operation.

WEST VIRGINIA

Beckley—The merging of the majority of the collieries on New River is under way according to well-founded reports. The merging of these collieries has been under contemplation for several months, and it is believed that the consumation of the deal will be realized within a short time. It is reported that the syndicate is capitalized at $100,000,000, and that $18,000,000 in cash is ready to be applied on the first payment.

Matewan—The plant of the Marvin Coal Co. was sold recently at public outcry to George Buskirk, for $17,500. No plans have been announced in reference to the operation of the plant, but it is expected that Mr. Buskirk will personally superintend future operations.

ALABAMA

Birmingham—The Mining Department of the State of Alabama reports only seven fatal accidents during September, out of probably 25,000 miners working. This is said to be the direct result of the hard, systematic work being done by this department to prevent accidents.

The Tennessee Coal, Iron & R.R. Co. states that its production for 1913 will be at least 500,000 tons more than 1912.

KENTUCKY

Louisville—The Pittsburgh Coal Co., of Louisville, has been awarded the contract for supplying coal to the Louisville Board of Park Commissioners for the ensuing year.

The Kentucky Court of Appeals recently affirmed a judgment rendered in the Bell Circuit Court against the Continental Coal Corporation and its foreman, Robert Mattingly, in the unusually large sum of $20,000, for the death of W. P. Cole in one of the company's mines. This judgment was given in a verdict and judgment for $15,000, which was reversed by the court. The court held that the latter judgment could not be said to be excessive, and found no error in the record. In this connection, the prospect of definite payments through a compensation law is of interest.

Madisonville—The Sunset Coal Mines, among other industrial concerns near Madisonville, will probably be forced to shut down shortly on account of the unprecedented scarcity of water in that section, unless heavy rains fall soon. The Louisville & Nashville R.R. is now furnishing the mines and the city with water hauled a considerable distance, but all available supplies in the vicinity of the town are about exhausted, the Ohio river at Henderson being the railroad company's source of supply.

The United Mine Workers of District 23 met at Madisonville, on Oct. 14, a large attendance from all over the district being on hand, and discussed plans for the organization of the Hopkins County coal field.

Watsonton—Watsonton, Ky., named in honor of the Watsons, who are the principal stockholders and incorporators of the Mineral Fuel Co. and the Elkhorn Fuel Co., is the latest of the new towns in the Beaver Creek section. Work on the several mining operations in that section is about completed, and it is thought that coal can be shipped out as soon as the C. & O. branch line up Beaver Creek is finished.

Owensboro—The Fern Hill Coal Co.'s properties near Owensboro, have been taken over by a syndicate headed by John B. Brasher, formerly of Madisonville, who will superintend the operations of the mine hereafter.

OHIO

Steubenville—The coal tipple and engine house of the Eastern Ohio Coal Co., at Amsterdam, was destroyed by fire recently. The loss is estimated at $20,000. The fire originated from electric wirng.

Pomeroy—The Martin Ebersbach Co., which was recently incorporated under the laws of Ohio with a capital of $250,000, to mine and deal in coal, has taken over the producing properties in the Pomeroy Bend district, which were formerly owned by the same interests as a partnership.

Columbus—T. W. Brockman, of the Coal Credit Exchange, of Detroit, was a visitor in Columbus recently. The Ralston Steel Car Co., of Columbus, Ohio, which makes coal cars, has started to erect a large addition to the plant in order to increase its output.

The coal-mining commission named by Governor Cox, of Ohio, to investigate coal mining in the state has fixed public hearings for both the operators and miners in the senate chamber, Oct. 20. At that time opportunity will be given for both sides to present their cases and evidence in support of their contentions. According to J. C. Davies, a member of the commission, it is hoped to complete the taking of evidence by Nov. 1, and to have the report completed Dec. 1. So far the commission has investigated mining conditions in the Bluefield district of West Virginia, the Indiana field and the northern and southern fields of Illinois. It has also investigated the unloading machines at the Milwaukee docks, the stoker systems at the Detroit manufacturing and electric plants, and other things connected with the industry. The conservation of Ohio's coal supply is receiving considerable attention from the commission, and a part of the report will be devoted to that phase of the question.

Alliance—Fire destroyed the tipple and other buildings of the coal mine at Bergholtz early Oct. 7. Nearly 500 men will be out of employment. The mine is sometimes called the Phillips mine and belongs to the Rice Coal Co., of Cleveland.

INDIANA

Indianapolis—The southern shipment of coal for fall and winter consumption has crowded railroad lines to such an extent that it is sometimes difficult to find power to move the coal. A blockade of cars was recently found to exist at Indianapolis and also at Terre Haute. According to railroad officials, the coal freight service will be improved at once.

Vincennes—A deal has been practically completed between Vincennes lease holders of coal lands and the Wassan Coal Co., of Harrisburg, Ill., by which the latter for a consideration of $500,000 will gain control of about 50,000 acres of coal lands with the intention of immediately opening a number of mines and giving employment to 1500 miners from the South.

Linden—The recently organized Linden Summit Coal Co. expects to open a new mine near here in a short time, and give employment to about 200 men. Work on the new shaft will be begun at once.

Clinton—Dering mine, No. 1, is the first in the Clinton field to be electrified for hoisting, as well as lighting the entries, running the machines and hauling along the main entries.

Evansville—Miners of southern Indiana are in sympathy with their striking colaborers in western and northern Kentucky in their efforts to organize. It is reported that farmers are also giving them support and that they have the assistance of the members of the American Society of Equity, an organization of farmers. Coal operators of southern Indiana, it is said, are opposed to the organization of Kentucky miners because they are forced to compete with mines that pay less than the union scale. Indiana operators protested strongly against the shot-firers' bill in the last legislature, arguing that it would be unfair to them while the Kentucky field remained unorganized.

ILLINOIS

Belleville—The cable at the Little Oak mine broke the other day just after 50 miners had been lowered in the morning shift. A car of coal was loaded on the cage, and when it was just about at the surface the cable broke. Fortunately there was no one injured seriously.

Harrisburg—The receivers of the O'Gara Coal Co. have finally sold enough receivers' certificates to pay the miners at the O'Gara mines $237,000. Some of this money has been owing for over five weeks and on account of this money being paid some of the mines will resume work.

Johnson City—The fire in the McClintock mine, which for several days got beyond the control of the miners, is now confined to a small number of entries on one side of the mine. Work has been resumed.

MISSOURI

St. Louis—In a recent report by W. P. Hawkins, fuel agent for the Missouri Pacific-Iron Mountain lines, the itemized fuel account shows that in the past fiscal year the system paid $4,500,000 for locomotive fuel alone.

OKLAHOMA

McAlester—Coal operators in the McAlester fields are not unanimous on the proposed advance in price of coal among the mines due to increased demand. Whether this price will be advanced or maintained at the prevailing quotation will depend entirely upon the individual operators.

COLORADO

Colorado Springs—The coal miners in the El Paso County districts are rapidly being unionized. The difficulties which arose some time ago when the strike began have been adjusted with one exception.

KANSAS

Coffeeville—An effort is to be made to organize a company for the purpose of developing a coal field just north of this city. It is stated that a 10-ft. bed of what is believed to be a good quality of semi-anthracite has been discovered at two different places at a depth of 40 ft.

OREGON

Coos County—The Coos County Colliers Co., of North Bend, has completed negotiations for the entire output of the Riverton Coal & Development Co.'s mine, on the Coquille River, the Libby Mine on Coos Bay, and the surplus of the Smith-Powers mine, and has contracted to supply Vancouver and Prince Rupert, B. C., parties with 24,000 tons of coal during the next six months. The same company has chartered two vessels to ply in this trade, and the first shipment will go forward from the Riverton mine in a few days, when 800 tons will be taken from the bunkers. Thereafter it is expected to ship 1000 tons over the bar at Bandon each cargo.

The Riverton Mine, one of the most extensive producers in the county, is increasing its working force, and by Nov. 1 will be operating with a double shift and producing 150 tons of coal per day.

The Libby mine will double its force, also its output, for besides the contract just entered into, the Coos County Colliers Co. has Seattle, Washington and California orders for coal shipments.

Coos County is the largest coal producing county in Oregon. The total area of its coal fields approximates 230 square miles, the character of the coal being sub-bituminous.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines. "The Production and Use of Brown Coal in the Vicinity of Cologne, Germany," by Charles A. Davis. Technical paper 55. Fifteen pages, 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines, "Monthly Statement of Fatalities in the United States, July, 1913, with revised figures for preceding months," by Albert H. Fay. Nineteen pages, 6x9 in., with numerous tables.

Department of the Interior, Bureau of Mines, "Mining and Treatment of Feldspar and Kaolin in the Southern Appalachian Region," by A. S. Watts. One hundred and seventy pages, 6x9 in., with many illustrations and three insert maps.

Department of the Interior, Bureau of Mines, "The Titaniferous Iron Ores in the United States: Their Composition and Economic Value," by Joseph T. Singewald, Jr. One hundred and forty-five pages, 6x9 in., with numerous illustrations and tables.

Department of the Interior, Bureau of Mines. "Rules for Mine Rescue and First Aid Field Contests," by James W. Paul. Miner's Circular 15. Twelve pages, 6x9 in., unillustrated.

The National Tube Co., Pittsburgh, Penn., N. T. C. Bulletin No. 17. "The Manufacture and Use of Shelby Seamless Steel Tubing." Thirty-nine pages, 8½x11 in., profusely illustrated with cuts showing the possible uses of Shelby steel tubing.

The National Tube Co., Frick Building, Pittsburgh, Penn., "The Whole Kewanee Family." Describing Kewanee unions and pipe specialties; 48 pages, 5½x8 in.; illustrated.

PERSONALS

Jabez Woolley, a wealthy coal operator of Evansville, Ind., has been selected by the Chicago & Eastern Railroad Co. to manage its $500,000 coal properties at Paxton.

W. L. Klutz, formerly superintendent of the Thomas furnace of the Republic Iron & Steel Co., at Birmingham, has been appointed general manager of the Central Iron & Coal Co., at Holt, Ala.

E. B. Sutton has been placed in charge of the rescue station at Birmingham, Ala., by the Government, and will take up his duties at once, working in coöperation with the State of Alabama Mining Department.

Herbert Jones, aged 30, prominent in the development of the New River coal field, was probably fatally shot from ambush at Oak Hill, Oct. 7. He was acting as one of the managers of the Fayette County fair.

J. Warner Shook, vice-president and general manager of the Central Iron & Coal Co., at Holt, Ala., has tendered his resignation, and will enter other business. Mr. Shook is one of the best known coal and iron men in the South.

D. S. Duncan, of the W. G. Duncan Coal Co., of Greenville, was seriously injured in an automobile accident at Graham, a few days ago. The car in which Mr. Duncan was riding turned turtle, pinning him beneath it and causing the injuries referred to.

Due to the illness of his mother, John T. White, president of the United Mine Workers of America, has postponed his trip to the anthracite coal field. He has cancelled all his engagements in this section, and notice to this effect has been sent out by the district leaders.

A. M. Healy, with his wife and family, has taken up his abode at Salt Lake City, Utah. He succeeds F. N. Cameron as Vice-President of the Consolidated Fuel Co., the Black Hawk Coal Co., and the Castle Valley Coal Co. He will have entire supervision over the operating departments.

Paul Hardy, until recently General Manager of the Island Creek Coal Co., at Holden, W. Va., has been promoted to the position of Consulting Engineer of the Island Creek Coal Co., the Pond Creek Coal Co., and the United States Coal & Oil Co. His headquarters will probably be at Huntington, although this has not been definitely decided.

F. N. Ulrich, sales agent of the Lehigh Coal & Navigation Co., has returned from a trip through the South, which he made for the purpose of opening up that territory to Lehigh coal, made possible by the recent traffic agreements between the Lehigh & New England, a subsidiary of the Lehigh Coal & Navigation Co., and lines covering various important southern points.

Peter Lobenguela, eldest son of the former King Lobenguela, who, until the British occupation of South Africa, ruled the rich domain of Matabeleland, has been found living in poverty in Pendleton, Salford, England. His identity was revealed at the Revision Court in Pendleton, where he appeared recently in defense of his vote as a British subject. In recent yers, he has been employed as a coal miner in the Agecroft mines, near Pendleton.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.

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Emma B. Hill, 80 Munn Ave., E. Orange, N. J.

The balance of the stock issued (less than 1% each) is owned by 62 employees, one ex-employee, and 11 others who are wives, daughters or relatives of employees.

There are no bondholders, mortgagees, or other security holders.

C. W. Dibble, Vice-President,
HILL PUBLISHING COMPANY.

Sworn to and subscribed before me this 29th day of September, 1913.

RICHARD L. MURPHY,
Notary Public.
(My commission expires March 30, 1915)

OBITUARY

ohn Bellas, aged 81 years, and believed to be the oldest e miner in the anthracite region engaged in underground , died at his home in Shamokin, Penn., Oct. 9. Since he 10 years of age, Bellas had worked in the coal mines.

ıkerman Bailey, Sr., one of the best-known operators in ern Kentucky, died Oct. 10 at Madisonville, at the age of ears, as the result of heart failure. Mr. Bailey was for y years connected with the Reinecke Coal Co., but for past few years he had been active in other operations, ntly organizing the Big Creek Coal Co. He leaves a wife four children.

he death of Col. John S. Holmes occurred in West Vir- a, on Oct. 5. Col. Holmes was one of the best known coal ators in West Virginia. For 25 years he was superin- ent of the Stevens Coal Co., the predecessors of the pres- Cabin Creek Consolidated Coal Co. With his two sons, iam S. and Daniel S., he shipped the first coal ever mined he Cabin Creek region.

hristopher Muckermann, 73 years old, a pioneer coal er, and founder of the Polar Wave Ice & Fuel Co., with ards in St. Louis, died unexpectedly at his home in St. s after an attack of gastritis. Mr. Muckermann was born Vestphalia, Germany, and came to St. Louis at the age 7. His father, upon arrival in St. Louis, engaged in the and coal business. His son followed in his footsteps and entire life has been devoted to that business.

. A. Sterling, aged 71, of Wilkes-Barre, died suddenly week at his summer home, at Glen Summit Springs. His h came almost without warning, even to his intimate nds. Mr. Sterling was taken with a heavy cold, which developed into bronchial pneumonia, and death came days afterward. Mr. Sterling was prominent in banking les, and was the active vice-president of the West End Co., as well as the Wyoming Valley Geological Society.

dolphus Busch, owner of the St. Louis & O'Fallon Coal mines at O'Fallon, Ill., and of the St. Louis & O'Fallon Co., died at his castle on the Rhine in Germany Oct. 10. th came somewhat unexpectedly, as the arrangements been made for the trip back home for the winter months. Busch was 76 years old last July, and was born in Ger- ıy. He came to the United States in 1857, settling in Louis. He is rated as being worth over $60,000,000, and is ous the world over as a brewer. He was a member of the . R. and of many foreign orders, and was in a general a great giver of money to various worthy causes.

CONSTRUCTION NEWS

omerset, Penn.—Work is progressing rapidly on the big ft of the Consolidation Coal Co., which is being sunk on John Biesecker farm, two miles west of Jenners No. 2.

airmont, W. Va.—The Fairmont & Cleveland Coal Co., of rmont, W. Va., organized with a capital stock of $600,000, acquired the holdings of the Parker Run Coal Co., in ion County and will increase the output and make new elopments.

roxton, Ky.—The Harlan Coal Mining Co. is progres- rapidly on its new No. 2 operation at Coxton. This ration will be handled by the company, as distinguished n its first mine at Coxton, which was leased to the Lick nch Coal Co., from which a good volume of coal is now ıg produced.

enkins, Ky.—The two great power plants of the Consoli- ion Coal Co., at Jenkins and Van Lear, Ky., respectively, gradually extending lines to various towns and mining rations in that section, and will ultimately supply electric- to a large area in that part of eastern Kentucky. The Van r plant was built two years ago, that at Jenkins, which is h larger, being completed during the past summer. The er plant cost $1,000,000, and contains five power units, able of developing an aggregate of 6000 kw., and the ıpany is now planning to increase this to 15,000 kw. The ıt develops a pressure of 40,000 volts, the highest of any er plant in the South. A line is in process of construc- between the two plants, a distance of 65 miles, so that er can supply the other with current in the event of acci- t.

NEW INCORPORATIONS

South Washington, Ind.—The South Washington Coal Co. has been organized with a capital of $7000 to engage in the coal business. The directors are A. A. Wallace, John Ridder, Jr., and Caspar Beale.

Clarksburg, W. Va.—The Templeton Coal Co. has been organized at Clarksburg, W. Va., to develop coal. The capital stock is $20,000, and the incorporators are J. M. Quinn, Ray Quinn, D. J. Carter, Harry W. Sheets and B. B. Jarvis, all of Clarksburg, W. Va.

Connellsville, Penn.—The Crescent Coal & Coke Co. has been granted a charter in Delaware, and will develop a tract of 122 acres in German Township, purchased from Sebastian Krado. Steps will be taken at once toward operation, but for the present at least, the company will produce only coal; but if conditions warrant, a battery of coke ovens will be built later.

INDUSTRIAL NEWS

Charleston, W. Va.—It is reported that Louis W. Adkins has sold his operations at Eagle near Boomer, and will in the future devote himself to coal ventures in other fields.

Pittsburgh, Penn.—Appalachian Coal & Timber Co., James T. Manning, president, has acquired 306,000 acres of coal and timber land in West Virginia, and will hold for developments through subsidiary companies and leases.

Charleroi, Penn.—For all the activity and confusion at Lock No. 4, they still have time to do business and surpass that of the preceding month. For the month of September the lockage of coal surpassed that of the month of August by 892,000 bu. of coal.

Washington, D. C.—The Interstate Commerce Commission on Oct. 13, suspended until Feb. 14, the proposed advances in rates on anthracite coal over the Lehigh Valley R.R. from the Wyoming coal district in Pennsylvania to Perth Amboy, N. J. The proposed advances would raise the freight rate from $1.40 to $1.55 per ton.

Atchison, Kan.—Although nothing definite can be announced, it now looks as if the negotiation looking toward the opening of a coal mine by a wealthy Eastern syndicate would reach consumation. Local men behind the deal are giving it careful and diplomatic attention, and they believe that negotiations can be brought to a successful issue.

Jenkins, Ky.—It is reported that negotiations are under way looking to the purchase by the Chesapeake & Ohio of the short branch line of the Baltimore & Ohio up Shelby Creek to the Consolidation Coal Co.'s Jenkins, mines, a distance of 28 miles. The branch referred to feeds to the C & O. route up the Sandy River, and is of great importance to that road, as more than 1,000,000 tons of coal a year move over it.

Wilkes-Barre, Penn.—Safety for employees of the mines of the Lehigh Valley Coal Co. has prompted this company to engage Evan A. Price, an expert mining man, to make a tour of the mines and report back to the company as to conditions pertaining to accidents, with a view of pointing out any faults that may come to his notice. Mr. Price will thoroughly investigate all fatal and nonfatal accidents which occur in the company's mines.

Brownsville, Penn.—The miners at the Denbeau mine of the Reliance Coke Co. have gone on strike. The men demand that the union scale as paid throughout the organized coal districts be allowed, but the operators have refused the request. The district and national organizations of the United Mine Workers are behind the miners in their demand. and a bitter fight is expected, unless the company agrees to terms. The Denbeau is a new mine, having in connection 236 modern coke ovens.

Birmingham, Ala.—John P. Harrison of Harrison-Tittswell Co., Ltd., of 66 Mark Lane, London, has placed with one of the large operators here an order for 50,000 tons of bunker coal, with the option of increasing the amount to 300,000 tons. This coal is to be used by the above company on its steamers, it being one of the largest water carriers in existence. The fuel is to be taken at the ports of Pensacola, Mobile and New Orleans. Mr. Harrison made a visit to this district and states that the collieries here were a revelation in comparison with the English mines.

COAL TRADE REVIEWS

GENERAL REVIEW

Conditions in anthracite are fairly active over the entire country, with stove coal in particular demand. The bituminous trade is holding its own with a tendency in many locations toward rising prices. The car supply is a predominating feature in Eastern and Central coal fields. Coke is, generally speaking, firm throughout all regions.

In Boston and New England generally, the anthracite market is strong. Many shippers are declining orders for stove coal unless accompanied by requisitions for other sizes. All firms appear to be well supplied with orders. The warm weather in New York has been a depressing feature in the anthracite trade, bringing the business to what is termed by some, a standstill. Nevertheless, stove coal and No. 1 buckwheat is in particularly strong demand. In Philadelphia and vicinity under adverse weather conditions, the market for anthracite does not improve as was expected. Prices, however, remain at circular level with but few rumors of concessions.

Reports on anthracite from Baltimore, Buffalo, Detroit and Chicago are all similar in tone. Dealers are buying freely, prices are well maintained, and stove coal is particularly scarce.

A week of steady fog along the northern Atlantic seaboard, has greatly shortened deliveries of bituminous coal to New England from Hampton Roads. There has been no improvement in the car supply throughout the Pittsburgh region while in northern Pennsylvania, Ohio and Indiana, generally, conditions have grown steadily worse. At Hampton Roads there is a fair accumulation of cars with but little free coal and that on hand is held for contract tonnage and Government colliers. But little change is reported anywhere in prices of bituminous. The demand throughout the South, generally, appears to be about normal. In the region tributary to the Lake trade, quotations have a general rising tendency. This would probably be decidedly augmented by a cold wave.

Lake shippers are still loading for the market of the Northwest as rapidly as possible. This condition is expected to continue until navigation closes. Warm weather in the St. Louis region has tended to break the market, but the indications are that with the possible exception of steam sizes, prices will recuperate. In some regions in Illinois and Kentucky screenings are a drug on the market, and are being either dumped at the mine or given away for freight charges.

British Columbia consumers are buying coal from the mines at Coos Bay. The practice in the past has been to occasionally import British Columbia coal to Oregon. A scarcity of fuel throughout the coming winter is predicted for this reason.

There is little change in coke conditions either as regards price or demand. A slight tendency has developed in the Connellsville region toward sagging, while throughout the Michigan and Illinois markets all grades of coke are firm.

Prices of all kinds of fuel are well maintained. What declines are recorded in certain varieties are fully compensated by advances in others. The sharp increase in the employment of railroad equipment, as shown in the new reports is an excellent index of the heavy movement of all grades of coal and coke.

BOSTON, MASS.

The Hampton Roads loading situation helped out by continuous fog along the coast. Prices firm on Pocahontas and New River but a slightly relaxed demand in New England. Distributing market dull. Georges Creek still out of the market and Pennsylvania operators beginning to feel the car shortage. Anthracite situation strong, with a heavy demand on Philadelphia, and barges in short supply.

Bituminous—A solid week of unbroken fog along the coast has served to help out the loading situation at Hampton Roads. Transportation has been practically at a standstill, and with few boats arriving there has been a chance for coal to accumulate. Most of this, however, is now going into Government colliers for the battleship cruise, and this week when bottoms begin again to arrive there will probably be further detention. Pocahontas and New River are being firmly held and on what small tonnages have be sold $3 has been the ruling price for the best grades.

The Pennsylvania coals are still in good demand, especially those of better quality. There is no marked chang in the price situation, but all the shippers maintain the usual caution about selling much ahead thus late in th year. Many operations are feeling the car shortage, pa ticularly for routings all-rail, and this is turning a larg proportion than is usual to Philadelphia for coastwise shi ment. If barge transportation is short at that port for th next fortnight on account of much of it being bunched this end it may be that prices f.o.b. will be a shade les firm than has been the case since early September.

Anthracite—The hard-coal situation in New England remarkably strong. One or two of the leading shippers a declining to accept orders for stove size and there are man signs of a shortening up of supplies. The retail trade tha started with a rush in September has so far depleted stock that dealers are getting anxious about October and November shipments. The heaviest demand is on shippers out Philadelphia and it remains to be seen whether a large proportion of the trade can be cared for from that quarter. goes without saying that all the companies are well supplie with orders.

Quotations on bituminous at wholesale are about as fo lows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahont New Riv
Mines*..................	$1.10@1.60	$1.30@1.70	$1.67@1.77	
Philadelphia*..........	2.35@2.85	2.55@2.95	2.92@3.02	
New York*............	2.65@3.15	2.85@3.25	3.22@3.32	
Baltimore*............			2.85@2.95	
Hampton Roads*.......				$2.90@3
Providence†..........				3.88@3
Boston†..............				3.88@4

*F.o.b. †On cars.

NEW YORK

No improvement in car supply. Cooler weather wou have a quick and marked effect. Bituminous stocks at tid still below normal. Warm weather has brought the anthracite trade to a standstill. Stove and No. 1 buckwheat are strong demand and scarce, other sizes plentiful.

Bituminous—There has been no improvement in the situation as regards the car supply during the past week, an the continued shortage is having its effect on the deman some of which is coming from operators who are obliged t buy coal to take care of their contracts. Prices on coa for line or tide shipment have not been materially affecte though the market would probably respond quickly to an sudden pressure on the part of consumers. The continue shortage of labor and cars, the irregular operations due t petty strikes, etc., and cooler weather, are bound to hav an effect in the near future. Stocks on hand at tidewate still continue to be below normal. The local market remain quotable on the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85 best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The continued warm weather of the pas week has brought the retail trade in and around New York City to a practical standstill. A number of the dealers, o course, still have some of their "fill-in" orders to be taken care of but the spot business which is usually looked for about this time of the year has not as yet put in an appearance. A turn in the weather would undoubtedly stimulate business and bring in cash orders which are highly desirable to the retail dealer.

There seems to be no question that stocks in the hands of the consumers are much heavier this year than they were last. Stove coal continues to be the short size and it is getting to a point where very few of the wholesalers will accept orders for this size unless accomplished with orders for other sizes, especially egg.

Dealers in the outlying points are, where financially able keeping their stocks to capacity taking in additional supplies as fast as they are put out. With this condition the consumers should be much better taken care of than they were last year.

In the steam sizes the pea coal is in fair demand, No. 1 ckwheat is weak, and the better grades of No. 2 and No. 3 ckwheat are quite short and in urgent demand, where- some of the poorer grades are a drug on the market.

PHILADELPHIA, PENN.

Under poor weather conditions, the anthracite trade does t improve as quickly as was expected. Prices remain as rcular with few reports of concessions. Bituminous trade ill holding its own, with a tendency to higher prices.

Anthracite—The weather the past week has put a little mp in what looked like an auspicious opening for the an- racite coal trade for the fall and winter. Wholesale as ell as retail dealers state that the foggy weather has had e effect of curtailing orders, and while cancellations are t plentiful, there seems to be a disposition to hold up ders for delivery the latter part of the month.

The month of October is not likely to come up to the nnage of last year, as there was no insistency to the trade, e mining departments were not called on to exert them- lves in the way of production, but the prospects, are wever good, provided there is any cold weather. This is ally the important factor.

Bituminous—The bituminous trade seems to have taken on new lease of life, not that it was by any means dead, but ere has been a lack of snap and a tendency to softness for e last two or three weeks. Apparently this has disap- ared. Accumulations of coal at tidewater have vanished, and ere appears to be many dealers in the East who are not le to get the kind of coal they want when they want it. looks now as if the winter will see an almost continuous eriod of prosperity for the bituminous trade.

BALTIMORE, MD.

The coal market generally strong. Demand covers nu- erous new contracts, which consumers find hard to place. lack still a feature. Anthracite conditions active.

A gain in strength was apparently recorded by the coal arket here during the past week, when connections on very side reported that prices were still on the increase and vailable coal growing shorter and shorter. Car scarcity is utting a big figure in the market just now, and in both the airmont and Somerset regions, there were reports that ines were shipping but from one-half to two-thirds of what hey could do if given rolling stock as desired. Once under ay, it must be admitted, the fuel cars are being disposed f much quicker than ever before, and there is not now so uch delay in unloadings and by waits on sidings as was he case in previous years.

Ordinary grades of Pennsylvania steam coal were being isposed of in small lots around $1.15 and $1.20, and cheap uels from West Virginia were commanding about $1.05 he past week. Gas run-of-mine was worth $1.10, and three- uarter brought readily from $1.15 to $1.20. In the meantime lack took another leap and little was being let go below 1.20. The demand for this fuel seemed on the increase, ith mighty little unattached in sight. The cement industry emains particularly active in inquiries for this class of coal.

The foreign movement of coal from this port should soon ake a decided jump, as the past two weeks have seen a large umber of new charters announced. These charters are split etween South American, Cuban and southern European de- iveries.

Anthracite conditions remain active despite the rather arm weather that has prevailed. Steam sizes were reported n good call. Household business should take an added im- etus with the first winter weather. Deliveries are sufficient, espite car shortage in many regions.

PITTSBURGH, PENN.

Car supply unchanged, and not altogether adequate. Re- ent advanced asking prices easily obtained on limited ton- age available. Connellsville coke stagnant, with 1914 con- racts the next important business to be negotiated.

Bituminous—Car supply has not grown noticeably worse n the average during the past week. but is not as good as 0 or 60 days ago, and coal production is in keeping with t. While the labor supply is not entirely adequate it is a inor factor compared with the car shortage. There is ittle free coal available, and operators find no difficulty in elling what they can spare at the advances recently men- ioned over the regular circular prices of the season.

We quote for prompt and near forward delivery: Slack, $1@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district. There is no emand for long term contracts and the regular circular rices, have become practically nominal, these being based n $1.30 for mine-run, with slack at 90c.

Connellsville Coke—The market has been entirely colorless the past week. Demand for prompt coke has been extremely light and there has been practically no inquiry for forward deliveries. By a considerable reduction in output the free coke has been largely worked off. The market is no nearer than it was to a realization of the asking price of the majority of operators, $2.50 for furnace coke, and the only question is whether or not these operators will modify their views before 1914 contracts come to be negotiated.

In some quarters it is asserted that operators are committed to $2.50 for 1914 contracts, and will adhere to that figure even though it develops that a large tonnage will be available at lower prices. We quote the market, based chiefly upon sales made more than a week ago for October, as follows: Prompt furnace, $2.15@2.25; contract furnace, $2.25; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 4 at 358,298 tons, a decrease of 27,196 tons, and shipments at 388,347 tons, an increase of 4981 tons.

BUFFALO, N. Y.

Market steady, with no indication or hint of immediate change. Not bituminous enough to go around and roads still cutting down their car supply. Anthracite selling in spite of the hot wave.

Bituminous—Certain of the big Pennsylvania coal roads have again cut down the car allotment, now making it 60 per cent. of the demand, which means that the mines are allowed to put out only a little more than half of what they are aiming at. There is much complaint of car shortage among the operators in the Allegheny Valley proper where they are dependent on roads in which they have no interest, but the more local coal roads, such as the Buffalo, Rochester & Pittsburgh, are said to be taking pretty good care of their shippers.

The quotations on bituminous coal are therefore as strong as ever, with no change of figures. Although there are notices of advances sent out from various centers, general survey shows that the advance is merely individual. The feeling is common that prices are high enough now. The figures are $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine run and $2.25 for slack, with Allegheny Valley coal about 20 cents lower, except for slack, which is about on a par with Pittsburgh.

Coke—There is no improvement in the state of the coke trade. Stock coke is a trifle easier, selling freely at $3.60 at Buffalo. Best Connellsville foundry is fairly strong at $4.85 f.o.b. Buffalo.

Anthracite—With the weather about as warm as it ever is in October and remaining so for several days, the anthracite market has shown unexpected activity, all shippers in that trade expressing satisfaction in the movement. There was so little stir through the summer that it is time to move now and the weather may change any day.

As a rule the lake-shipping agents of the anthracite companies are anxious to do more business and are wondering why the amount coming forward is no larger. While the space on the upper-lake docks is not what it was early in the season there is enough to keep the fleet busier than at present. It is felt by all that it will not be easy to get too much coal west this fall. Still the amount reported at the custom house for the week was only 108,000 tons.

TOLEDO, OHIO

Lake shippers are loading as fast as possible and are complaining of the car shortage. Domestic and steam demand is good and prices are firm with prospect of rising.

Lake shippers are loading as rapidly as is possible but have been somewhat handicapped by an inability to secure coal for cargoes fast enough, owing to the car shortage which has affected coal dealers somewhat during the past month and especially coal shippers who are anxious to get all the coal up the lakes possible in the short time still remaining before the close of navigation. The demand continues good and prices are exceedingly firm with prospects of rising a little later on.

Domestic demand was extremely good during the cooler weather of a couple of weeks ago and there was some falling off the past week owing to the warmth but this condition is purely temporary. Steam coal is in splendid demand. The traffic situation is looked upon by dealers generally as threatening and local coal dealers scoff at the charges recently made by certain state officials that coal cars are being sidetracked purposely by railroads for ulterior purposes. However there is a decided shortage of cars, brought on, so local dealers say by a variety of causes. The heavy sugar beet crop has made a big demand for cars for the transportation of sugar beets which will continue for practically 90 days. Railroads seem somewhat short of motive equipment also which has handicapped the return of empties to the coal fields. Some of the local dealers are complaining bitterly of a shortage of cars in the Pennsylvania coal fields which has greatly handicapped them in securing supplies. This they claim is not noticeable in nearly the same degree in the Ohio fields. Labor difficulties have been a source of annoyance and loss in the latter state and it is stated that there is at present fully a 60% shortage of labor.

Prices as quoted here follow:

	Pocahontas	Hocking	Jackson	Pomeroy	Massillon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.75	$2.50	$2.00	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.75	2.50	....	....
Nut	1.80	1.20	2.25	1.75	2.50	....	....
⅞ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.60	1.35	....	....	....	1.10	1.15
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Despite the warm weather which has prevailed, there has been a good demand for all grades of coal in Ohio. Production is still limited by the car shortage which is growing worse in every district of the state. Prices are firm and inclined to advance. Tone of the market is good.

The feature of the coal trade in Ohio during the past week was the increasing car shortage, coupled with a good demand for all grades. The warm weather which prevailed for a greater part of the week apparently did not lessen the demand for domestic fuel to any extent and thus the trade is in excellent shape. Prices have ruled firm and no cutting of consequence is reported. Prospects for the future, outside of the smaller car supply are believed to be good.

Domestic trade is probably the strongest point in the market. Dealers stocks are generally small and they are trying to increase them for the rush which will come sooner or later. Retailers are busy with deliveries although the warm weather caused a slight lull in the retail trade. Retail prices are strong and no weakness of any consequence is reported.

Steam business is still strong and no falling off is seen in any branch of the trade. Manufacturing establishments are still taking a large tonnage and railroads are also using a fair amount. As the car shortage is mostly caused by a lack of motive power, there is some falling off in the consumption of railroad fuel. Steam prices are firm in every way. The small sizes are in good demand and prices are holding up firmly.

Production has been only fair during the week because of the shortage of transportation facilities. In the Hocking Valley the output is estimated at 60 per cent. and the same is true of the Pomeroy Bend district. In eastern Ohio the output is about 50 per cent. of the average. In the domestic fields there is a large falling off due to car shortage.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75 @ 1.70	....	$2.00 @ 1.90	$1.75 @ 1.70
3-4 inch	1.60 @ 1.55	$1.50 @ 1.40	1.75 @ 1.65	1.55 @ 1.50
Nut	1.30 @ 1.20	....	1.60 @ 1.55	1.25 @ 1.20
Mine-run	1.40 @ 1.30	1.30 @ 1.25	1.50 @ 1.40	1.25 @ 1.20
Nut, pea and slack	0.85 @ 0.80	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack	0.70 @ 0.65	1.00 @ 0.95	0.90 @ 0.80	0.65 @ 0.60

LOUISVILLE, KY.

Practically no change in prices and the supply of gondola cars is short. Some operators are dumping their screenings as there is no sale for this grade.

There has been practically no fluctuation in price during the past week, although there is a pronounced tendency toward even lower figures than those which have prevailed on steam coal, especially the western Kentucky variety. Just one thing is standing in the way of an equally undesirable tendency in the eastern Kentucky steam-coal market, and that is the extreme difficulty of getting suitable cars for handling this coal.

The high-side hopper car question is quite as acute as ever in this section. With the absolute refusal of consignees of domestic coal to accept the "battleships" under any circumstances, operators have been forced to load only steam coal for the larger markets, in this type of car; and inasmuch as there are relatively few consumers willing to accept these cars, even with steam coal, the market is in effect substantially narrowed, and the available supply of steam coal is limited by the supply of gondola cars to a point where it is hardly more than adequate to meet demands.

A somewhat slackened demand for steam coal has resulted from the inactivity of business in some lines. The distilleries have not yet opened up, and there is still some uncertainty as to the extent of the busy season with them; while it is reported that lack of water has caused shutdowns of large manufacturing plants in various parts o state, and the consequent cessation of deliveries of fu them.

A number of mines in both of the big coal field dumping a large percentage of their screenings, findi useless to ship this grade, in view of market conditions. satisfactory movement of the domestic sizes continues, ing the production of screenings much larger than the any possible market for at present, hence the unusual cedure referred to. There seems to be no immediate pro of relief in this connection, as there is small doubt tha demand for domestic will become larger, rather than sm as the season advances and really cold weather begins.

As stated, there has been no change in prices, ea Kentucky block ranging up to $2.25 to $2.35, with scree somewhat slow at 60 to 75 cents. There is practicall market for western Kentucky screenings in this sectio

HAMPTON ROADS, VA.

Fair accumulation of cars at tidewater but little coal. Coal on hand being held for contract tonnage and ernment colliers about due. Quite a fleet of bunker s ers taken care of during the week.

The dumpings over the various piers at Hampton have been about normal. The New England market taken care of practically all the coastwise shipment while there have been some foreign cargoes there have no extra heavy shipments either coastwise or foreign. beginning of the week saw a large fleet of bunker ste taken care of at all piers but toward the end of the the supply of vessels arriving was not so heavy.

While there is a fair quantity of coal now at tide practically all of it is contracted for and is only held w for tonnage to arrive to lift it. Several government liers are about due to take large cargoes ranging 5000 to 12,000 tons each.

No heavy sales of Pocahontas or New River have be ported during the week. Some small lots have been dis of, however, at from $2.85 to $3.

The demand for high volatile coal is still light. quoted for this grade run from $2.65 to $2.75 with no reported.

Foreign cargoes for the week have been made to Zone. St. Lucia, Havana, Naples and Para and Manos,

BIRMINGHAM, ALA.

Little change in market, either lump or steam. on blacksmith coal fair. Practically no change in fu and foundry coke. Pig iron quiet.

This week has brought but little change in the coal ket. Domestic coal, due to the warm weather of the pa days, is quiet for this season of the year, and the ope can hope for no better market until cool weather co Steam coal is rather quiet, there being some new bus but due to the large production, prices are not quite no

Blacksmith coal is about normal with indications better demand shortly. Furnace and foundry coke practically no change over last week, fair demand at prices, with practically no large sales.

The market on pig iron is somewhat more quiet th has been for the past two weeks, no large sales being but with a fair tonnage composed of small sales. Pric holding at $11.50 to $12 for No. 2, foundry for the bala the year, with 25 to 50 cents advance for next year, first

INDIANAPOLIS, IND.

The car shortage continues and tends to stiffen pric domestic coal, which nevertheless has a good movemen consumers' hands. Warm weather in October has against any increased consumption of steam coal or sc ings.

The car shortage that began to show itself with the ing of October, is still cause for complaint. Operators that unless soon relieved it will have the effect of ma prices higher. Some buyers say they are already pa stiffer prices but operators affirm there has been no eral advance, though the market is strong. Where there been any rise, it was on domestic lump, which is in demand at $1.80 at the mines.

Notwithstanding the fact that October weather has be average summer temperature, coal continues to go into sumers' cellars in a way gratifying to retailers. There improvement in the call for steam coal or screenings, the sually fine weather being against them. Terre Haute is the center of the car congestion, which seems worse o Big Four, though the Vandalia is also a sufferer. it is the custom of yards to lay in stocks of Indiana coal ea than September and they prefer to wait until October. result is that there is an aggregate demand which w it starts swamps both mines and railroads.

When corn begins to move, the mines will be lucky, if they get half as much coal hauled as they would like to have. Cold weather will also make transportation more difficult. Some mines are not being operated, yet that does not seem to have much effect in lifting the blockade. The Big Four allows a larger part of the uniform rate for coal to Indianapolis and the gas belt to the originating road than does the Vandalia, so a greater amount of coal is routed by the Big Four and the congestion is greater in its yards and terminals. There is a better movement north to Chicago, than south to Indiana points, it is said. The advance in domestic coals at the mines has been 10c. and 15c., a total of 25c. since Sept. 1. This was promptly added to the retail prices, but the latter have not been changed since Sept. 20.

DETROIT, MICH.

Strength is the predominating feature of the local coal market and this with the car shortage is tending to raise prices. Anthracite is not plentiful and stove size is particularly scarce. Coke prices are firm.

Bituminous—The steam situation in and about Detroit is very active. No slacking off of any consequence is noticeable at the present time, there being a steady demand for steam grades from all the large manufacturing plants which will continue throughout the balance of the year. This will have a tendency to bring the market toward higher levels. Local operators claim that the production has been slightly curtailed over the previous week. This condition seems more acute in the Hocking Valley district where the car supply has probably not been the best; the output has probably not been over 70 per cent. of the normal.

Generally speaking, strength is the chief feature of the coal trade in Detroit. Demand for all grades is running along steadily, which together with the growing car shortage is making quotations firm in every respect. The volume of business that can be done here at the present time is entirely at the mercy of the car supply, which seems to be growing steadily worse, so far as this vicinity is concerned. Tone seems to be satisfactory and the future prospects bright.

Quotations are as follows:

	W. Va. Splint	Gas	Hocking	No. 8 Ohio	Cambridge	Jackson Hill	Pocahontas	Semi-Smo.
Domestic lump..	$1.75					$2.50	$2.75	
Egg	1.75	.....	.....	.....	.....	2.50	2.75	.....
Nut	1.60	.....	.....	.....	.....	.....	.....	.....
Steam lump	1.30	.....	.....	.....	.....	.....	.....	.....
$\frac{3}{4}$ lump	1.25	$1.25	$1.25	$1.20	$1.15	.....	.....	.....
Mine run	1.10	1.15	1.15	1.10	1.10	.....	.....	$1.00
Slack	0.90	0.95	0.75	0.80	0.80	.....	.....	0.85

Anthracite—This fuel is not as plentiful in the Detroit market as it was some time ago. Stove sizes are especially scarce and dealers are urging their customers to take a mixture of egg and stove. Jobbers are not hesitating to ask a premium of 35c. per ton for stove anthracite. The other sizes do not seem to be coming along in great abundance. The scarcity of box cars is given as reason for the slight shortage on hard coal and certain operators are asking permission of the dealers to ship their anthracite in open cars.

Coke—Prices on coke especially Semit-Solvay and gas are very firm. Semit-Solvay is being quoted at $3.70 and gas house at $3.25 ovens. The above cannot be said of Connellsville, because in some instances the foundry size has been quoted as low as $2.50 per ton.

CHICAGO

The coal trade throughout Chicago continues to be brisk. A number of the operators are sold up to Dec. 1. There is a heavy demand for steam coal and current orders absorb about all of the available supply. Retail dealers in anthracite are buying freely. The coke market remains firm.

All departments of the coal trade in Chicago are on an exceptionally satisfactory basis. There is an unusual demand for Hocking coal and some of the operators have sufficient orders on hand to keep them busy until Dec. 1. None have any free coal. The price of $1.75, the mines, continues firm. Additional strength is being displayed in the coke market, a wide demand for the by-products being noted.

Good prices are being obtained for domestic lump on spot business although a considerable quantity of low-price lump is being received. A large volume of orders is being placed by retail dealers for anthracite coal. Reports furnished by selling agencies disclose that the sales last month were the largest on record and that all indications point to exceptionally heavy business throughout the current month.

Smokeless lump and egg is being offered at $2.50, the mines. The mine-run price remains variable, ranging between $1.40 and $1.50. A new circular price of $2.25, the mines, is being quoted by producers in Franklin County, but there has been no recession in buying. No Carterville coal is being sold for less than $2, the mines, and the operators have about all the business they can conveniently handle. The price for Springfield domestic lump remains firm at $1.75. Screenings are selling at from 45c. to 55c. for the lower grades and from 70c. to 75c. for the higher product.

Prevailing prices at Chicago are.

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.97	2.40@2.55	1.87	3.45@3.55
Screenings	1.27@1.32	1.75@1.85	..22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.85; gas house, $4.65@4.75.

ST. LOUIS, MO.

Warm weather had a tendency to break market, but indications are it will regain. Steam sizes breaking and in the Standard field is given away for freight charges.

A drop in temperature the early part of the present week saved the coal market from going to pieces. As it was, the latter part of last week conditions were very bad locally with a tendency to cover the country market also.

Standard ¾-in. slack was given away for the freight charges, and when it became known the latter part of last week that the O'Gara miners had been paid, the screenings market on high grade fell off in Chicago, which, of course, affected St. Louis to the extent of 10 or 15c. a ton; and as a matter of fact, all sizes dropped.

Franklin County that had been up to $2.25 in our last report, dropped down to $1.75 with a maximum of $2. Carterville got down to about $1.60, as the minimum on domestic sizes, and No. 3 and No. 4 washed went down to $1.05.

The colder weather of this week, however, has strengthened the domestic market some but the steam market is very unsteady. This is a condition that will likely continue now for some time.

The prevailing market f.o.b. mines is as follows:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.10@1.15
3-in. lump	....	....	$1.40@1.50	....
6-in. lump	$1.75@ 2.00	....	1.50@1.60	1.35@1.45
No. 1 nut	1.35@ 1.50	....	....	....
Screenings	0.50@ 0.55	....	....	0.10@0.15
No. 1 washed nut	1.25@ 1.35	....	1.40	....
No. 2 washed nut	1.60@ 1.85	....	1.60	....
No. 3 washed nut	1.10@ 1.15	....	....	....
No. 4 washed nut	1.10@ 1.15	....	....	....
No. 5 washed nut	0.25@ 0.30	....	....	....

PORTLAND, OREGON

British Columbia coal consumers buy from mines at Coos Bay, Oregon, whereas practice has been occasionally to ship coal from British Columbia to Portland. Scarcity of coal predicted for the winter for various reasons.

News has been received that the Coos County Colliers Co., of North Bend, on Coos Bay, Ore., has completed negotiations for the sale of the entire output of the Riverton Coal & Development Co.'s mines, on the Coquille River, the Libby mine on Coos Bay, and the surplus of the Smith-Powers mine in that vicinity, to Vancouver and Prince Rupert, B. C., parties. The quantity will aggregate about 24,000 tons. This is the first instance known where Oregon has shipped coal to British Columbia. In past years it has occasionally been the practice to import coal here from the mines across the line to the north.

The Coos County Colliers Co. is reported as having chartered two vessels to carry the coal, the first shipment to be made at once. The Riverton mine will shortly begin the operation of double shifts and produce 150 tons daily. The Libby mine, too, will put on a night shift. In addition to the above orders, the mines have contracted with Seattle and California buyers for about 10,000 tons of coal.

As a result of the strike troubles in British Columbia prices on Washington coals have advanced during the past two weeks from 25 cents to 50 cents per ton, and indications are that they will go higher.

Following are prices in Seattle on staple and established coals at city bunkers:

Grand Ridge, lump, $5; nut, $3.50; Newcastle, nut, $3; lump, $5; Black Diamond, mine run, $4.25; lump, $7; South Prairie, mine run, $4.25; lump, $7; Renton, nut, $4; lump, $5.

Washington coals in the Portland market, delivered to consumers are quoted as follows: Newcastle, nut, $6; lump, $7; South Prairie, lump, $9.50; Black Diamond, $9.50.

Rock Spring, Wyo., is quoted at $9.50 for nut and $10 for lump, Utah egg is quoted at $9.50, and Australian, what little there is here is quoted at $10.

PRODUCTION AND TRANSPORTATION STATISTICS

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during June and the first six months of this year in comparison to last year, in short tons:

	July		Seven Months	
Anthracite	1912	1913	1912	1913
Baltimore & Ohio[1]	122,214	80,404	825,636	839,103
Chesapeake & Ohio[1]	789	1,571	17,268	10,346
Erie[2]	715,621	765,140	1,008,675	4,970,188
Pennsylvania[1] [2]	952,741	719,944	5,525,010	6,138,175
Virginian[3] [1]	....	100	20	809
Total 5 roads	1,791,365	1,567,159	10,376,609	11,958,621
Bituminous				
Baltimore & Ohio[1]	2,648,032	3,089,536	19,396,094	20,645,446
Buffalo, Roch. & P.[1] [3]	623,864	806,763	4,576,317	5,367,876
Buffalo & Susq.[1] [3]	100,130	147,616	817,159	1,051,151
Chesapeake & Ohio[1]	1,400,867	1,390,703	10,317,818	9,371,471
Erie[1]	18,306	9,616	176,552	283,868
Hunt. & Br'd T. Mt[1] [3]	54,986	112,143	694,181	785,938
New York Central	486,385	721,614	4,412,889	5,190,466
Norfolk & Western[1] [3]	1,999,250	2,148,250	13,065,813	13,579,702
Pennsylvania[1] [2]	3,655,387	4,551,528	26,175,168	28,833,947
Pitts. & Lake Erie[1] [3]	1,129,555	1,130,003	6,156,833	7,431,716
Pitts. Shaw. & North.[1] [3]	140,325	233,664	1,074,208	1,558,512
Virginian[1] [3]	245,087	331,626	1,997,365	2,522,659
Western Maryland	193,282	197,122	1,662,419	1,699,088
Total 13 roads	12,695,456	14,860,184	90,522,116	98,321,840
Coke				
Baltimore & Ohio[1]	368,720	391,485	2,703,015	2,499,815
Buffalo, Roch. & P[1] [3]	49,863	42,962	283,352	339,887
Buffalo & Susq.[1] [3]	24,965	24,604	146,711	180,026
Chesapeake & Ohio[1]	19,976	29,945	145,887	210,483
New York Central	9,598	580	50,358	36,207
Norfolk & Western[1] [3]	97,227	106,351	839,439	946,993
Pennsylvania[1] [2]	1,077,047	1,183,070	7,451,340	8,569,978
Pitts. & Lake Erie[1] [3]	495,675	494,053	3,530,218	4,119,403
Pitts. Shaw. & North[1] [3]	....	....	5,155	9,383
Western Maryland	5,556	4,317	40,531	44,410
Total 10 roads	2,148,627	2,277,367	15,196,006	16,956,585
Coal and Coke, 13 Roads				
January			16,421,839	18,936,646
February			17,787,331	17,546,496
March			19,483,025	17,631,345
April			13,429,367	16,850,690
May			15,635,568	18,986,796
June			16,702,153	18,580,363
July			16,635,448	18,704,710
August			18,396,247	....
September			17,432,358	....
October			18,712,657	....
November			17,815,767	....
December			17,929,632	....
Total, 12 months			206,381,392	

[1] Includes coal from connecting lines.

[2] Does not include company's coal hauled free.

[3] Includes company's coal.

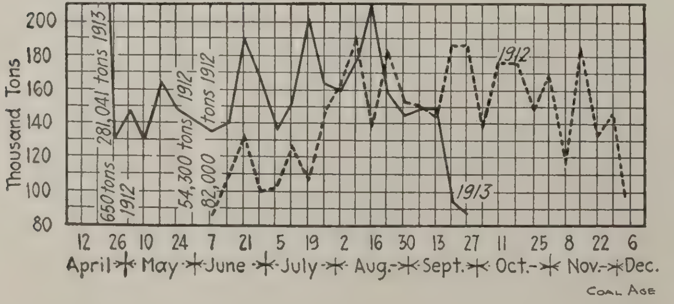
Note.—Southern Railway handled 338,648 short tons of coal during July and 2,409,598 short tons during the 7 months ending July.

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for September and the first nine months, of the years 1912-13, in long tons:

	September		9 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading	888,060	1,184,594	9,504,550	18.54	8,950,472	19.96
Lehigh Valley	1,031,876	1,168,649	9,671,928	18.86	8,287,807	18.49
Cent. R.R. N. J.	788,038	691,253	6,795,406	13.25	5,830,831	13.00
Del. Lack. & West.	834,345	835,316	7,357,984	14.35	6,354,946	14.17
Del. & Hudson	605,071	579,792	5,303,075	10.34	4,536,977	10.12
Pennsylvania	533,439	521,741	4,610,332	8.99	3,948,019	8.81
Erie	669,364	683,026	6,119,302	11.93	5,303,084	11.83
Ont. & Western	222,086	212,125	1,919,308	3.74	1,623,083	3.62
Total	5,572,279	5,876,496	51,281,885	100.00	44,835,219	100.00

Stocks at Tide on Aug. 31 were 575,385 tons as compared with 537,404 tons on July 31.



FOREIGN MARKETS

GREAT BRITAIN

Coals—Best Cardiff coals are fairly well "stemmed," and the price is about unchanged, but all other descriptions of large and small are in good supply for prompt loading and prices have an easier tendency. Colliery owners, while making concessions to immediate buyers, are reluctant to modify forward quotations.

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

Prices are approximately:

Best Welsh steam	$4.74@4.87	Best Monmouthshires	$4.07@4.14
Best seconds	4.38@4.56	Seconds	3.98@4.02
Seconds	4.38@4.44	Best Cardiff smalls	2.43@2.56
Best dry coals	4.38@4.63	Seconds	2.25@2.37

Freights—Tonnage is offering more freely and chartering is fairly active. Rates show some signs of weakening a little.

Quotations are as follows:

Gibraltar	$2.06	Colombo	$3.22
Malta	1.88	Sabang	3.22
Marseille	2.73	Singapore	3.40
Algiers	2.49	Las Palmas	2.24
Genoa	2.37	St. Vincent	2.43
Naples	2.43	Rio de Janeiro	4.30
Alexandria	2.37	Buenos Aires	5.28
Port Said	2.31	Santos	5.11
Aden	2.80		

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Oct. 11.

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	....	....	80	87	80
American Coal Products Pref.	....	....	105	109¼	105
Colorado Fuel & Iron	31¼	27⅛	27½	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com	51½	51	51	53½	47¼
Island Creek Coal Pref.	84½	84	84	85	80
Pittsburgh Coal	22¼	19¾	20⅜	24⅜	14½
Pittsburgh Coal Pref.	92	86½	88	95	73
Pond Creek	22¼	21	21	23¾	16½
Reading	163	159¾	160	171	151⅜
Reading 1st Pref.	..	..	82½	92½	82½
Reading 2nd Pref.	91½	91	91	95	84
Virginia Iron, Coal & Coke	45	44	44	54	37¼

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	95	98	98	Sept. '13	93½	99⅛
Colo. F. & I. gen. 6s	104	104½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	80½	81	80½	81	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	85½	86	85½	Sept. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77	78	78½	Sept. '13	73	80½
Tenn. Coal gen. 5s	98½	99	99	99	98½	103
Birm. Div. 1st consol. 6s	..	101⅞	101⅜	Sept. '13	100⅝	103
Tenn. Div. 1st g 6s	..	102	102	Sept. '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92¼	93½	92⅞	93	92	98

Burns Brothers—Dividend No. 1 on the common, 1¼% and No. 3 on the preferred, payable Nov. 15 and Nov. 1, respectively.

Pacific Coast Co.—Dividend of 1½% on the common and second preferred and 1¼% on the first preferred, all payable Nov. 1.

Colorado Fuel & Iron Co.—For the year ended June 30 last, this company reports a surplus after charges of $1,727,192, which is sufficient to meet the regular dividend of 8% on the $2,000,000 preferred, together with the 75% back dividends due, and still leave a substantial amount over. The back dividends now amount to only 40%, as 35% was paid in March of the current year.

The National Bituminous Coal & Coke Co. (Washington, D. C.)—The bonds of this company are secured by a first lien on about 52,000 acres of coal land and coal rights in West Virginia, 44,800 acres of which are owned in fee. There are eight operations on the property at the following points: Gauley, Peerless, Cedar Run, Crown Hill and Eskdale. The company has large holdings in the Pocahontas field. The production is contracted for up to March, 1914.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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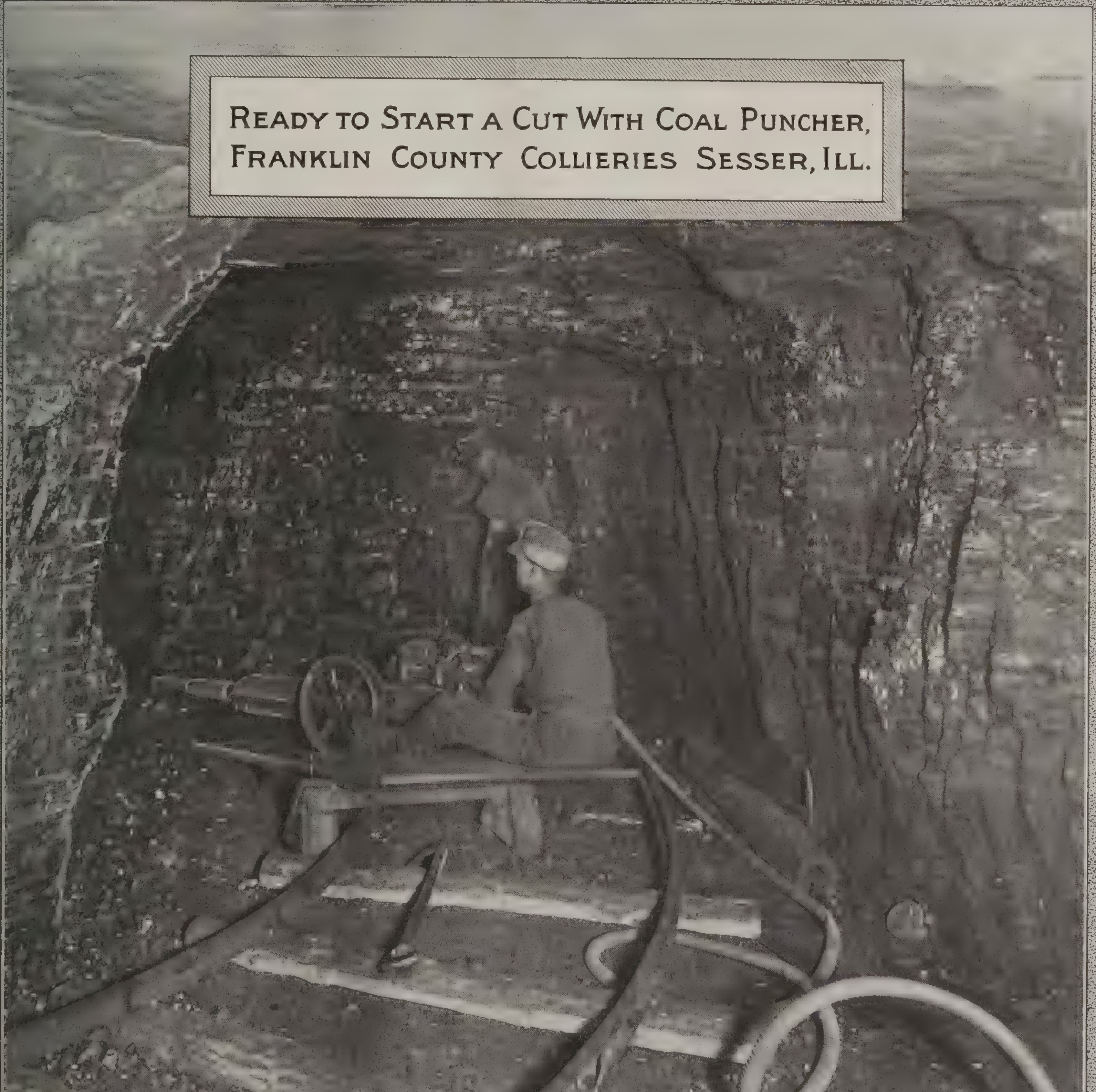
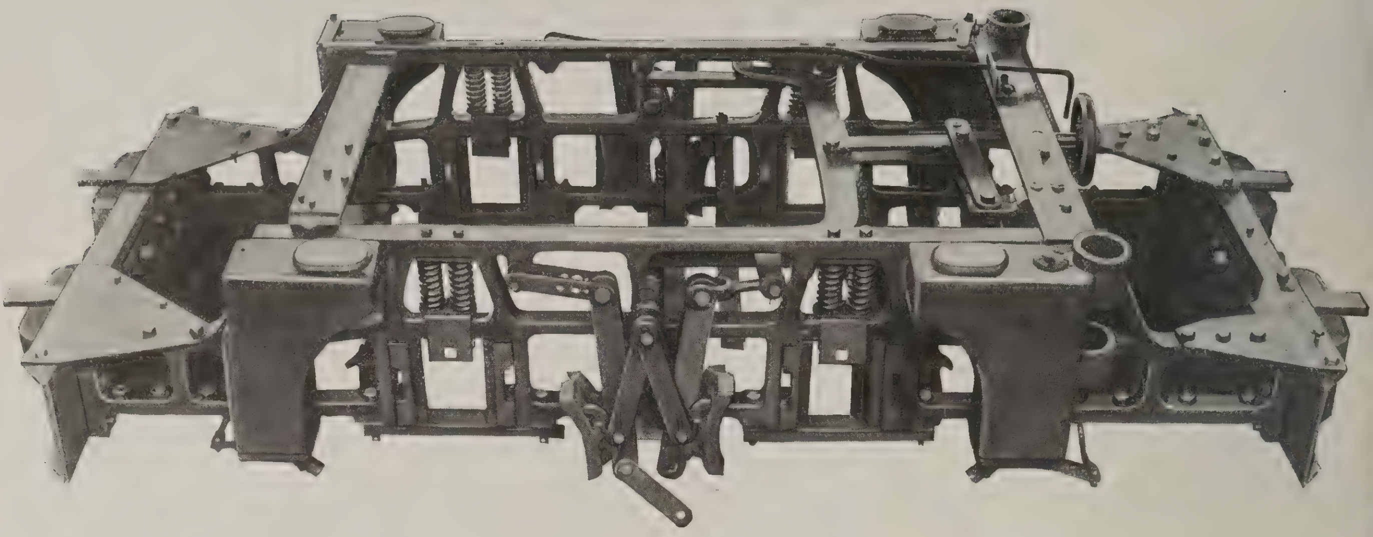


READY TO START A CUT WITH COAL PUNCHER, FRANKLIN COUNTY COLLIERIES SESSER, ILL.



The Cast Steel Bar Frame

(*Barsteel*)

of Baldwin-Westinghouse Mine Locomotives

This frame is of the same type as that used on the famous Baldwin Mikado steam freight locomotives. It is designed to give greater strength than any other type of frame for a specified weight of locomotive and to allow easy access to all parts so that the locomotive can be inspected or overhauled, when necessary, with the least possible cost of time and labor.

The motors; brake shoes; brake rigging and sand boxes are all quickly reached, and excellent ventilation is given to the motors and resistance, through the openings allowed by the ***Barsteel*** frame construction. The journals and the motor armature and axle bearings are also easy to get at for thorough lubrication.

The ***Barsteel*** frame is only one of the important features of Baldwin-Westinghouse Mine locomotives, which give the user the greatest possible service.

Full information can be obtained by addressing either Company.

Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

The frame on this Baldwin Mikado locomotive and the mining locomotive frame shown above are of the same type—simple, accessible, strong and durable.

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any post-office in the United States or possessions, and Mexico. $4 to Canada.

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Go After It

The Weekly Ad-Talk Page

Graham Hood, who writes the little stories of practical, every-day philosophy for the New York *Evening Globe*, recently published one on the importance of a man's equipping himself with the right knowledge and training, in the right way, and at the right time in his career.

To quote a part of it:

"If there is anything that it is absolutely necessary that you should know, especially in your business life, there is every probability that you will in some way manage to acquire this information some time. If you are wise you will go about the work of acquiring this knowledge systematically, beginning at the earliest possible moment.

"Because you fail to do this, however, don't imagine for a moment that you are to go through life in the state of ignorance that you have adopted.

"Even though you might be so foolish as to deliberately elect to know nothing that might help you get on in the world, you can't keep yourself from gaining this knowledge, for the only way to escape the lessons that Schoolmaster Experience teaches is to stop living. As long as breath remains in our bodies we are compelled to continue our studies in this school.

"The mistake that a great many persons make, however, is that of waiting until the knowledge comes to them instead of going after it. It may be true that the knowledge may come eventually, but what are to become of the countless opportunities when the sometime-to-be acquired knowledge would enable you to change a failure into a successful achievement?

"It is true that it costs something to secure this knowledge at first hand. It costs a great deal of time, much patience and persistence, and possibly a little money, but if you could compare the cost of the knowledge you get in this way, and that for which you have to wait until experience can get a chance to teach you, you would be amazed to see how much cheaper it is to secure your training in the right way.

"In the first place, the man who knows just what he wants to do, and exactly how he should go to work to get these results, reduces the possibility of mistakes and failure to a minimum. Mishaps may occur, for it is not easy to devise a positive safeguard against such incidents, but should they happen the man who knows how can usually find an easy way to remedy them.

"It is the fellow who does not know, and who is waiting for experience to teach him, who falls into all sorts of costly pitfalls. Experience does teach him in time, but in the meanwhile he must meet the cost of his experiments, and the expense of tuition in the School of Experience is far in excess of that which is charged for the thorough training that he may so easily secure at the beginning of his career."

The moral is, don't wait until knowledge comes to you—go after it.

It is the Coal Age's business to bring you a fund of valuable knowledge each week—all you need to do is to go after it, to read it. The selling section of this paper represents in reality an enormous, costly system of engineering education, which comes to you every week.

If you don't conscientiously read and study the ads, you are neglecting a great opportunity.

The information is there—*go after it.*

COAL AGE

Vol. 4 NEW YORK, OCTOBER 25, 1913 No. 17

Coal Age is entering the third year of its growth. All expectations have been surpassed. It is probable that this journal now has a larger circulation than any other mining paper in the world. 'Tis a record of which we need not be ashamed.

But with it all, we are not satisfied. We must have the lowest accident rate, although our business is the most hazardous. We must have the most contented body of workmen, notwithstanding the dreariness and drudgery of laboring each day in dust and darkness.

You say, "Fine talk, commendable sentiments, but easier said than done." Of course, it's not easy. The attainment of any ideal condition is the result of persistent effort—so much more reason why we must all lend a hand. At least if we can't render material service to the betterment of coal mining, we can refrain from discouraging those who have their shoulders to the wheel.

The success of every mine official is measured by the results he obtains. It's the cost sheet and the accident roll which most interest stockholders and directors. No manager can carry the burden of his entire operations; he is dependent on the efficiency of his superintendents. The latter are often made or broken by their foremen, and the foremen can't get coal out with safety and economy if the miners are ignorant or careless.

Every man engaged in the production of coal is "His brother's keeper." A "slip-up" in the mines may cost, not one, but many innocent lives. Education is the solution, and no man should be too busy to keep himself informed as to the progress of the industry. Originality and initiative are not everything; ability to grasp and utilize the essentials that have made the other fellow successful is a quality that marks the industrial leader.

If all this be true, then every coal man should regard the papers devoted to his particular business with a sense of proprietorship. They have been created to bridge the chasm between him and his brothers in other fields. He should not only read what they say, but should express his own thoughts, tell of his individual exploits and relate the results of his company's experience.

The manager or superintendent who won't look beyond the limits of his own backyard is doomed. The foreman or fireboss who refuses to see over the fence at his particular colliery is already booked for the discard. The miner who is satisfied to be a miner all his life need not fear that "Opportunity" will lasso him and force honor and success down his throat. Such things happen in dreams, but in real life we labor and fight for all we get.

You want a fireboss' or foreman's certificate —then study our instruction pages conscientiously for a few months, and you'll have no trouble in realizing your ambition. Perhaps your aim is to land a job as "super" at some plant where you can show your real worth; the advance will come to you sure as death if you have the requisite knowledge and ability. The man who is too busy or too smart to absorb further education is booked for an early and indefinite vacation, without salary or old-age pension.

Commence today. Adopt a plan based on so much study per week—it may be only one evening or one hour—the results will justify all the time you can give. And this goes for the man who is sixty, as well as for the one who is twenty; it applies to the mine manager as much as to the man who is loading coal at the face of a room.

And don't forget to show people you are still alive. Enter into our discussions, ask us questions, write an article describing something of interest at your mine. It may all seem commonplace and uninteresting to you, but probably the man at the colliery down the river or over in the next county will get a good idea from what you are doing at your eplant. Coal Age will pay you liberally fo very word published. For instance, if your can write a foreword of 500 words worth printing on this page, we will pay as much as $20 for it. Let us hear from you NOW.

The Certificate Law

By Charlton Dixon*

It is but a few years ago that the mine foreman was not required to pass an examination to prove his ability to fill that position in the mine. Before the adoption of the law requiring the certification of mine foremen, the entire country presented a wide field for employment. The mining man could go to any coal-mining state, and a position was open to him if he was a competent man. This condition had the advantage that many good men found their way to different states and districts.

That day has passed. The certificate law, so prevalent in most mining states, practically confines men to a certain prescribed territory, as it prevents their going to other states, without taking another examination and obtaining a certificate in that state.

When one reflects that the conditions, in different states, are very much the same in respect to the methods and systems of mining, the laws and regulations controlling the operation of mines, as well as labor conditions, it would seem only a wise provision if each coal-mining state would pass a law *making the holders of a duly authorized certificate of competency in another state, eligible to hold a like office in that state also.* The law could be so drawn as to protect the state against imposition, by specifying certain limitations to govern the practice.

Such a law would encourage the interchange of intelligent mining men and could not fail to prove an advantage. It would also provide a means by which ambitious young men could obtain a wider experience and increase their competency. It would prove a particular advantage in those states where a certificate law had been in force for several years, and, in which, as a result, there is an over-supply of qualified men.

The British Government granted such a privilege to her qualified officials some years ago by sending them to the colonies where, in many cases, the language and conditions differed materially from those with which they were familiar. The idea is worthy of consideration, and a discussion of this subject would be interesting and profitable.

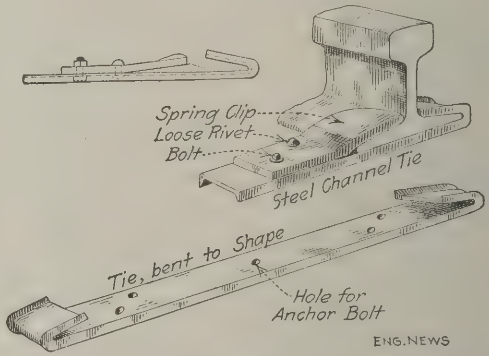
⁂

A Steel Channel Tie for Mine Tracks

The steel tie is becoming the approved support for the rails in the rooms of mines, largely because of the economy of space its use affords. It seems, however, that it has a marked adaptability for outside and heading tracks. It is true that it tends to bend when subjected to the heavy straining thrusts of the hoofs of mules, and these thrusts also tend to move the tie from its proper place in the track. These defects are met, however, by the W. H. Coffman tie, because instead of the bearing surface being flat, it is channeled, which increases its strength and by indenting the floor prevents slipping.

It would seem that the saving in ballast is an advantage which would serve with the reduction in the ties needed, to pay for their greater cost. Where the floor is hard, the laying of a few steel ties on the bottom of the cut or on the top of the bottom rock will be better than using wood ties and bringing in crushed ballast from outside. The maintenance of ditching with a shallow track is cheaper than with one which is of standard depth, especially where that track has to be kept close to a traveled road, as in a mine heading.

The ties are made of ½-in. steel, and they weigh from 1.75 to 1.90 per running foot. They have already been in use for years. *Engineering News* thus describes the tie: A form of steel tie for mine tracks, which is now being introduced in the mines of the Pocahontas coal field, consists of a light channel having the ends bent back so as to fit over the outer side of the rail base. The fit is close enough to require the rail to be driven in with some force, thus insuring a tight grip on the rail. On the inner side of the rail is a clamp held loosely by a rivet, so that it can be swung aside to allow the rail to be placed in position. The clamp is then driven back into line with the tie so that it grips the inner side of the rail base. A bolt can be fitted in the tail of the clamp, to keep it from working loose, but this is rarely used, as the clamp is slightly sprung when driven on the rail, so that it exerts a direct pressure and would require some force to displace it. At the middle of the tie is a hole for an anchor rod which is driven in the roadbed and prevents creeping of the track, but we are informed that this is not always necessary.



Steel Channel Tie for Mine Tracks, with Spring Clip Fastenings for the Rails

The channel is 2x$\frac{9}{16}$ in., $\frac{3}{16}$ in. thick, and is bent cold to shape in a machine specially designed for the purpose. A form of steel tie used somewhat extensively in these mines is made from a flat bar 1½x½ in., weighing 2.55 lb. per ft., but this is not so stiff as the channel of lighter weight. The price for the channels, however, is a little higher than that for the bars. For track of 44-in. gage the channel is 50½ in. long, and the two spring clamps are 6 in. long. Such a tie will weigh 9½ to 10 lb.

A special advantage of the steel tie is its shallowness as compared with wood ties, and it is said that this is sufficient to enable 8 or 9% more coal to be carried in each car. It also enables the rails to have a bearing on the floor of the mine, so that track will keep in better surface than when the rails are unsupported between the ties. Under these conditions it is stated that the steel ties may be spaced 5 to 8 ft. apart, especially if the cars are not heavy and are operated by mules. Some of the steel ties, however, are used on tracks operated by electric motors. Separate short pieces of steel channels (not attached to the rails) may be placed longitudinally under the joints or at intermediate points.

These steel channel ties and the bending machine used in their manufacture are the invention of W. H. Coffman, Bluefield, W. Va.

---

*3010 Banksville Ave., Pittsburgh, Penn.

Mining Low Seams of Anthracite

By Hugh Archbald*

SYNOPSIS—A discussion of the methods and difficulties of working thin seams of anthracite, with particular reference to the adaptability of machines. It is the general impression that hard coal cannot be successfully mined with machines. Some remarks on longwall practice in the anthracite regions are also made.

⁂

A few years ago a seam of anthracite coal 30 in. in thickness would have been disregarded in making any estimate of the possible tonnage which could be obtained from a colliery. In a suit decided in 1899, where the proper prosecution of a lease on a certain tract was involved, it was held from the evidence produced that such a seam was unminable. Nowadays, however, a large amount of coal is obtained from small seams from 2 to 3 ft. in thickness.

This is especially true in the Lackawanna Valley, where the thicker seams have been almost exhausted as far as first mining goes. The Mine-Cave Commission, appointed by the governor of Pennsylvania to investigate the caving of the surface in the anthracite region, reported that there is only sufficient coal left under the city of Scranton to last 20 years at the present rate of mining; the same commission reports that there is enough coal in the Schuylkill region to last four hundred years. It can, therefore, be seen that there is not, at the present time in the Schuylkill region, the necessity for mining the smaller seams that exists in the Lackawanna district, where the mining of low coal is the general practice, the price of anthracite being such that this can be done at a profit.

One distinct difference between these regions, is the position of the seams. Throughout the Lackawanna Valley the seams lie almost flat, so that there is little pitch mining and practically none on any heavy pitch, whereas in the Schuylkill region, most of the mining is done on the pitch, flat seams being the exception. Pitch mining has the advantage over horizontal in the fact that the miner can stand up when boring a hole for blasting and also that he is not compelled to do any shoveling.

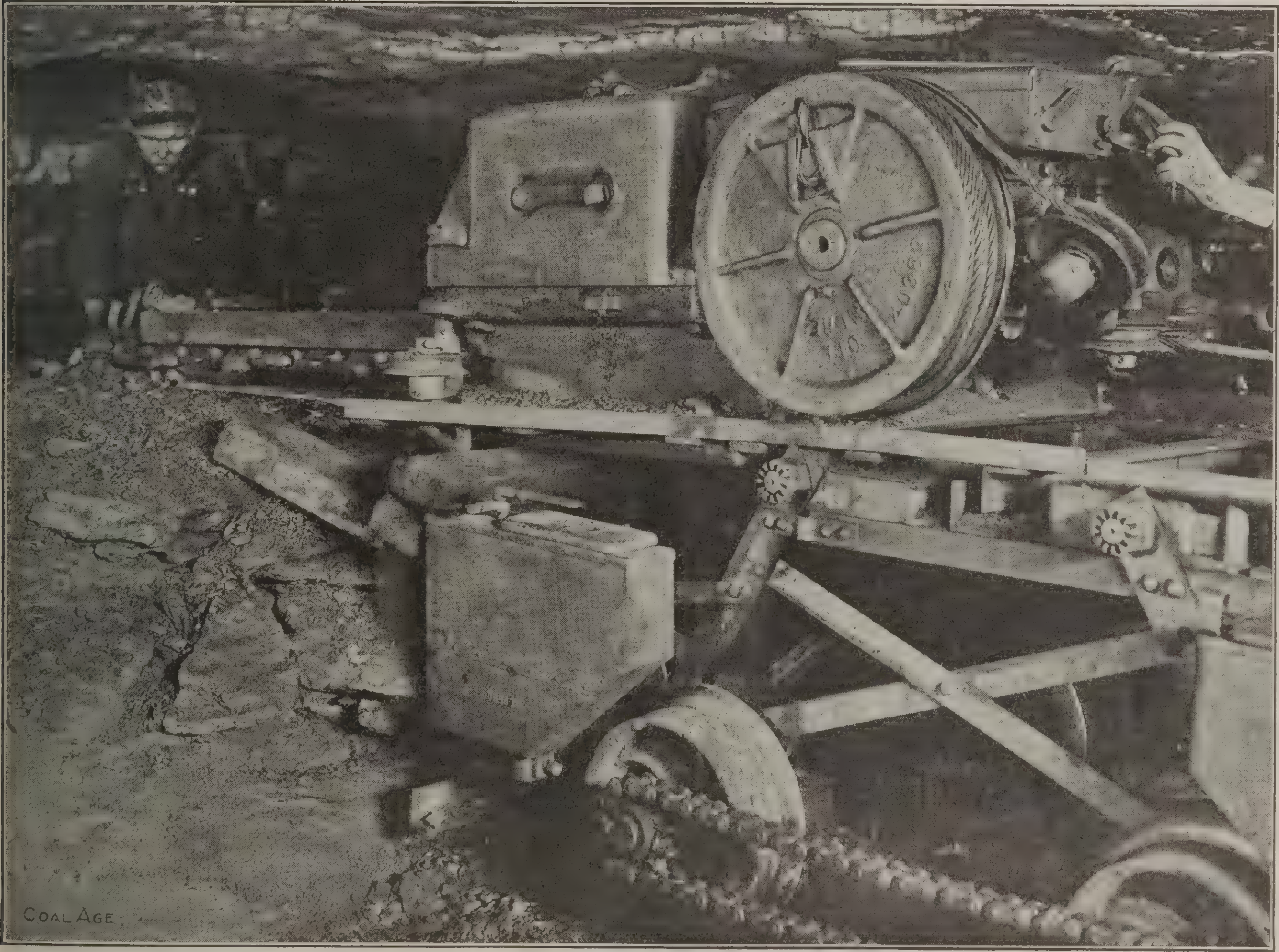


Fig. 1. Goodman Cutting Machine Being Loaded onto a High Truck

Early Method of Working Subjacent Seams

In this region the first mining was done on the room-and-pillar method, and it has not been customary to draw the pillars until the whole seam has been worked out. As a result there are large areas with pillars still standing from which coal will be obtained for a number of years to come. As there are a number of overlying seams, the leaving of pillars in one seam has necessitated the leaving of those in the seams beneath, in order not to break them by any movement of the subjacent strata.

---

*Cresson, Penn.

It has not always been realized, though, that the coal would ultimately be won from the pillars, this being especially true in the early days when the best seams were being mined. At that time no care was taken to drive the rooms with any regularity or to leave strong pillars, a seam being considered worked out as soon as there was no more room for chambers. The result has been that the small pillars left standing have weakened from air chipping, and squeezes have occurred over large areas, affecting all the seams above. This has meant, in some places, the loss of as much coal as is contained in the small seams which are now being mined.

The method employed in mining the thin seams has generally been the room-and-pillar system, as they underlie other seams from which the pillars have not yet been withdrawn. The exception to this rule occurs in those cases where the small seam happens to be uppermost; when this is the case, the coal is mined on the longwall system, either by maintaining roads at chamber intervals, blasting down the top rock or taking up the bottom in order to give height for the passage of the mine cars; or sometimes the panel longwall system is used with conveyors for loading the mine cars and a face from 200 to 250 ft. long. In this latter case, the coal is first undercut by machines and then loaded into the conveyor by hand.

Mining Machines in Low Seams

The use of undercutting machines in the anthracite mines has not become at all general, there being less than one hundred in the Lackawanna Valley at the present time. But a few have been in use long enough to demonstrate that they are as advantageous in mining anthracite as bituminous. The universal practice is shooting off the solid. It is to be expected, now that only the small and hard seams are left, that mining machines should come into more general use.

In mining some of the 30-in. seams of coal, it has been found that as much as 50 per cent. of the coal was broken into the smaller or steam sizes. As a higher price is obtained for the larger or domestic sizes, this is, of course, a great loss. An advantage in the use of undercutting machines is the increase in the amount of large sizes secured. The cuttings from a machine are merchantable sizes, being mostly pea coal and No. 1 buckwheat, with some chestnut mixed in.

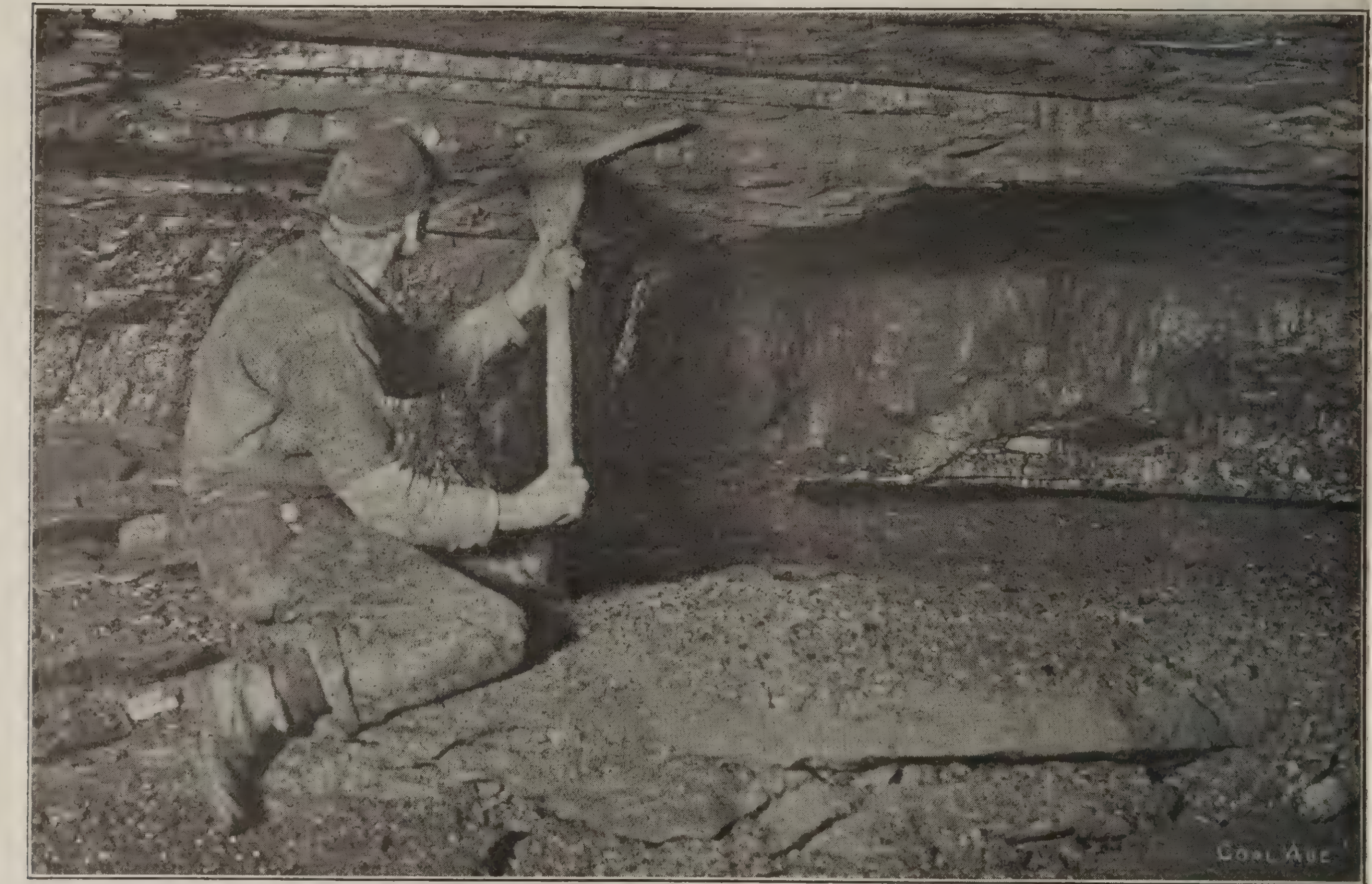


Fig. 2. Cutting in a Thin Seam at the Cayuga Mine of the D., L. & W. R.R. Co.

Machine Mining of Anthracite Coal

The generally accepted idea that anthracite coal is too hard for the successful operation of undercutting machines is wrong. They have been used to an advantage in places where the coal was so hard that a miner could only blast three and four cars with a keg of powder. Where the coal is as hard as this, a machine cannot cut much more than three places a day, but the cost of mining is reduced when a machine cuts between two and three places per shift. Nor is this confined entirely to low seams of hard coal, but has been a success in five feet and more.

In a hard seam there is greater loss from coal being blown into the gob than where it blasts easily, though even in free blowing coal there is some loss from this cause. This is due to the fact that a greater amount of powder has to be used and the lack of care in the arrangement of the gob. When the waste is piled up in neat order with walls, the coal scattered by the blast will fall on clear spaces where it can be easily recovered, but this is not the case when the flying pieces fall on the rough surface of the gob.

Roof Brushing vs. the "Buggy"

One of the large items of expense in mining low coal is the rock blasting. Where not more than two feet to two feet and a half of bottom or top has to be removed to give height, it is easier and cheaper to blast this and carry the track to the face. But where a large amount of rock has to be moved, it is more economical to employ a small car, or "buggy," into which the coal is first loaded and then unloaded into the mine car at the mouth of the chamber. The "buggy" is handled by the miner and his laborer, though sometimes a mule and a rope are used to draw it back and forth.

The "buggy" stands low, somewhat less than the height of the seam, so that it can run on a track placed in the chamber, and will hold usually about half a mine car of coal. The cars which are used in the Lackawanna region have a capacity of from two to three tons of coal. Frequently the high standing car, which was well adapted to the large seams of former days, has been still employed in the smaller ones now being mined, necessitating the cutting of a large amount of rock to give height. Along main roads it is well to maintain sufficient height, so that a man can stand upright, but this is not as essential in the chambers, where the greater part of the rock cutting is done.

System of Mining with the "Buggy"

In places where a "buggy" is used to load out the coal, enough bottom rock is taken up at the mouth of a chamber so that a switch may be laid in. The cut is made deep enough so that the mine car stands below the buggy in order to facilitate the loading. The chambers are driven in this case about 200 ft. long. Where undercutting machines are used, they are fitted with a special truck about 33 in. high, in order that the machine may be loaded and unloaded onto the bottom rock in the chamber. The height of the undercutting machine is 24 in., so that with one of these high trucks, a clearance of 57 in. above the rail must be maintained along the gangways. This is no more than is usually kept for the loaded car and its topping.

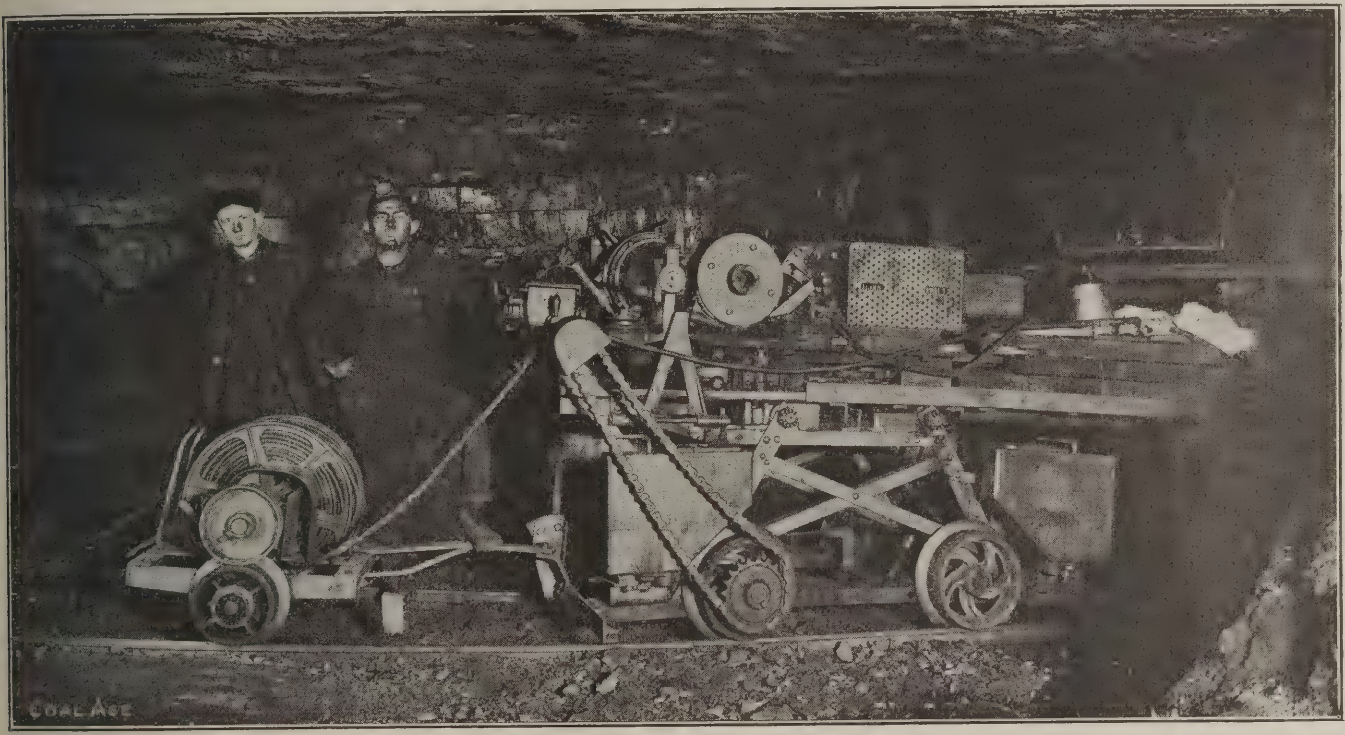


Fig. 3. Complete View of Machine Equipped with a High Truck

In Fig. 1 is shown a Goodman machine in use at the Cayuga mine of the D., L. & W. R.R. Co., being loaded onto a high truck after having made a cut; Fig. 2 shows the seam and the undercut which the machine has made. In this case the coal is from 30 to 36 in. high and above that is about 8 in. of bone. About 3½ ft. of bottom rock is taken up here. In Fig. 3 is shown another view of the undercutting machine shown in Fig. 1; this view shows the chain connections by which the machine is moved under its own power, and also the cable reel, which works automatically. The "buggy" can also be seen at the right-hand side, standing above the end of the machine; this gives an idea of the amount of rock that is taken up at the mouth of a chamber, it being quite thick but not covering a great area.

The chambers are driven about 200 to 250 ft. long and from 24 to 30 ft. wide, according to the conditions of the roof. Any greater depth than this consumes too much time and labor in the movement of the buggy back and forth.

LONGWALL MACHINE MINING

In one mine, where exceptionally strong roof occurs, the scheme has been tried of driving two narrow places to the full depth by means of a buggy, leaving a small pillar eight or ten feet wide between them. When they have been finished, an undercutting machine is used along the rib on opposite sides of each of the places, thus allowing the machine to make one long undercut before moving to another place. The real mining of most of the coal is then done by widening a narrow place. Loaders follow up the undercut, loading out the coal by means of a "buggy." The narrow places are driven in pairs and a strong pillar is left between each pair of chambers.

By the use of a "buggy" a saving in the cost of mining is obtained on account of the reduction in the amount of rock handled. There is not always room, in small seams, to stow the rock on the side of the chamber, so a great deal must be packed in other portions of the mine. Another advantage in the use of a "buggy" is the continuity of the work on coal, as the miner is not employed every so often in blasting rock.

In a certain panel longwall system in use at some places, gangways and airways are turned off from a main road at 500-ft. intervals. As soon as the gangway has advanced far enough to provide a strong pillar along the main road, two places are driven in to a depth of 225 ft. Allowing 50 ft. for the gangway and airway and the pillar between them, this will make the depth of the place equal to half the distance between the roads. After the places are driven in, a conveyor and an undercutting machine are installed. The undercut is made parallel to the main road and in the beginning it is made along the rib of the narrow place. One-half of the block of coal is mined advancing and the other half retreating.

The undercutting of the coal is done at night, the face being about the length that a machine can undercut in an average of nine hours. The conveyor is moved forward also at night, and is kept as close to the face as possible and still allow room for the movement of machine and men. The coal is loaded into the conveyor by hand during the day. A 30-in. seam will produce about 150 tons from an undercut 6 ft. deep, which is about as much as can be conveniently loaded in one shift in the cramped quarters of such a seam. An advantage which the use of the conveyor and the panel longwall system has, is the concentration of the work. Moreover there is the least maintenance of roads and branches.

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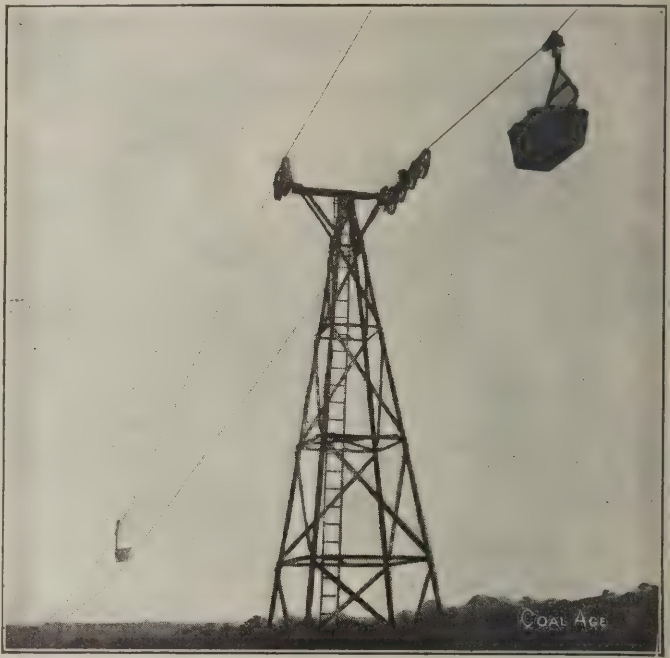
Aerial Ropeway at English Colliery

Among the more interesting equipments recently installed in British Collieries is an aërial ropeway at the Bayton Colliery in Shropshire. It is interesting as being the first case in which the makers have adopted a positive rope saddle for a single-cable ropeway. In this case one rope both supports and hauls the carriers. The ropeway is 7030 ft. long and has been built to carry coal from the screens at the colliery, delivering it to railroad cars on the colliery siding close to the Cleobury Mortimer Station. At the colliery end of the line there is a main coal bunker, which has four sections for storing different sizes of coal, the classification of the coal being done by a shaking screen located over the bunker. The ropeway buckets are loaded by gravity, there being eight loading chutes, so that all four classes of coal can be loaded, if necessary, at the same time, and carried to different railroad cars at the siding.

At an angle station, situated about the middle of the ropeway, the rope makes a turn of 104½ deg., and arrangements have been made so that coal can be discharged at this point. The ropeway passes over two main roads between the colliery and the siding, but it has not been considered necessary to provide safety bridges at these points, reliance being placed on the grip of the rope saddles.



VIEW OF STANDARD, BAYTON ROPEWAY

The standards are built of steel sections and vary in height from 25 to 50 ft., according to the varying contour of the ground. Four steel sheaves are used to support the loaded rope and two similar sheaves for the no-load rope on the return side of the standards. They are bushed with phosphor-bronze and mounted on balancing arms, so as to divide the stress equally between them. The spindles on which they are carried, have a hole drilled through the middle and a Stauffer lubricator fixed at the end, which can be filled with grease or have the caps tightened, while the ropeway is working. The discharge terminal is 76 ft. long and allows the simultaneous loading of three railroad cars without their being shifted, as it has a shunt rail onto which the carriers run to the required position for loading the cars. It also

DISCHARGING AND RETURN TERMINAL

contains apparatus that automatically and continuously maintains the working tension on the ropes. A telephone line connects the loading and discharging terminals and also the angle station.

THE DISCHARGE OF THE BUCKETS

The buckets on reaching the discharging position are tipped into chutes, provided with anti-breakage shutters, to lessen the degradation of the coal as much as possible. As they leave the rope to pass onto the shunt rail at the terminal, their weight is taken by the inner wheels and the position of the grip is such that its movable jaws are able to easily clear the rope. The actual amount of this clearance is about ¾ of the diameter of the rope, leaving plenty of play in reserve for the time that the carrier leaves the shunt rail to run onto the rope.

When the movable jaws of the gripper have closed onto the rope, the whole of that clamp is clear of the under side of the latter, allowing it to easily pass over the supporting sheaves without fouling them. It is stated that this form of gripper is not affected by frost or snow or even by an excess of lubricant on the rope and that loads can readily be taken up a gradient of 1 in 1½ or even 1 in 1. Another advantage of this gripper is that buckets can be carried around the return terminal without being stopped or detached from the rope or handled in any way. This is unusual in single-rope systems.

The installation is designed to carry 39 short tons of coal an hour, but this capacity could be increased by adding further buckets. Special carriers are provided for bringing up pit props and other materials from the railway to the colliery.

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German Methods of Allaying Stone Dust

Some notes on recent Prussian practice in allaying the dust resulting from the drilling of boreholes are contained in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1. The increasing amount of rock work in coal mining and especially the development of machine drilling makes this provision of no little interest.

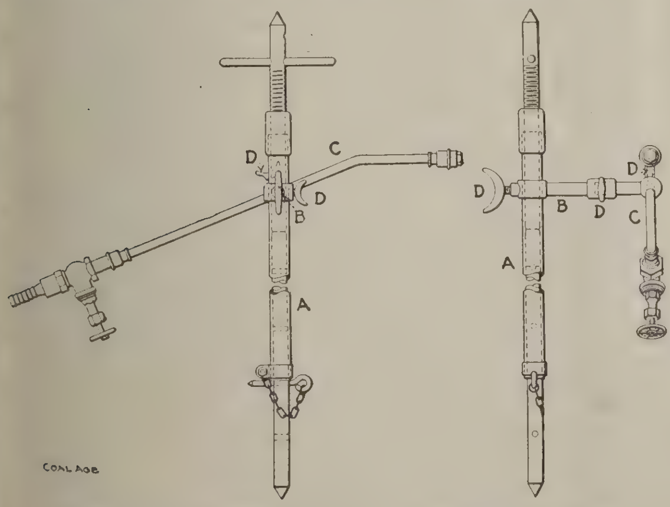

FIG 1. APPARATUS FOR ALLAYING DRILL DUST

At the Richter shafts of the Laurahütte coal mine in the North Kattowitz district, a water jet is used to remove drill dust from holes bored in the rock by compressed-air hammer drills. Wrought-iron gas pipes about 0.4 in. in diameter and 4 ft. long are connected by hose with the water piping and introduced into the hole during the work of the drill so that the water continuously removes the drill dust.

At the Monopol mine in the Dortmund I mining district, a water-jet device has been used with excellent success to render the stone dust of machine drills harmless. This is shown in Fig. 1. It is comprised of a mounting column *A*, similar to a drill post, which extends from floor to roof in the middle of the roadway. Upon it one or more movable brackets *B* are affixed according to the number of holes to be drilled simultaneously. On the ends of these arms are carried sprinkling pipes *C*, which can be revolved and moved longitudinally. They are equipped at the front ends with brass or bronze nozzles, while the rear ends which are provided with valves are connected with the water-supply piping by rubber hose. The valve of each pipe is so adjusted that a fine stream of water flows from the nozzle. The jet of water is arranged to strike exactly in the drill hole and is clamped in this position by the winged screw *D*. Experience has shown that a water jet about 0.04 in. thick suffices to moisten the waste from a hole so as to prevent the formation of a cloud of dust. Since the workmen are not annoyed by so small a quantity of water and as the apparatus is easily and quickly manipulated, they are willing to use it.

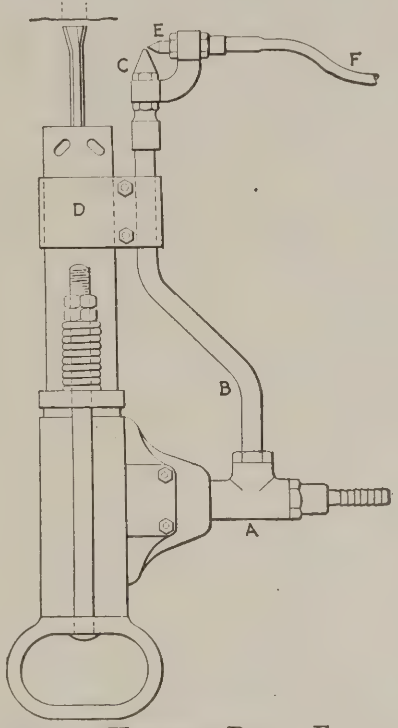

FIG. 2. HAMMER DRILL FITTED WITH A WATER JET

To obtain a similar end an appliance is being used in the Schlägel und Eisen I-II mine in the East Recklinghausen mining district. This is patented by Herr Voss and called a "dust destroyer." It is manufactured by the Glückauf Drill Factory, in Gelsenkirchen, Germany. As shown in Fig. 2, the apparatus consists of the small tube *B* connected with the T-piece *A* and the collar *D* on the hammer drill. This little tube ends in a nozzle *C*. Perpendicular to this is another nozzle *E* connected with a hose *F*. When drilling, this is hung in a water tank. The T-piece *A* is connected with the compressed-air piping so that a part of the air flows through the little tube *B* and the nozzle *C* and sucks a supply of water through the nozzle *E* and the water hose *F*. This is finely sprayed around the drill hole thus continuously allaying the stone dust as it forms in drilling.

Since the fixture is fast connected with the hand-hammer drill, the workmen are compelled to make use of it.

POWER DEPARTMENT

The Utilization of Exhaust Steam

SYNOPSIS—In using low-pressure steam from hoisting engines, some kind of accumulator is necessary. A device is here described which is flexible in that it accommodates itself, within limits, to a varying supply of exhaust steam.

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In many collieries the problem of the efficient utilization of the exhaust steam from the hoisting engines, making a large intermittent demand on the boiler capacity, is a perplexing one. Even when run condensing these machines do not utilize the full heat value of the steam. Attempts have been made to secure further thermal efficiency by passing the exhaust through turbines on its way to the condenser.

Providing that the condensing arrangements are effective and the vacuum maintained is high, it has been proved in practice that a considerable increment of power can be thus obtained. This is generally utilized in driving electric dynamos, from which auxiliary machinery can be economically run.

Much trouble has, however, occurred in the past, owing to the fact that the power demand of the hoisting engines is intermittent and hence the supply from the exhaust may vary in a ratio of as much as five to one, comparing the maximum with the mean output.

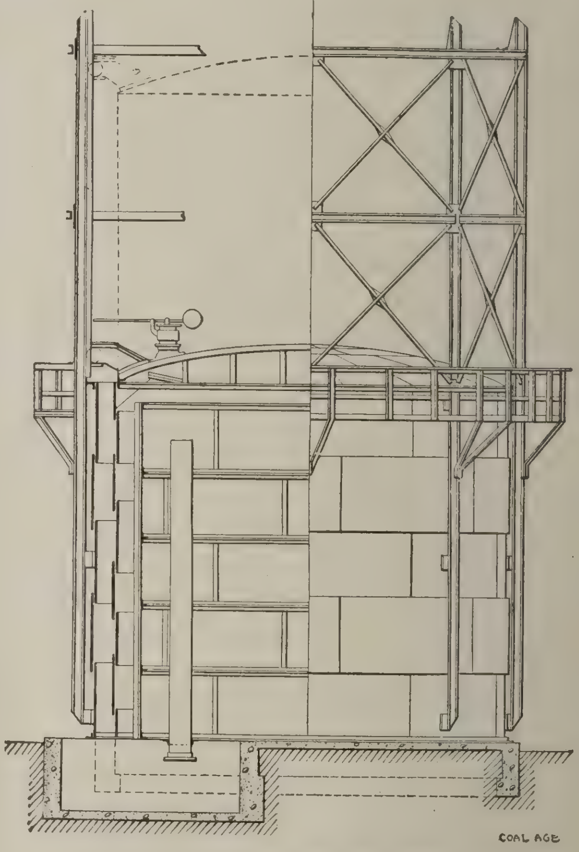
This obviously imposes a considerable difficulty in the proper use of exhaust steam from this source, because in order to utilize the whole amount, a low-pressure plant of sufficient capacity to deal with the maximum output, would have to be provided, which for considerable periods would operate at but a small proportion of its rated output. Where electrical power is obtained in this way, some form of electrical storage could be adopted in order to equalize supply and demand, but the expense of equipping and maintaining a storage battery becomes a serious factor in the adoption of such a scheme.

Steam Storage Is Advantageous

It is evident therefore that suitable storage, located between the main engine and the exhaust-steam equipment, would have many advantages, and numerous attempts have been made in this direction. In many situations compactness and simplicity are essential features in connection with exhaust-steam accumulators, and one of the successful types which has been adopted in practice is that illustrated herewith. It is made by Messrs. Louis Schwarz & Co., of London.

The exhaust steam leaving the primary engine in a fluctuating manner is collected in an inverted bell accumulator, similar to a gas holder, without regeneration. An intermittent supply is thus changed into a continuous stream passing at an even tension to the low-pressure machine. The simplicity of construction and reliability in operation make it a simple and easy means of surmounting the difficulty outlined above.

The accumulator consists of a riveted wrought-iron or mild-steel bell, contained in a structural-steel framework, and so arranged that it is freely movable in a vertical direction. The pressure of the steam thus remains constant irrespective of the variation of the volume of the space between the bell and the stationary floor of the accumulator.



Half Section of Receiver

The bell dips at its lower end into a water seal and an easy upward and downward movement is obtained without tilting or jamming by means of suitable guides and guide wheels or similar devices in exactly the same way as the gas holder is constructed. On the inside of the bell internal ribs and girders are provided to resist pressure.

The bell is constructed of an ample capacity in relation to the output of the primary engine in order to give a storage proportionate to the usual ratio between maximum and mean demand. There are, however, frequent occasions in practice when this ratio may be exceeded.

Overloads and Underloads

On the one hand the primary engine may operate on an overload larger than that originally intended, or for a longer period than the storage capacity of the bell was designed for. In this case there will be an excess of steam, and in order to allow its escape in the event of the bell rising to the full extent of its travel, there is provided a suitable safety valve. This allows any surplus steam to blow off, is large enough to prevent a dangerous increase of pressure inside the accumulator, is automatically opened just before the bell reaches its top position and closes again when descent has begun.

On the other hand, the primary engine may be operated on light loads for a considerable period. In this event there will be a shortage of exhaust steam compared to the demand of the low-pressure equipment. In such cases it is necessary to admit live steam to the accumulator should the ordinary supply be insufficient for the requirements of the secondary engine. This is also automatically provided for. When the bell falls to a predetermined point, shortly before its arrival at its lowest position, a valve is opened by means of a suitable mechanism arranged therefor and live steam is admitted to the accumulator.

This steam then expands to the pressure for which the bell is arranged and a further supply is automatically cut off as soon as the accumulator regains a certain height, which can also be predetermined.

In order to prevent, in case of a shutdown, the possibility of a vacuum being formed in the bell or in the pipes leading thereto, an automatic air valve is provided. The necessary drain valves and pressure gages are also suitably located.

Surface Condensation Is Reduced

In order to reduce the condensation of steam, due to surface radiation, to a minimum, a coating of heat-insulating composition is placed over the bell, so applied that there is no danger of its being displaced in working. The floor of the accumulator consists of concrete which also serves as a foundation. This is in consequence suitably thickened under the side walls and around the piping leading into the accumulator.

Between the main engine and the accumulator an oil extractor is fitted in order to eliminate the oil and impurities from the exhaust steam. This is necessary because it would be disadvantageous to allow oil to pass through the turbine into the condenser and thence to the boiler. It is also desirable that back pressure be reduced as far as possible as this lowers the initial pressure of the exhaust-steam plant. A device has been produced which accomplishes both these results admirably, the steam reaching the low-pressure apparatus being said to contain only 0.001 per cent. of oil. Moreover, the oil thus recovered can be filtered and used over again.

The accumulator above described would appear to be a valuable means of reclaiming waste power from an intermittent supply of exhaust steam. Its compactness, simplicity and reliability are strong features in its favor.

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The Norfolk & Western Electrification

The Norfolk & Western R.R. has decided to electrify that portion of its trackage lying between Bluefield and Vivian, W. Va. Including branch and feeder lines, this amounts to about 85 miles.

The carrying out of the contract which has been already let will give form to one of the most important projects of steam-railroad electrification yet undertaken. This contract calls for the manufacture and delivery of twenty-six 130-ton electric locomotives of the single phase-two phase type, together with all required power-house generating machinery and transmission apparatus.

Single-phase alternating current at a frequency of 25 cycles and a tension of 11,000 volts will be supplied to the locomotives through an overhead trolley wire. This is the same type of system that has long been successfully used by the New York, New Haven & Hartford R.R. on its main line, by the Boston & Maine in the Hoosac tunnel and by the Grand Trunk Ry. in the Sarnia tunnel, also by the New York, Westchester & Boston Ry.

The Norfolk & Western locomotives besides being large and of enormous hauling capacity, will embody many unique features and refinements of design, which it is expected will result in their showing unprecedented flexibility and economy of operation.

The Bluefield-Vivian section serves the Pocahontas coal field, which is one of the largest and most celebrated coal regions in the world. The coal handled amounts to 65,000 tons per day, necessitating trains weighing as high as 3250 tons. It was in order to facilitate handling this heavy traffic that electrical operation has been decided upon. There are a number of grades on this section, the maximum being 2 per cent. At the present time, three Mallet locomotives are required per train, one at the head and two pushing. Only two electric locomotives will be required for this service and the speed will be approximately doubled.

Three Speeds of Operation

Since the Norfolk & Western locomotives are intended for handling what is called tonnage trains, they will be built for running speeds of approximately 7, 14 and 26 miles per hour. The design of the electric equipment will be such that the tonnage can be readily increased in the future as the service may demand. The traffic conditions on this section of the road are especially well adapted for electrical operation. It is in reality a separate engine division at present and can therefore be operated electrically without affecting locomotive service on other sections of the line.

Power for the entire electrified section will be generated in one central station, located at Bluestone, W. Va., with an installed capacity of 27,000 kw. in turbo-generators. All of the electrical apparatus including the locomotives, will be supplied by the Westinghouse Electric & Mfg. Co.

Conditions that are conducive to high economy in an electrification like that of the Norfolk & Western, are: (1) Traffic requirements such that a minimum electrical equipment will give practically continuous service. (2) Fewer engine crews will be required per train. (3) The speed of operation over the division will be nearly double that possible with present steam equipment. (4) Increased capacity of electrified section. (5) Electric locomotives are not limited to short hours of service, on account of boiler or fire conditions, as are those propelled by steam. (6) Watering and coaling delays incident to steam operation will be entirely eliminated. (7) The general reliability of locomotive operation will be considerably improved.

As stated above, the contract for this work has already been let. This calls for its completion in the summer of 1914.

An Example of Colliery Switch Gear

Special Correspondence

SYNOPSIS—A totally inclosed switch with many features making for safety. The device has been designed and constructed in conformity with the rigorous stipulations and recommendations of the British Home Office.

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The conditions imposed by the British Home Office with regard to colliery-switch gear have been made stringent. This is a step in the direction of insuring safety to employees in what is admittedly a dangerous occupation.

In the report of the Departmental Committee appointed by the Secretary of State for the Home Office to consider special rules for the use of electricity in mines, a good deal was said with regard to the switch gear in use in collieries. It was pointed out that such apparatus was not sufficiently strong mechanically to resist rough usage and that switch gear of the open type was really designed for surface work and was not suitable for underground use.

Switch gear for underground use should be dust-proof, moisture-proof, and so constructed as to prevent open sparking. The outer metal coverings should be of ample thickness with well-fitted joints and glands where cables and spindles pass through. All handles for operating the switches themselves should be safely and conveniently placed. The general design should be such that any fault or failure is under all conditions confined to the inside of the metal box or covering so as to avoid all danger and risk even to the operator himself.

The switches should be so constructed as to reliably make and maintain all contacts, and so designed, built and adjusted that they cannot be left in partial contact or accidentally moved into such when left out of contact.

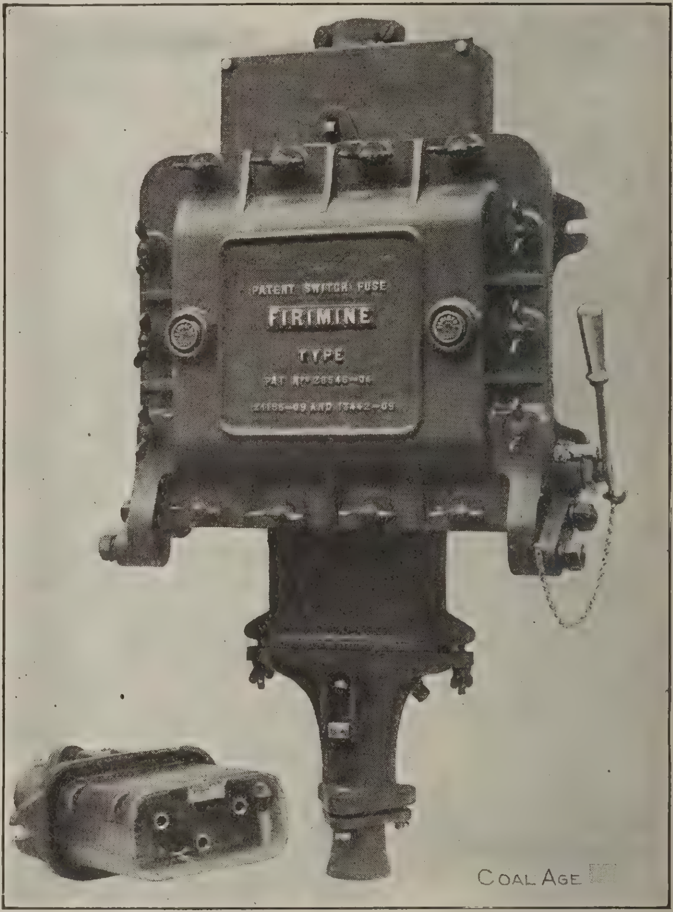
Unless the "on" and "off" positions are obvious from the position of the handle, the two extremes "on" and "off" should be clearly marked. Except in the concentric system, single-pole switches are not to be used. In choosing a switch, furthermore, regard should be paid not only to its capacity to carry the working current but also to its ability to open the circuit safely on any short-circuit with which it may be called upon to deal.

Reference has been made to the foregoing details of this report inasmuch as it has been upon these recommendations that modern British practice in switch-gear design for colliery work has been based. The accompanying illustration shows the general appearance of a fused switch constructed by Messrs. Berry, Skinner & Co., of Birmingham, England, who specialize in the design of switch gear capable of being used by unskilled attendants. It will be seen from this illustration that it is particularly substantial in its design and construction and highly suitable for use in mines. It has been actually tested with a violently explosive gaseous mixture and withstood the trial admirably. This particular test was witnessed by several expert mining engineers who commented on the switch in favorable terms.

The arrangement is entirely fool-proof, that is to say, the lid of the switch cannot be opened until the lever is first thrown to the "off" position. The plug cannot be withdrawn from the live contacts, nor can it be inserted into them. The switch has to be brought to the "off" position before this operation can be effected, and the plug is provided with a special ground connection.

Particular attention may be drawn to a good feature in the design which is the broad machine-faced jointed box which is provided with unloosable fastenings. When the plug is withdrawn all live contacts are shrouded and in this way the operator is not liable to accidentally receive a shock from exposed and live metal-work. Mica is used as an insulating material throughout the design. The illustration shows a triple-pole combination, and owing to the compactness of the design it is claimed that for a given current capacity less internal space is required than is generally the case. The fuses are of the cartridge type and when correctly installed are guaranteed to open any short circuit with which they may be called upon to deal. They can only be replaced after the current has been automatically cut off as all fuse-carrying parts are dead when the switchbox is opened.

The apparatus is automatically locked on and off for intermediate positions, and it is impossible to tamper with the contact to any extent. As regards carrying capacity the switch fuse is designed with a generous margin of safety. Total inclosure as regards terminals, cable ends, cable joints and connections are provided and suitable bushed packing glands are used of a type approved by the factory inspector. The entire mechanism constitutes a fine example of modern British switch-gear design.



The Switch. Note Careful and Heavy Contruction

Our British Coal-Mining Letter

SYNOPSIS—Bath-houses should not involve an expenditure of over 6c. per person. Requirements for their construction and management suggested by British investigating committee. Account of the byproduct plant at Birchenwood, which produces gas, tar, ammonia, benzol, phenol, cresylic acid and pyridine. Turbine pumps for raising water, their operation, advantages and desiderata. Recommendations to machine runners. Difficulties in grounding, and the inefficiency of the earth as a conductor.

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In accordance with the terms of the Coal Mines Act of 1911, where a two-thirds majority of workmen represent to the owner of a British mine that they desire facilities for taking baths and drying clothes at the mine, the owner must provide sufficient and suitable accommodation for the purpose. It is assumed the maximum cost of maintenance will not exceed 6c. per head per week.

A departmental committee has reported that the bathing accommodation should consist of spray or douche baths, each bath being contained in a cabinet so constructed as to secure privacy, and having suitable arrangements for dressing and undressing. The committee states that the number of baths should be in the proportion of one to every six persons in the largest shift employed in the mine. The building must be of sufficient dimensions, efficiently lighted and ventilated, must be constructed of non-inflammable material and have a floor of concrete or similar material so graded and drained as to allow any water to run to and be carried away at the sides of the building. It is also proposed that each person using the bath shall be provided with soap, and, at the beginning of each week, and at such other times as the person in charge may think necessary, with a clean towel for his sole use.

English Indorse the "Monte-Habits"

As regards drying accommodation, arrangements have to be made for suspending in the roof of the building the clothes of each person using the bath, by means of a chain so arranged and fitted as to be under the sole control of the person to whom it is allotted, and to keep the clothes of such persons, when suspended, entirely separate from the clothes of any other person. Efficient means must also be provided for drying clothes when so suspended. The management of the baths as suggested by the departmental committee shall be vested in a committee consisting of three persons appointed by the owners of the mine and three elected by ballot of the workmen.

Coking Plant Makes Seven Byproducts

The Birchenwood Colliery in North Staffordshire has acquired some fame by reason of its coking and byproduct-recovery plant. There are two sets of coking plants, the first being erected by Simon Carvés, Ltd., in 1909, and consisting of 84 ovens, 60 of which are of the nonregenerative, or waste-heat type, and 24 of the regenerative type, with complete byproduct plant for the extraction of tar, ammonia and benzol. Each oven takes a charge of 8 tons of slack and yields about 5.5 tons of dry coke.

The second plant was only completed last autumn; it consists of 72 Still coke ovens of the regenerative type, and in addition a complete byproduct plant for the extraction of tar, ammonia and 65 per cent. of the crude benzol, also for the manufacture of carbolic and cresylic acids and pyridine. Each oven takes a charge of 9.5 tons of slack and yields about 6.6 tons of coke, the charging and coke-discharging machines being electrically operated.

The producer-gas plant, at Birchenwood, consists of 13 Mond producers, each capable of gasifying 20 tons of fuel per 24 hours. The gas is used both for direct boiler firing and also for driving gas engines to generate electricity for general purposes. The electrical supply consists of three-phase alternating current, generated at 2500 volts, 60 cycles.

Turbine Pumps in Collieries

Features common to turbine pumps, as noted by R. H. Willis, before the East Scotland branch of the Association of Mining Electrical Engineers are: One or more impellers, mounted on a shaft, revolving in suitable chambers, each delivering the water through a diffusion vane into the succeeding impellers, and finally into an annular space, from which the water escapes into the delivery pipe. The diffusion vane takes hold of the water after it leaves the impeller at a high velocity, and guides it into suitable passages until the velocity is comparatively reduced; the kinetic energy due to the velocity being thus converted into static energy.

There is no actual displacement of water in the turbine, as in the ram pump, the action depending on the velocity imparted to the water, due to the revolving impeller, this velocity being ultimately changed into pressure head. There is, therefore, no necessity to provide relief valves on a turbine pump, as the pressure can never rise above that due to the velocity set up by the speed of the impellers.

By reason of this the pumps can be started up with the delivery valve closed, and this is a great advantage as there is no chance of accidents happening, as would be the case if this procedure were adopted with a pump of the ram type.

Desirable Points in a Turbine Pump

Mr. Willis says the following points should be considered when undertaking the installation of a turbine pumping plant: (1) The pump should be capable of being easily reërected; (2) all wearing parts should be made renewable, and all similar parts of similar pumps should be made interchangeable; (3) effective construction should be adopted to obviate end thrust. Having decided upon the type of pump, further considerations include: (a) The pump should be fixed on solid foundations and set carefully in line; (b) the suction pipe should be absolutely airtight; (c) an efficient foot-valve should be provided; (d) the pump should be placed as close as possible to the water to be lifted.

Don'ts for Machinemen

In his paper on the Installation and Manipulation of Coal Cutters, before the West of Scotland branch of the Association of Mining Electrical Engineers, J. McCann gave some advice in the form of Don'ts, including:

Don't switch on the power too quickly; let the machine attain full speed gradually. If the load is unusually heavy, switch on the power more slowly, not faster.

Don't increase the size of the fuse just because it often "blows." It is easier to change a fuse than an armature.

Don't raise or lower the cutting level in quick steps when driving a disk or chain machine. The only machine that can be so operated is the bar cutter.

Don't force the machine through a hard cut with blunt picks. Time is saved, not lost, by changing them.

Don't neglect such trifles as a loose screw or a broken spring, because it is a small detail; either repair it or report it. "A stitch in time saves nine."

Don't bury the machine in a cut because you are working by contract. Work out your costs properly and see whether it does not pay better to cut with the crown wheel clear.

Dangers of Electricity in Mines

Before the Association of Electrical Engineers (South Wales), Chris Jones pointed out that (1) the danger from shock arises from leakage, and is more likely to arise in mine work than in other industrial applications, owing to the rough conditions under which the plant is used. (2) Fire risk is greater also and means of escape are not readily provided. (3) Risk from explosion is peculiar to colliery work; and excluding the risk peculiar to brushes on motors and to switchgear it may be due to (a) an explosion arising from leakage accompanied by arcing or sparking; (b) an explosion arising from breakdown of an individual device or cable, and accompanied by arcing or sparking.

In both these sources of danger the leak is the principal contributing cause, a leak being the passage of electricity through some path other than that provided by the conductors intended for the purpose. The best protection against the danger of shock from conducting bodies lies in properly conducting or inclosing live parts; and in efficiently grounding armored cables and substantial fittings for making good mechanical and electrical connections between the metallic cases and the armoring.

The Earth an Uncertain Conductor

The earth is a conductor of electricity, and in the past it has been so used for telegraph and telephone work. A "ground" has been legally defined as follows: "*The* ground is *a* ground, but *a* ground need not necessarily be *the* ground." Grounding the tubing or other metal sheathing of insulated electric light and power conductors is generally meant to signify that the tubing, etc., are to be grounded to the earth; that is to say, they are to be connected to the general mass of the earth. A really satisfactory ground is not easy to obtain, for the old idea that the earth is of zero resistance, because it is of practically infinite cross-section, is now recognized as erroneous.

Testing Permissible Explosives

Prof. Vivian B. Lewes, discussing the "Testing of Safety Explosives," before the Royal Society of Arts, said the only true way to test the safety of a mine explosive was to use it in coal mines during a period of many years, his opinion being that when tons of the material had been used and millions of shots fired under every condition conceivable in practice without a single accident being traceable to its legitimate use, such an explosive held a certificate of safety which no series of tests under empirical and artificial conditions could ever afford. He pointed out that testing stations had different methods of testing and he feared that satisfactory explosives would be supplanted by others so feeble in character that great difficulty would be found in insuring their complete detonation.

It seems wrong to reject years of experience gained under mine conditions and to follow other methods unless statistics show that per million tons of coal won a certain explosive in use gives rise to greater loss of life than others. The practical conditions in use are so widely different from those of the tests that the personal factor of care in use becomes of enormous value. Mr. Lewes is convinced that a reliable and careful shotfirer blessed with common sense is a greater protection than any tests, rules and regulations that can be framed. For this reason he views with suspicion anything tending to lessen personal responsibility.

Explosive Dusts Classified

Doctor Wheeler, who is the chemist to the British committee investigating the causes of explosions in coal mines, has conducted experiments with samples of carbonaceous dust collected by factory inspectors to determine (1) the degree of inflammability and (2) the capacity to transmit explosions. The dusts are divided by Doctor Wheeler into three classes: (*a*) Dusts which ignite and propagate flame readily, the source of heat required for ignition being comparatively small, such, for instance, as a lighted match. This class includes sugar dextrine, starch, cocoa, rice meal, sugar refuse, cork, unextracted soya bean, wood, flour, malt, oat husk, grain (in flour mills), corn meal, tea, compound cake, grain (in storage), rape seed, cornflour, flour (in flour mills), chicory, briquettes, gramophone record material, and extracted soya bean. (*b*) Dusts which are readily ignited, but which for the propagation of flame require a source of heat of large size and high temperature, such as an electric arc, or one of long duration, such as the flame of a bunsen burner. This class consists of copal, gum, leather, dead cork, cocoanut oil, milling rice, milling sawdust, castor oil, meal oil, cake offal, dust from the grinding of bran, grist milling, horn meal, mustard, shoddy and shellac composition. (*c*) Dusts which do not appear to be capable of propagating flame under any conditions likely to obtain in a factory either (1) because they do not readily form a cloud in the air, or (2) because they are contaminated with a large quantity of incombustible matter, or (3) because the material of which they are composed does not burn rapidly enough. This class consists of organic ammonia, tobacco, spice millings, drug grindings, cotton seed, soya bean, bone meal, coal, lampblack, sack cleanings, retort carbon, rape seed (Russian), blacking, brush carbon, stale coke, plumbago, bone, charcoal, and mineral and ivory black.

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As a result of investigations made by the U. S. Bureau of Mines, it was estimated that a cubic foot of coal from Monongah set free, during its mining and in the first two weeks thereafter, 1.4 cu.ft. of methane. During the first 12 weeks after mining, a volume of methane is liberated equal to 1¼ times the volume of the coal. At first the gas escapes rapidly; then it gradually diminishes and stops altogether in from 8 to 18 months.

Fire Fighting by the Madison Corporation

By A. T. Shurick

SYNOPSIS—Through the courtesy of President Moorshead, of the Madison Coal Corporation, a number of mining men were afforded the opportunity of viewing a demonstration of the company's fire-fighting, rescue and first-aid work at two of its Illinois mines. The exhibition was unique in that all the conditions of an actual explosion were assumed and acted upon, including the recovery of the mine, extinguishing the fire and administering first aid. In view of the fact that the Madison people are the acknowledged leaders in Illinois, if not in the United States, the demonstration is of particular interest.

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It is probable that no one unequipped with a military training could ever perfect such a fire-fighting machine as the Madison Coal Corporation boasts of. Such a task requires something more than mere executive ability. In event of an explosion or fire, the operating department is subjected to a severe test—a test under which the most efficient organizations frequently crumble to pieces.

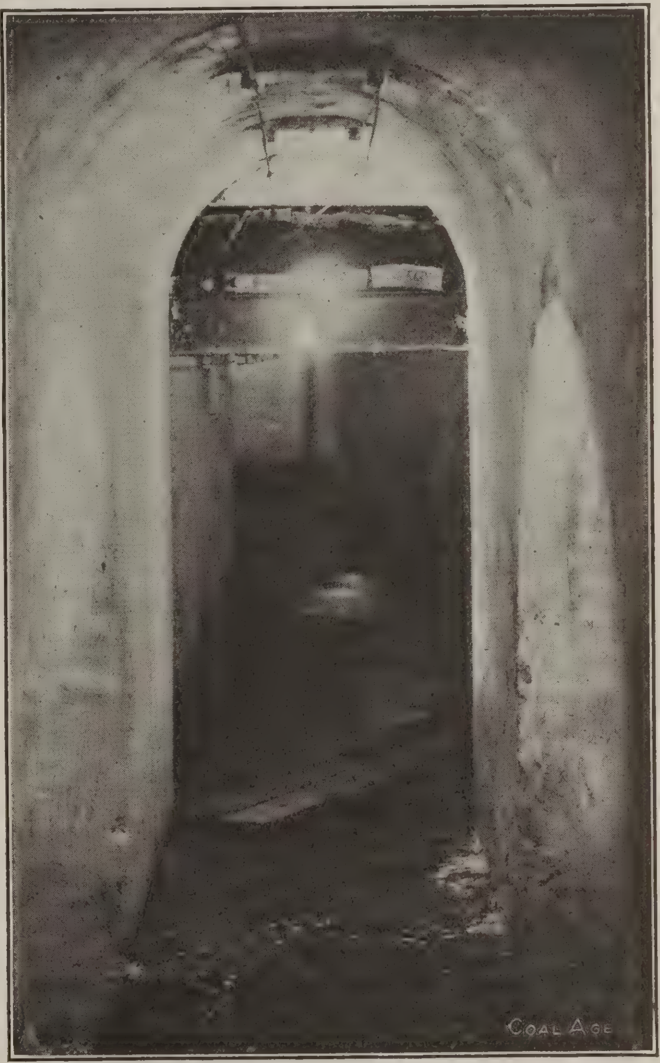
It is clear, therefore, that the exigencies of the case must be anticipated insofar as it is possible to do so. Each man must be allotted his particular task so that all may act promptly, without waiting for orders, and the work of each unit must be performed with the precision of an automaton, for the slipping of a single cog at a critical moment may disarrange the working of the whole machine. Obviously this perfection can be attained only by such frequent drills that each man's duty becomes a matter of habit with him. Apparently the Madison Corporation, thanks to President Moorshead, has reached this millenium.

The Fire Team in Action at No. 8 Mine

The Surface Equipment at No. 9 Mine

At the request of Manager Cartlidge, of the Illinois Mine-Rescue Station, seconded by many of the state mine inspectors, President Moorshead was prevailed upon to give a special demonstration of the company's apparatus and methods. Through the courtesy of his company a special train was arranged to convey the visitors from Carbondale to their No. 9 mine, at Cambria. This is a shaft operation somewhat over a hundred feet deep and having a capacity of 3000 tons per day. It was not working on the day of the inspection, Oct. 14.

Arriving at the mine a complete inspection of the surface plant was made, which developed a number of interesting features. One of these was a plant for manufacturing concrete blocks for the arching of the roof in the mine. The forms are of steel, quite simply constructed and economical. There is also an unusually efficient Jeffery fan installation kept up in remarkably excellent shape; it is equipped with a pressure-recording apparatus and under test showed 290,000 cu.ft. of air per minute with a 6-in. water-gage. Insufficient boiler capacity at the time of the test made it impossible to bring the fan up to full speed.



Reinforced-Concrete Run-a-Round at the No. 9 Shaft Bottom

The rescue station, shown on page 588, of last week's issue, was of particular interest. It is a substantial brick building having rooms for smoke testing, washing and dressing, helmets and oxygen tanks. Another unique feature was the automatic gates at the shaft top. These are controlled entirely by the hoisting engineer and cannot be opened when the cage is in motion; also, should it be attempted to open them when the cage is not at the landing a gong sounds a warning in the engine room.

This device, together with an arrangement for belling the engineer from the cage, when same is in motion, were invented by A. J. Gurney, master electrician of the Madison Coal Corporation. Patents are now being taken out and we hope shortly to publish detailed descriptions of these inventions.

Fire Drill on the Surface

When the inspection of the surface plant had been completed the fire alarm was sounded. It seems difficult to pay a sufficiently high tribute to the excellence of the fire drill. In one minute and thirty seconds by the watch a strong covering had been lowered over the shaft top*, a 2-in. stream of water was playing on each side of the head frame, and the busy little hand extinguishers were in evidence on every hand. Each man had his allotted task and he did it with an accuracy and dispatch that left little to be desired.

Rescue Car About to Start for the Scene of the Accident

Rescue Corps Fully Equipped and Ready to Enter the Mine

It was now explained to the visitors that the hypothetical condition of an actual mine fire and explosion had been assumed underground. Accordingly the helmet corps of five men was ordered out to make an inspection of workings and report the location of the trouble. Before going underground the men are subjected to a rigid inspection and testing of the apparatus. The smoke room in the rescue station is filled with sulphur gases and each man is required to enter, after which they are lined up, the oxygen pressure and general condition of their apparatus noted, clocks set and the name of each man recorded. All of this is done with military precision, and 18 min. after the alarm sounded the party was ready to descend. In the meantime the rescue team from No. 8 Mine, about two miles distant, had been ordered out to be on hand in case of emergency.

Everything being in readiness, even to the canary bird and electric hand lamps, the rescue party was lowered away. In about half an hour the foreman returned to the surface and reported the location of the trouble; also, that while they had been unable to determine the full extent of the fatalities, there were at least two men injured. The first-aid men were accordingly ordered out and entered the mine equipped with safety lamps.

Inspection of the Underground Workings

The visiting party having been equipped throughout with overalls and carbide lamps, then went below and witnessed the preparation and departure of the special rescue cars for the scene of the trouble. These cars are of particular interest and we hope to publish a detailed description of them shortly. They were illustrated in our issue of last week. On the exterior they much resemble the ordinary mine car. On each side, however, are arranged lockers which contain the first-aid appliances and serve as seats for the rescue team while riding in. Before starting the entire equipment, consisting of rubber pillows and gloves, blankets, bandages, stretchers and tools, such as wire cutters, hammers, hatchets, axes and crowbars, are thoroughly overhauled. These two cars, together with a 50-gal. revolving chemical fire extinguisher, mounted on mine-car trucks, are always standing in readiness for instant use.

After the departure of the rescue party, the visitors made a complete inspection of the bottom, which was of interest because of the large amount of steel and concrete construction used. This was made necessary by the inadequate pillars left in the early mining. Concrete is used profusely at the immediate shaft bottom, in the run-a-round and in the pump room and sump. Steel doors only are used here and the double partings at the bottom are carried on large I-beams.

The underground hospital is also concrete lined and has a lighter section of I-beam for the roof; it is quite commodious, clean and sanitary. The underground stables proved a model of cleanliness and convenience; whitewashing is liberally applied and perforated pipes make it possible to flood the entire stable almost instantaneously. A concrete underground oil house was another feature of interest, also an electric device for drying the sand required by the mine motors.

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*It should be noted here that an underground concrete conduit leads from the side of the shaft, a few feet below the surface, off to a point well removed from danger, where it comes to the surface. Thus when the covering has been lowered over the shaft the air enters through this auxiliary air course.

Guests of the Madison Corporation Who Viewed the Fire-Fighting Demonstration
President Moorshead wearing a black "jumper" is seated near center of picture in front row.

Some Safety Devices and an Underground Fire Drill

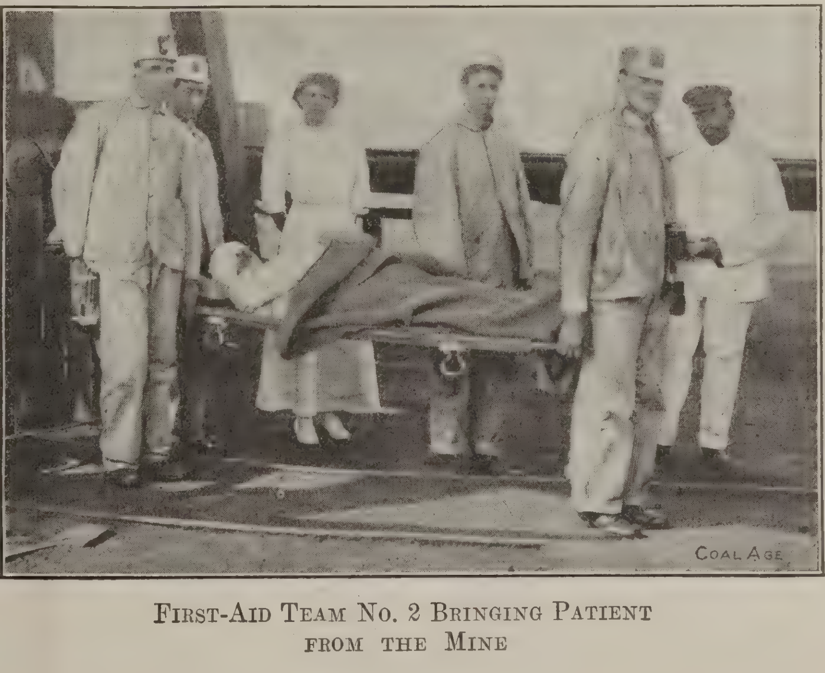
The Madison Corporation employs a unique safety arrangement that seems worthy of particular attention, because of its simplicity. This consists in whitewashing all wide places in main haulageways that are also used as traveling ways. These points stand out with remarkable distinctness in the inky blackness of the underground workings and provide a ready safety hole in which to escape a passing trip. The underground motors are also equipped with powerful searchlights and gongs. In view of the possibility of running into fall, or other trouble on the track, or in the roof, it is rather remarkable that this feature of a better light on the motors has not been more generally adopted.

Pending the return of the rescue men from the face, the visitors were again treated to the inspiring sight of the Madison company's fire-fighting machine in action, this time underground. The company officials seem to have anticipated all the possible contingencies of a mine fire with an almost inhuman ingenuity.

Thus, while all regular hose connections are being made and the different stations brought rapidly into action, there is one man equipped with an extra length of hose and nozzle, who goes rapidly from station to station, so that any defective apparatus may be promptly replaced. The foreman and his assistants are employed entirely in pacifying and reassuring the escaping miners. The importance of this latter feature cannot be too strongly emphasized as those of experience in such matters will readily concede; the moment the official personnel shows indication of weakening or losing control of the situation, discipline rapidly disintegrates and the rout becomes general.

In the immediate vicinity of the shaft bottom there are six hydrants, eight extinguishers and the same number of pump buckets. Water for the hose is obtained directly

The Colored Rescue and First-Aid Teams



First-Aid Team No. 2 Bringing Patient from the Mine through the mine pumps; provision is also made for cutting in water from the surface in event of the failure of the underground apparatus, for any reason. In addition to this there is the 50-gal. revolving chemical extinguisher, and perforated pipes in the stable, as already noted.

Underground First Aid

The fire drill was followed by the return of the first-aid men with the two "victims" of the explosion; they were carried on stretchers swung on the usual spring chains hooked over the sides of the cars. It was assumed that one was overcome by afterdamp and burned on the chest and right hand, while the second was supposed to be suffering from a broken left arm, a fracture of the left thigh and bleeding at the temple. Appropriate first aid was administered to each, the man overcome with afterdamp, being treated with the Salvatore oxygen apparatus and the pulmotor. Superintendent Duncan, of the Benton Rescue Station, complimented the rescue men highly, particularly on the application of splints; it was his opinion that their work exceeded the requirements of actual first-aid assistance.

The Company Ambulance and Physicians

The "patients" were removed to the underground hospital and the visitors made a further inspection, witnessing the operation of some automatic switches for landing the loaded trips at the shaft bottom, by a flying switch. Every car hoisted at this shaft is handled over one of these switches which has been in operation for more than a year and has not yet been the cause of an accident; even disregarding the cost of an extra man for handling the switch, Mr. Mooreshead expressed the belief that this method was superior, for the reason that it was purely mechanical in its operation and therefore eliminated the uncertainty of the human equation. In addition to this there are turnouts at different points where the motorman can throw the switch for either track while the trip continues at its normal speed.

Luncheon and the Inspection at No. 9

Returning to the surface the visitors saw the two "injured" men brought up and put in the ambulance to be transported to the hospital, about two miles distant. It is worthy of note with what infinite care all the minute details of an actual fire and explosion had been worked out and followed up. It is probable that such a complete all-around exhibition as this was never before attempted.

After a general wash-up, the visitors participated in a delicious and substantial luncheon, served by the ladies of the vicinity. The special train was again called into service and the party was conveyed to No. 8 Mine, which was in full operation. This plant is essentially a replica of the No. 9 Mine.

The visitors were again accorded a demonstration of fire-fighting on the surface, a description of which would only entail needless repetition of what occurred at No. 9 Mine. After an inspection of the surface plant the party went below and viewed the bottom arrangement at the shaft, which also resembled that at No. 9 Mine in the permanency and substantial character of the work.

A block-signal system for protecting trips against collision with each other was observed in operation here. Thus when an electric locomotive makes its flying switch, throwing the loads into the shaft bottom, while it goes into the empty "hole" for another trip, a red light out on the main haulageway warns approaching motormen that the bottom is occupied. Red lights are also installed at the automatic doors to warn the motormen of approaching trips on the other side. The automatic doors are provided with man-doors at one side.

Commendatory Remarks and the Hospital

Returning again to the surface some additional first-aid work was observed and a few brief speeches made, in which the thanks of the party were extended to Mr. Moorshead and the heartiest approbation expressed of his men and methods. In reply Mr. Moorshead expressed his gratification at the interest shown and modestly disclaimed any particular credit to himself on the grounds that his work along this line was only made possible by the altruistic policy of the company he represented.

The Automatic Safety Gates at the Shaft Top

A brief visit was then made to the district superintendent's office, where the mine maps and office systems were seen, after which the party adojurned to the hospital. This latter is in charge of Dr. Springs and his wife, both of whom are graduates in medicine. The two "victims" of the mimic explosion were again seen here, carefully propped up in standard hospital cots. The hospital itself is equipped with an unusually thorough complement of surgical instruments and an excellent X-Ray machine. The general cleanliness and sanitary conditions at the hospital called forth favorable comments from all.

Returning once more to the train, the run was made into Carbondale, where the party disbanded at 4:30 in the afternoon.

EDITORIALS

In no industry is a closer study of conditions and nethods of greater importance than in coal mining. In io calling is there a greater need of efficiency on the art of the individual worker than in the mining of coal. ntelligent supervision of all departments by the mangement is essential in promoting the highest individual nd collective efficiency. Such intelligent supervision an only be attained by the close and continued study of onditions and a thorough familiarity with the principles f mining.

The Wooden Mine Car

Of the many inconsistencies in coal mining, none stands out more conspicuously than the continued general use of the leaky wooden end-gate mine car. We spend much thought and effort in evolving plans to prevent dust explosions, and yet cling to a practice that creates the evil we are working to overcome. There is no doubt but that leaky pit cars are the chief cause of finely powdered coal dust on the haulage roads in most of our coal mines. Wouldn't it be better if we started our preventative measures somewhere nearer the source of our troubles.

Another Petition

Some weeks ago, about 13,500 employees of the H. C. Frick Coke Co. petitioned Congress to prevent the dissolution of the United States Steel Corporation. More recently some of the men employed by the Tennessee Coal, Iron & Railroad Co. have sent a similar missive to Washington. This latter document contained no less than 13,000 signatures and weighed twenty pounds.

In both of the above instances, the action of the men was neither instigated nor fostered from "higher up," the signers of the petitions acting entirely upon their own initiative. Regardless of what action may be taken by the legislative or judicial branches of the government in the dissolution case above mentioned, one fact is established—over 26,000 perfectly sane and rational citizens in two widely separated states are not believers in indiscriminate "trust busting."

Where Progress is Opposed

It isn't always a question as to whether a certain system is most economical and efficient that determines whether the plan shall be adopted. In this day of organized labor, the employees of a company have much to say in the administration of its affairs. Especially is this true in European coal mines. One of the reasons machine mining has not been more generally adopted on the continent is because the miners believe the substitution of mechanical means for human labor is inimical to their welfare.

A company in Belgium was daring enough to experiment with machines, and found that in one of their collieries the cost of mining the coal was reduced 40c. a ton when undercutters were used. Notwithstanding the evident desirability of machines, this company could not overcome the hostility of their employees and persuade them that the undercutters would lighten their labor and increase their pay.

Just what the unions expect to gain through their opposition to modern machinery is hard to determine.

An Efficient Fire-Fighting Machine

We wish to invite particular attention to the article appearing in this issue on the rescue- and first-aid work of the Madison Coal Corporation in Illinois. Since the unfortunate Cherry catastrophe in that state, most stringent laws governing mining operations have been enacted by the Illinois legislature. As a result, safety precautions, methods and devices have probably been developed here to a higher general efficiency than in other fields.

The movement generally has met with the enthusiastic support of the leading coal men of the state, who, as a rule, have more than complied with the full requirements of the law. Naturally some leaders have appeared who are setting the pace, and among these is President Moorshead, of the Madison Coal Corporation. In a recent interview with Francis Peabody, of the powerful Peabody coal interests, and Carl Scholz, president of the Rock Island coal subsidiaries, both freely acknowledged Mr. Moorshead's leadership. We are particularly gratified, therefore, at being able to publish a detailed description of the Madison's men and methods.

The Nanticoke Movement

Last year at the town of Nanticoke, the school board and the Susquehanna Coal Co. both contributed to supply mining education for those desirous of such training. The innovation, based on the new law relative to occupational schools, was a complete success. This year, profiting by the indications obtained, commercial and domestic science classes are to be added.

We are convinced that the miner would resent the suggestion that there was nothing but muscle in his employment, and we are equally sure that to obtain success in a broad sense, the miner should combine knowledge, intelligence and enthusiasm. The mining schools will make this change. They give promise that hereafter there will be a scientific precision in operation from office to working face.

The Continent of America, 400 years ago, was physically better equipped to sustain a large population than it is today. It had limitless woods filled with comparatively harmless game, coal and iron were to be found outcropping on the hills, and the soil had all its original fertility. But the Indians starved, shivered in tents, had no comforts, raised negligible crops and did not increase in numbers. Despite our waste of resources, conditions are better today than then, because the people are better informed and more resourceful.

Hence, in order to urge technical education, it is, we believe, not necessary to represent life as a strife between man and man, all seeking for preferment. The usual competitive cry is raised, now it is America seeking to crowd England or Germany out of its markets, now it is the miner seeking to be foreman. Skill is needed for other objects, to make it possible for us to gather from such resources as we now have such a measure of comfort, dignity and ease as education and skill will enable us to wrest from nature.

This is the answer—the only reply to those who would urge on us that only a certain number of men can occupy positions of trust. It is becoming clear that only by training can men succeed in operating with safety, efficiency and minimum labor in the modern mine, with all its dangers and complications. There is no use for brain till a brain is found. When men present themselves in numbers who have and can use their knowledge, we shall be able to place our mines on a higher basis, use machinery which demands that higher intelligence, and which will make possible not only larger economies, but less exhausting labor and higher earnings. The time will come when the mines will be operated like a railroad by engineers; every man who digs a ton of coal by machinery will be an expert in running the machine under his control, every motorman will understand, not merely how to throw a controller, but wind an armature.

The School in the Mining Town

The Tennessee Coal, Iron & Railroad Co. entertained the school teachers of the Birmingham, Ala., district at a hotel on Shades Mountain and, for a whole week, experts told them about education; not about cramming the students with book learning, but about the sociological aspects of their duties. For instructors should teach the children about health, cleanliness, thrift, safety and how to play, how to perform house duties, how to garden and to sew.

Particularly desirable is instruction in play, for any boy who is so taught, is free from the temptation to break windows, throw stones and terrorize the neighborhood. When manly games are popular, the necessity for boarding up the windows of idle houses and for locking and guarding store rooms is removed and the deterioration of the boys due to delay in putting them to work is largely prevented. The healthy rivalry makes the child approaching manhood appreciate the necessity for subjecting himself to rules and this training in later life will make him assertive of his rights, yet keen to respect those of others.

We long ago urged that in schools, children be taught regarding the right use of the home, so that better houses could be intrusted to tenants and also about safe practices in mines and out of them. But the instructors of the teachers around Birmingham have gone even further; they would have the students warned against loan sharks, and patent-medicine venders. They are seeking to promote public-school libraries and to popularize training in manual occupations, music, art and science.

In a few years the miner who seeks a good education for his children will not have to send them to the normal school to be educated. The farmer may always suffer that drawback, but there is little cause in our larger mining towns for inadequate schools if we can only inspire that same spirit in the rank and file of the miners which the farmers now possess. The foreign miner will doubtless always be somewhat of a drawback, but even he can be made to appreciate educational advantages.

The public school is not a place for political propaganda, but it is the appropriate opportunity for grounding our boys and girls in the arts of right living, decent home life, generosity, good citizenship and charitable estimates of their fellowmen. Time was when the mining population of a village prided itself that it could beat up the citizens of some neighboring lumber town or could ride rough shod over the policemen and merchants of a near-by borough. Present ideals are better, though still not of the best. As the school does its work, rivalry in violence will give way to competition of a less destructive and more amiable character and our labor situation will be freed from breaches of contract and outbursts of vandalism.

The American Mining Congress

The sixteenth annual session of the American Mining Congress, which was held in Philadelphia this week, was a quality meeting rather than a quantity affair. A number of men were present whose names stand for all that is biggest and best in American coal mining. The papers and discussions dealt with such vital topics as "Taxation of Mining Property," "Mine Accounting," "Mine Rescue Work," "Coal-Mining Legislation" and "Cost of Production." All of these papers and discussions will appear in Coal Age next week.

The mining-machinery exposition in Horticultural Hall was a much more complete exhibit of the kind than is usually the case and was deserving of closer attention and better attendance. In fact, the mining congress, on the whole, is a laudable enterprise if it can be brought to fulfill the purpose for which it was conceived. As an institution, or viewed in the light of a movement for betterment in mining conditions, the American Mining Congress today is not a national body of great importance, although the intent is there and magnificent possibilities exist.

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Harmonizing the work of many different departments in all industrial operations is more essential to success than to establish and maintain a high-pressure system, in which the employees are forced to work under a strain that is nerve-racking in the extreme. Just as an expert engineer knows instantly by the throb of his engine when the load is excessive, so the intelligent manager knows by the response of his men when the system needs revision and the conditions amelioration. Not that the day's labor should be shortened, or the wages increased; but that the work should be readjusted and made to run more smoothly. It is even more important for the manager or superintendent to study to harmonize working conditions, than that he should continually strive to reduce the cost of production by lengthening the hours of labor, cutting down wages or requiring more work for the same pay.

trolled and a selection of the best men made, to form an exploring party. If a helmet squad is available they should enter the mine and advance, as far as possible, ahead of the air, to ascertain the condition of the mine with respect to fire, gas and the circulation of air. By this means, any fires that might exist would be discovered before the air current is restored in that part of the mine. After exploring a certain section and finding no fire, this party should return and report the condition of the mine to the men charged with the duty of restoring the ventilation. When that has been accomplished in one section or portion of the mine, another section can be explored and the circulation restored there, in the same manner.

Assuming that the fan has suffered no injury from the explosion, however, it should be slowed down so as to furnish only sufficient air to force back the products of combustion, to the point on the main entry where the air is made to return, whether this be a blownout stopping or an overcast. At this point, a regulator or canvas brattice should be erected, so that the quantity of air passing here can be controlled until the next crosscut is reached when this opening should be stopped and a regulator or canvas brattice established at the next opening, for the same purpose.

While thus advancing through the entries, the air should be carefully tested, at frequent intervals with a safety lamp, and a careful watch be kept to detect any fire that may exist in adjoining workings. By pursuing this course, the danger of a second explosion occurring is minimized and the rescue of any possible survivors is made possible, in the shortest time. I have proved the efficiency of this method in a particular case, and have no hesitancy in recommending its general adoption.

Charlton Dixon.

Pittsburgh, Penn.

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Letter No. 6—The advisability of again starting a fan disabled by an explosion, as specified in the question under discussion, can only be answered directly by saying, in the most emphatic manner, that to start the fan previous to making a most careful preliminary examination underground, as far as practicable, would be both unwise and criminal, and would probably destroy all hope of the rescue of any survivors and endanger the life of those who attempt to enter the mine.

Even after such preliminary examination of the mine has been made, the question of starting the fan will depend entirely on the conditions found to exist underground, and whether restoring the circulation will imperil the entombed workmen or increase the danger of rescue work. The existence of mine fires would be the chief determining factor. The question that must be considered is: What will be the probable effect in the mine if the fan is started even at a slow speed?

In my opinion, whatever the condition found below, with respect to the stoppings, overcasts, doors, etc., if fires exist in the workings, they will produce a disturbance of equilibrium in the mine air and start a circulation of air that will make a second explosion imminent, without the assistance of the fan. It may be supposed, however, that if the fan is started, its action may either assist or oppose the natural current produced by the heat of the fire, according as that current is traveling with or against the current induced by the fan. Thus, in either case, unless the speed of the fan be properly regulated, the result would be favorable to the occurrence of a second explosion. These conditions can only be ascertained by a careful preliminary examination underground.

While the direction of air current and the possible existence of fires might be ascertained by indications at the surface, it will be important to know in what sections of the mine fires exist; and to ascertain this, it is necessary to explore the shaft bottom and gradually extend the investigation through the mine. This will determine whether, if the fan be put in operation, the current will be short-circuited near the shaft bottom or extended to more distant parts of the mine, and will reveal the existence and location of fires, if any exist.

But, whatever the conditions with respect to restoring the ventilation in the workings may be, one fact impresses me as of the utmost importance; namely, to destroy as far as possible, any natural currents of air that may be induced by the heat of the fire, and thus to prevent the access of fresh air to the fire areas as these are found to exist. If this is accomplished successfully, I see no reason why there would be any additional risk incurred by restoring the circulation between the intake and return openings of the mine, by starting the fan slowly, providing the air current be short-circuited at the proper point and not allowed to enter workings that have not been explored. This being accomplished, a more extended exploration can then be made with breathing apparatus.

I. C. Parfitt.

Jerome, Penn.

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The Safety Lamp and the Eyesight

On returning home from the West and reading the article of John Rose, in regard to the effect the safety lamp produces on the eyesight of miners, Coal Age, Sept. 27, p. 465, I want to add a few words. I have worked in the mines from the time I was a boy, 11 years old, for the past 36 years, and have filled every place, digging coal, bossing, superintending and managing. A few years ago I visited the Barnsley district, in Yorkshire, England, where there are some of the largest collieries, worked exclusively with safety lamps. The miners of that district had the superstition that the wearing of bright-gold ear-rings, in some way, reduced the effect they supposed was produced on the eyesight by the brightly polished brass of the lamps.

My experience, after many years' use of the safety lamp, teaches me that all men do not have the same eyes; nor does the safety lamp have the same effect on all men's sight, just as the same medicine will not affect all men alike. What will cure one man will kill another. Some men have good, bright eyes, while others have weak eyes. Some miners can work in gas all day without complaining of headache at the end of the shift; while other men can hardly walk home because of the effect of the gas. This used to be my case, but it is not so today. I believe the same is true of the safety lamp; what will blind one man will not hurt his fellow.

Mr. Rose says a man can load as many cars with the safety lamp and timber his working place as well, as when using an open light. This may be true; but, as Mr. Rose adds, it seems a little "unreasonable." I believe very much depends on the condition of the mine, the thickness of the coal and the class of work, whether room-and-pillar, long wall, or some other system. Mr. Rose states that he has worked eight years with open lights, followed by 13 years with safety lamps. I do not doubt his statement, but I am inclined to believe that he was not mining coal for 13 years with the safety lamp. A part, or all of that time, he may have been a "walking boss;" but the effect of the lamp on the eyes is greater when mining coal with the pick.

Samson Smith,
Mineral, Va. Mining Engineer.

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Fire Protection in Mines

In addition to what has been said, Coal Age, Sept. 13, p. 391, in regard to adequate fire protection in mines, I want to suggest that statistics show that there are more fires occurring in mines where open lights are used than where safety lamps are employed.

Among the numerous causes of mine fires may be mentioned: A blast setting fire to a gas feeder, which ignites the coal; gob fires occurring mostly in abandoned portions of mines and, especially, in mines where the coal absorbs oxygen readily. I believe such coals have a low percentage of carbon and a high percentage of moisture. Sulphur in the coal increases the tendency to fire.

The old proverb, "An ounce of prevention is worth pound of cure," teaches that it is more important to pr vide ways and means to prevent fires in mines than t study how to extinguish fires after they have started, al though we must be prepared to do both. An importan matter is to carry a pipe line along the main entry, wit connections at each cross-entry and fire plugs at shor intervals, where hose may be attached. The lack of a adequate water supply, in the mine, has often resulted i great loss.

There is one other point I want to mention. It is i reference to fires that are started by the ignition of gas in blasting. To avoid this danger, every working plac should be examined as soon as practicable after shots hav been fired. In many mines, the first examination of th working face, after shotfiring, is that made by the fire boss, in the early morning, from 7 to 10 hr. after th shots are fired. It frequently happens that the fireboss at that time, discovers a fire that has gained a consider able hold in the chamber where it started. In man cases, an entire section of the mine is thrown idle as th result, and several days are required to extinguish th fire. This could all have been avoided by an earlier exam ination of the working face.

John Sutton.
West Terre Haute, Ind.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

HEAT

Definition—Heat is now understood to be a form of motion. All matter is assumed to be in a state of molecular vibration. The rapidity of the vibration depends on the degree of heating of the mass. The theory assumes that the amplitude of the vibrations or the swing of the molecules is greater as the density of the mass is less. This would lead naturally to the conclusion that pressure, which increases the density of matter, will decrease the amplitude and increase the rapidity of vibration.

Heat is thus assumed to be a form of energy, the amplitude and rapidity of the vibrations being functions, respectively, of pressure and velocity, the factors of energy, in mechanics. The theory is well supported by observed facts, as the blow of a hammer or the friction of rubbing surfaces alike develop heat.

Heat In Bodies—Assuming that heat is a form of molecular vibration, which varies in different kinds of matter, it is clear that each kind of matter has its own peculiar capacity for heat. This is shown to be the case by the fact that different bodies when exposed to the same source of heat are heated differently. For example, when equal weights of water and mercury are exposed, for the same time, to the same heat it is found that the mercury becomes much hotter than the water. When water and mercury at the same temperature are allowed to cool in the atmosphere, the air absorbing the same heat from each, the mercury is found to cool much quicker than the water. It is evident that the water absorbs more heat and gives out more heat, per pound, than the mercury, for the same change in temperature. In other words, water has a greater heat capacity.

Temperature—The temperature of any body or mass of matter is the degre of heat it can radiate or impart to other bodies or matter with which it is in contact; or, in other words, the degree of sensible heat of the body. It is not the amount of heat in the body; as water contains 30 times the quantity of heat contained in an equal weight of mercury, at the same temperature.

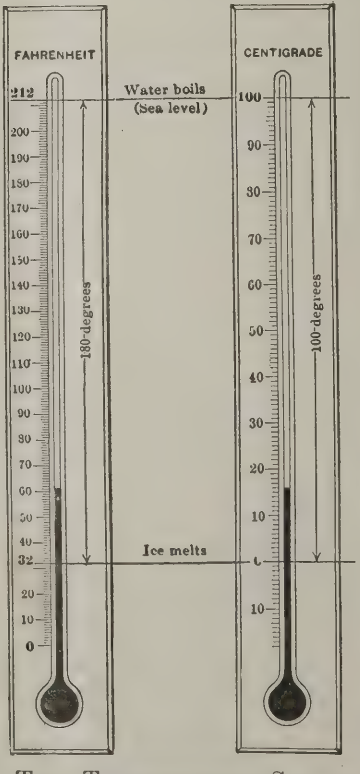
The temperature of a body depends on the quantity of heat the body contains, per unit weight, and its heat capacity. A body or matter having a large heat capacity will have a comparatively low temperature.

Sensible Heat—The heat that when absorbed or given out by a body is accompanied by a change of temperature is called "sensible heat" because it is manifest to the senses.

Latent Heat—When matter passes from the solid to the liquid state, or from the liquid to the gaseous state, the change is always accompanied by the absorption of a considerable amount of heat, although the temperature remains constant. The heat thus absorbed is called the "latent heat," being absorbed in performing the work of driving the molecules of matter farther apart than they were in the previous state. This heat is again given out when the matter passes from a gas to a liquid, or from a liquid to a solid.

The Coal Age Pocket Book

How Temperature Is Measured—Temperature is measure by the thermometer, an instrument so common as to need n description. The principle involved is that the expansio of the liquid contained i the bulb of the thermometer is much magnified i the capillary stem. An rise of temperature is thu clearly indicated by a co responding rise of the li uid in the stem and a fa of temperature is likewis accompanied by the co traction of the liqui which drops in the ster



Two Thermometer Scales

Two Scales—There a two principal thermome scales, the Fahrenheit ar the Centigrade. These a each calibrated with re erence to the freezing ar boiling points of wate As shown in the accon panying figure these poin are marked 32 and 212 deg respectively, in the Fah enheit, and 0 and 100 deg respectively, in the Cent grade scale. Thus, 180 de of the former correspor to 100 deg. of the latter; the ratio is 9:5.

To convert Fahrenhe (F.) readings into Cent grade (C) or vice vers the following formulas a useful:

$$F = \frac{9}{5} C + 32$$

$$C = \frac{5}{9} (F - 32)$$

Example—(a) What a the readings of the Fahre heit scale corresponding 40°, and —10° Centigrad

Solution—

$$F = \frac{9}{5} \times 40 + 32 = 104° F$$

$$F = \frac{9}{5} (-10) + 32 = 14° F.$$

Example—Convert —4 and 50 F. into Centigra readings.

Solution—

$$C = \frac{5}{9} (-4 - 32) = -20 C.$$

$$C = \frac{5}{9} (50 - 32) = 10 C.$$

Readings above zero are plus. (+) and those below ze minus (—).

EXAMINATION QUESTIONS

Miscellaneous Questions

Ques.—What is a windy or blown-out shot?

Ans.—There is, or should be, a slight difference in the meaning of these terms. A "windy" shot is one that produces a heavy concussion of the air, because much of the energy of the powder is expended on the air. The shot may or may not have blown its tamping. It may have broken the coal, or may have found vent through a crack or crevice; but, in any case, the energy of the powder is not wholly absorbed in the work of breaking the coal, as is the case when the shot works properly.

A blownout shot is one that blows its tamping without breaking the coal. The effect produced is quite similar to that of a windy shot; but the projected flame is, generally, more intense and the shot liable to prove more dangerous.

Ques.—What are the causes of windy shots?

Ans.—The chief causes that give rise to windy shots are: 1. Too great a charge of powder for the work to be accomplished. 2. The exploding charge finding vent through a crack or crevice, or blowing out through a soft stratum of the seam. 3. The use of different grades of powder, at the same time, in the same hole.

Ques.—What are the chief causes of blownout shots?

Ans.—The principal causes of blownout shots are: 1. Too small a charge of powder for the work to be performed in breaking the coal. 2. The shot being unable to free itself, as when roof-bound, or when the hole is drilled perpendicular to the face, with no side cut or mining, or when the charge is laid too deep on the solid. 3. The hole having too great a diameter for the quantity of charge. 4. Insufficient or poor tamping. 5. The hole being tamped with coal slack or other combustible material. 6. The use of too quick a powder.

Ques.—Name some conditions under which a windy or blownout shot may prove dangerous.

Ans.—Such a shot is dangerous in a dry mine, where dust and fine coal have been allowed to accumulate at the working face, particularly if the coal is highly inflammable. Also, in the working of a gaseous seam, where the gas is liable to accumulate over the waste and on the "falls" or in other void places that are difficult to ventilate. The concussion of a windy shot is liable to throw much dust into the air or dislodge the gas from its lurking place, which may then be ignited by the flame of succeeding shots. The projected flame of a blownout shot may raise and ignite the dust and accumulated gas.

Ques.—How is the size of mine cars affected by (a) thin coal; (b) poor roof?

Ans.—The mining of a thin seam of coal in which the cars must be taken to the face will require building low cars. In this case, in order to provide a suitable tonnage or capacity for each car, if the conditions permit the cars must be built broad and long.

(b) A poor roof always requires narrow openings or roadways; and, for a given capacity or tonnage, the cars, in this case, must be built as high and as long as possible; since the width of the car is limited by the width of the opening, after leaving sufficient clearance at the side of the roadway.

Ques.—What is the breaking strain and safe working load of a good steel rope $1\frac{1}{8}$ in. in diameter?

Ans.—The breaking strain of a crucible-steel 1-in. rope is 39 tons. On this basis, the breaking strain for a $1\frac{1}{8}$-in. crucible-steel rope is $39\ d^2 = 39\ (1\frac{1}{8})^2 = 49.36$ tons. The safe working load, for this rope, will depend largely on the depth of the shaft and the speed of hoisting. In common mine practice where the depth of the shaft does not exceed 100 yd. and the speed of hoisting is not greater than 20 ft. per sec., a factor of safety of 5 may be used, making the safe working load, in this case, say 10 tons. In deeper shafts with a greater speed of hoisting, say up to 50 ft. per sec., a factor of safety of 8 or even 10 should be used, making the safe working load, then, say from 5 to 6 tons.

Ques.—In a 12-in. column pipe 450 ft. long, on a 42-deg. pitch: (a) What would be the pressure per square inch at the bottom of the pipe? (b) What would be the total weight of water in the pipe, in tons?

Ans.—On this pitch, the vertical rise of a pipe 450 ft. long is $450 \times \sin 42° = 450 \times 0.669 = 301$ ft. The sectional area of the 12-in. pipe is $0.7854 \times 12^2 = 113$ sq.in.

(a) When the pump is not in action, there is, at the bottom of the pipe, a static pressure of 0.434 lb. per sq.in., for each foot of vertical height or water column. The pressure, in this case, therefore, is $0.434 \times 301 = 130.6$ lb. per sq.in.

(b) The total weight of water in the pipe, taking the unit weight of water as 62.5 lb. per cu.ft., is $(113 \times 450 \times 62.5) \div (144 \times 2000) = 11.035$ tons.

Ques.—The main entry in a mine runs due west; at a point 600 ft. from the shaft bottom a cross-entry has been run due north for a distance of 160 ft. This cross-entry caved in and was lost. In order to reach the coal at the head of the entry, it is resolved to start a cutoff on the main entry 400 ft. from the shaft. Find the length and the bearing of this cutoff.

Ans.—The distance from the point where the cutoff is to be started to the mouth of the cross-entry is $600 - 400 = 200$ ft. The cutoff forms the hypotenuse of a right triangle, therefore, whose sides are 200 and 160 ft., respectively. The length of the cutoff is then

$$\sqrt{160^2 + 200^2} = 256 + ft.$$

The bearing of the cutoff is the angle that it makes with a due north and south line, or the angle between the cutoff and the cross-entry. The tangent of this angle is $200 \div 160 = 1.25$; and the angle of the bearing is, therefore, 51 deg. 20 min. The bearing of the cutoff is then N 51° 20′ W.

The length of the cutoff can be found, also, thus

$$\frac{200}{\sin 51° 20'} = \frac{200}{0.7808} = 256 + ft.$$

COAL AND COKE NEWS

Washington, D. C.

The Government has filed a brief with the Supreme Court in behalf of F. W. Howbert, Collector of Internal Revenue for the District of Colorado, in the case of "Stratton's Independence Ltd.," this being the case involving the applicability of the corporation tax to mining corporations, the contested issue in which was the matter of depreciation allowance, fully dealt with in these pages heretofore.

Three questions were certified to the Supreme Court—whether the act applies to mining corporations, whether the proceeds of ores mined by corporations are income, and whether if they are income such a corporation is entitled to deduct the value of ore as depreciation.

After contending that the act is applicable to mining corporations the Government brief goes on to argue that the proceeds of the ore is income, contending that:

> When capital is by labor changed from a fund into a flow, it necessarily changes its character from capital to income. In the case of a mine, the mineral as it lies in the ground is capital, but when it is extracted, converted into ore and sold, the result is a flow; the tree has borne fruit, and income has accrued.
>
> The argument that, since this flow necessarily results in depletion or exhaustion of capital, therefore, the flow is a flow of capital and not of income, is entirely fallacious, according to the above definitions, the understanding of business men, and the practical necessities of a tax based on income. The law takes things as it finds them; it taxes property under the character which the owner has impressed on it, and where that owner voluntarily changes his funds of capital into a flow of income the law accepts the designation and taxes him accordingly.

The brief goes on to say that an ordinary life tenant may not open new mines but when opened he may work them even to exhaustion, while a lease by the State of the mineral under its public land would not be a sale of such lands and the payment of dividends by a mining company out of the proceeds of ore is not a payment of capital. Moreover the fact that the operation of a mine may decrease its valuation does not prevent profits not spent in dividends from being called surplus. Lastly it has been held by the Supreme Court of Pennsylvania that oil companies and mining companies have incomes within the meaning of an income tax act.

In summing up the Government says that: "The principle for which the mining companies contend is not applicable to them alone, and if applied generally, as it must be if applied at all, would seriously hamper the working of an income tax. A pension or a terminable annuity produces an income at the expense of capital, but who would think of calling such produce any the less income?"

As for the claim that depreciation ought to be allowed on the ore the Government says:

> In the absence of any showing to the contrary, the word "depreciation" here must be given its ordinary meaning in business usage, and also it must be taken as similar in meaning to a "loss." So considered, depletion of capital cannot be called "depreciation," nor would any business man think of so calling it.
>
> When capital is converted into income, as when a loaf of bread is eaten it cannot be said that the capital has "depreciated:" it has merely been converted into another form. "Depreciation" takes place when the capital retaining its form, decreases in value owing to wear and tear, change of fashion or methods of manufacture, or the like. When a fund of capital in a mine consisting of the ore in place is converted into a flow of income resulting in money to the owners, the ore has not depreciated; it has suffered a change. Gold is mainly valuable because it does not depreciate. The buildings, machinery, shafts, etc., do depreciate. They retain their form and use, but their value diminishes at different ratios with different causes.
>
> If a man have a stock of goods and he sells some and the balance becomes worthless through a change of fashion, it would be absurd to call the two processes by the same name, nor would any business man carry the results to the same account. In fact in the Nipissing Mines Co. case, in which a writ of certiorari from this court is asked, the company in its second return abandoned the theory of depreciation and replaced it with the items "return of capital," "distribution of capital nontaxable."

In closing the claim is made that because the mining company never actually retained any sum and applied it to depreciation, but distributed the income, in the form of dividends, no claim for depreciation can justly be made. The brief further undertakes to apply the reason in the case to coal mining companies as well as to those engaged in metal mining.

HARRISBURG, PENN.

The Lehigh Coal and Navigation Co., one of the defen ants in the suit brought by the Government last Septemb to dissolve the so called "anthracite coal trust," filed answ on Saturday, Oct. 18, making general denials. This suit primarily against the Philadelphia & Reading Railway C and other coal-carrying railroads, charging illegal combin tion in restraint of trade in violation of the Sherman ant trust act and the commodities clause of the Interstate Com merce Act.

The Lehigh Coal and Navigation Co. denies any com munity of interest between it and the Philadelphia & Rea ing Railway Co., the Philadelphia & Reading Coal & Iron C and the Reading Co., through its directorship, contract otherwise. It also denies entering into a combination stifle competition in the sale of anthracite coal.

The answer gives a history of the company since its form ation in 1822, with a detailed account of the acquisition canals, railroads and coal lands in Pennsylvania. The d fendant contends that, had it not been for the ownership mines by companies that built canals and roads, these nev would have been built. The company denies any allian with the Central Railroad of New Jersey designed to suppre competition.

The answer of the Reading Co., which is expected to b most important in the defense, is expected to be filed in week or ten days.

Good Car Service to Coal Mines

The car service furnished the coal and coke trade by th railroads is conceded to be above the average and about a perfect as possible. For years past the operators have bee furnished with sufficient cars to move their output whe as now other interests suffered from lack of transportatio In return for this service the railroads have asked the oper ators to make their service go as far as possible by load ing cars to capacity.

At a meeting held last week between about 35 coke oper ators and representatives of the railroads, the transportati representatives made a plea for better lading. The new ste cars have a capacity of 50 tons. A great proportion o them are going out under 40 tons. The lading runs fro 36 to 41 tons. Other cars are also loaded short. The rai road managers presented some calculations showing how th poor lading kept cars in service in the coke region tha could be profitably employed in the coal trade and thus de prived the railroads of valuable revenue. It was estimate that with proper lading in the coke region the railroad would have 3000 cars more to put into the coal trade. Thes cars are constructed to haul coal, coke, ore and limeston and can be utilized in any of these industries.

The coke operators confessed that they did not want t load too full because of the loss of coke by being jarred of the tops of the cars. It was pointed out, furthermore, tha the specific gravity of the coke varies considerably in dif ferent portions of the Connellsville region. The operators however, acknowledged the justice of the railroads' com plaint, and promised to do all they could to remedy th conditions.

More Button Strikes

The numerous button strikes at the mines in the anthracite region are clearly contrary to the agreement between the representatives of the miners and the operators The award of the original Strike Commission, to which both parties subscribed, says:

> It is adjudged and awarded, that no person shall be refused employment, or in any way be discriminated against on account of membership or nonmembership in any labor organization and there shall be no discrimination against or interference with any employee who is not a member of any labor organization by members of such organization.

It is apparent that the operators are living up to their part of the agreement. Refusal on the part of the employees at a number of collieries to work with men who do not belong to the union, or who are in arrears in their dues, is a form of discrimination expressly denounced by the Commission. At this time of the year when there is a big demand for coal, both the employees and the operators are put to a serious loss by the suspension of operations for days, sometimes weeks at a time. It is understood that the union officials are averse to the button strikes. It will be to the miners' interests and to the officials' interests, in future negotiations with the operators to abide by the stipulations of previous contracts.

The strikes during the past year have become so expensive and annoying to both sides that some definite arrangement should be entered into to continue until the expiration of the present contract.

PENNSYLVANIA

Anthracite

Harrisburg—The Pennsylvania, New York & New Jersey Power Co., of Scranton, has filed the biggest return of an increase of stock or debt known at the capitol in a long time. The stock was increased from $405,000 to $5,000,000, and notice given of authority to issue bonds to the amount of $25,000,000.

Pittston—After being abandoned for fifteen years the Schooley colliery is to be opened and operated by the Pennsylvania Coal Co., which has bought the property. Pumps are now drawing out the water which flooded the workings of the mine 15 years ago when a cave occurred under the river bed.

Hazleton—The Lehigh Valley Coal Co. is preparing to tear down the company houses at Laurel Hill prepartory to stripping operations.

The G. B. Markle Co. has completed arrangements for the erection of a modern club house for the use of its mine employees. This company, to insure a more plentiful and certain supply of water for its mine workings, is drilling three artesian wells.

Wilkes-Barre, Penn.—Damages to the amount of $4000 was the verdict awarded Joseph Zizkie in a suit against the Pennsylvania Coal Co. for the loss of his arm. The plaintiff was employed as a brakeman on a mine motor at No. 14 colliery and while seated on the front of the machine sanding the rail it collided with two cars left standing on the track and he was badly injured, one of his arms having to be amputated. The company was charged with negligence in not having a suitable headlight and a sanding device on the motor.

Shamokin—In a terrific explosion of gas on Oct. 17, at Bear Valley shaft, operated by the Philadelphia & Reading Coal & Iron Co., four miners were severely burned, probably fatally. Members of the first-aid corps quickly arrived, and after bathing the victims in oil, wrapped them in blankets and conveyed them to the surface. The explosion was probably caused by one of the victims exposing a naked lamp in a corner full of gas.

Two miners while mining coal at the Mineral R.R. & Mining Co.'s Luke Fidler Colliery on the same day were fatally burned by a gas explosion caused in a peculiar manner. A piece of rock slipped from the roof, struck and broke a safety lamp, the flame becoming exposed and instantly igniting the gas.

Scranton—The Bliss Colliery of the Lackawanna Coal Co., which was tied up for a few days by a button strike, has resumed operations, the members of the union claiming 100 per cent. membership. The Seneca Colliery of the Lehigh Valley Coal Co. has been closed down for a few days for the same cause. It is claimed that a very large proportion of the workmen at the Seneca have failed to ally themselves with the union.

Bituminous

Johnstown—Coal operators are viewing with concern the inroads made in the labor supply of this mining field by the agents of the West Virginia miners. Hundreds of miners brought to this part of the country as raw material and worked into experienced men by the Cambria County operators are being offered inducements by the West Virginia agents and enticed to that field. Thus far no strenuous effort has been made to stay the movement though it is not thought that any attempt in that direction would prove successful.

Cannonsburg—The Henderson Coal Co. has begun the preliminary work of opening a mine on the Montour R.R. There is a large acreage of coal in this vicinity which has not yet been opened. The same company also is clearing off land preparatory to erecting about 100 houses which will be occupied by miners' families. This mine will be one of the largest in the Central Charitiers Valley and will be equipped with modern machinery It is expected to be opened and in operation by next summer. Several other mines will be opened at various points along the new railroad, work on which is progressing steadily.

Patton—The strike of the 800 miners in the Pennsylvania Coal & Coke Corporation mines has been settled. The half dozen or so employees who had been holding out against joining the union have finally been prevailed on to join for the sake of peace, and the men have gone back to work.

Washington—An ejectment suit has been brought by the Reliance Coke Co. against several miners. The trouble between the miners and the company is, it is averred, the outgrowth of a determination to operate nonunion . The men, against whom the suits are brought, refused to work and also refused to give up the company houses in which they are living.

WEST VIRGINIA

Charleston—Fifteen thousand jobs that will pay from $80 to $180 per month depending entirely upon the industry of the men who hold them are waiting applicants at the coal mines in West Virginia. Every coal field in the state is ready to take on more men, and the sooner these men come the better.

A conference was recently held between a committee of miners from the Fairmont coal region and Thomas J. Haggerty, International Board member and President Thomas Cairns of District 17, at which meeting the organization of the Fairmont field was discussed. It was decided to invite the coal operators to meet a committee representing the miners for the purpose of entering into a wage agreement.

Wheeling—A number of coal mines both in this state and on the Ohio side of the river have been forced to suspend operations owing to the scarcity of coal cars. So great has been the demand for coal at Lake ports and other shipping points that the railroads although doing their utmost to meet the emergency are unable to supply sufficient cars. As there is no apparent relief from this situation in sight at present it is likely that many of the mines may be off indefinitely.

TENNESSEE

Knoxville—October 25 has been set as the date for a meeting of representatives of the Kentucky Mine Owners' Association and of the Southern Appalachian coal Operators' Association at Knoxville, to discuss various matters of interest to the operators, including the details of workmen's compensation legislation which will be recommended to the next Kentucky legislature. Kenneth U. Meguire, of Louisville, will probably present to the meeting a tentative draft of an act embodying features desired by the coal interests. It is the object of the coal operators to do what they can toward securing the adoption of an act which will be equally fair to mine owners and miners, and which will be free from the confusion and ambiguity which has resulted in legal entanglements over many acts passed in other states.

KENTUCKY

Pineville—Various rumors regarding the establishment of a large electrical plant, or of several plants, at some point in the vicinity of Pineville, Ky., have been crystalized by the recent purchase of the T. J. Asher plant, which has been leased to the Southern Mining Co. The Kentucky Utilities Co., which has recently acquired numerous other electric plants in Kentucky, is the purchaser, and it is taken for granted that large improvements will be made in the small plant referred to, which has at present one 500 k.w. unit only, for the purpose of enabling the company to take full advantage of the possible market for electricity which is presented by the numerous coal mines in that section.

Madisonville—A picnic held at Madisonville, by the United Mine Workers of America, was largely attended, a parade of more than 2000 miners and their sympathizers being a leading feature. The affair was intended as a demonstration in connection with the work of organizers among the nonunion mines in that section, and was regarded as highly successful from that standpoint. The miners were especially careful to avoid any semblance of disorder, all of the saloons being closed and the proceedings being decorous in every way. It is claimed, however, by several of the larger non-union operators that their men did not attend the picnic, figures being presented showing that the amount of coal loaded out on that day was as large as usual, and larger in some instances.

OHIO

Columbus—The Detroit, Toledo & Ironton R.R. is to be purchased by the bondholders committee, Jan. 20, and to be put in condition to take care of the business of the road. Attorney General Hogan, who threatened ouster proceedings because of insufficiency of equipment received a letter from George P. Johnson, receiver, from Detroit, saying the bondholders committee had agreed with Judge Tuttle of the United States district court of Michigan to bid in the road Jan. 20 and to advance sufficient money to keep it going and improve the conditions.

Cadiz—The Selway Coal Co., which was recently granted a charter by the Secretary of State has secured 200 acres of coal land at Rayland. Mining operations have started. D. W. Selway is president.

INDIANA

Brazil—Drillers for coal on the farm of Fred Emmert, four miles south of this city, struck a pocket of gas at a depth of 42 feet.

A keg of powder exploded in a car at the Lost Creek mine, Seeleyville recently. The driver a few feet away escaped injury. The car was attached to the electric locomotive and it is believed a spark from the trolley fell into the can. Several other cans were badly bent and thrown many feet but none exploded. Two trap doors and two brattices were blown in.

ILLINOIS

Marion—At the village election at White Ash, a mining town north of here, the entire Temperance ticket was elected on account of the vote of the miners' wives. About one-half of the votes cast were by women, only a small number of the men voting with the female voters.

West Frankfort—The Burlington R.R. has finally made its connection with the several mines west and south of this place. Heretofore the mines depended upon the Chicago & Eastern Illinois entirely for moving its coal to market.

MISSOURI

Higginsville—There is little probability that a reorganization of the Farmers' Coal Co., operating mines at Higginsville, Mo., will take place, at least during this winter, according to an announcement by Receiver John H. Bovard. Mr. Bovard is now giving his attention to the producing end of the business, and hopes to demonstrate that the mines are fully up to all claims. A daily capacity of 500 tons has been attained, Missouri block coal being mined. The company will probably be put on a more stable basis next spring. It went into the receiver's hands in June.

KANSAS

Lansing—Deputy Warden Fitzgibbon has reported to Governor Hodges that there is a big shortage in the coal production at the state penitentiary at Lansing. The production for the summer was 34,201 bushels less than during the summer of 1912. This is accounted for by the fact that there were less men employed in the mines to the extent of 5456 fewer days work being done.

ARKANSAS

Clarksville—A. P. Hoye formerly of Russellville recently secured a lease on the Eureka Anthracite Coal Co.'s property near Montana. This development has in the past been operated by John E. Daley.

TEXAS

Rockdale—Seven Mexican miners, entombed since Oct. 16 in the Vogel & Lawrence lignite workings here, were found alive Oct. 21, when rescuers gained the mine interior by drilling a ninety-foot shaft. The men were imprisoned by a cave-in following a cloudburst which flooded the mine. Two other men entombed in another part of the mine are believed to be dead.

COLORADO

Crested Butte—The Colorado Fuel & Iron Co. is erecting a model gymnasium for its employees at Crested Butte. This building is to be completed by Dec. 1.

Baldwin—The Citizens' Mine is to be opened shortly after three years of inactivity. Arrangements for opening this operation have already been made and 100 men will be put to work. This will more than double the output of the Baldwin district.

OREGON

Marshfield—A new coal mine has been opened up by Smith & Hennessy on Isthmus Inlet, four miles above the town of Marshfield. It is now producing 50 tons daily, and by Jan. 1, will be turning out 250 tons per day.

Beaver Hill—It is stated that this mine is about worked out, at any rate the Southern Pacific interests, owners are opening up a new mine which will be the main producer. The Beaver Hill has had a steady and large output for years.

Libby Mine—The management of this mine on Coos Bay are now working a double shift and making a record production, as all their coal is contracted for.

PERSONALS

A. B. Kelly, for the past three years superintendent of the Dearth plant of the H. C. Frick Coke Co., has resigned to assume a similar position with the J. H. Hillman Co.

James M. Page, of Pratt City, Ala., has resigned his position as division engineer of Pratt No. 1 Division of the Tennessee Coal, Iron & R.R. Co., to accept the position of superintendent of the Rex No. 2 coal mine of the Lafollette Coal, Iron & Ry. Co. He will be located at Lafollette, Tenn.

John Phillips of Century, Barbour Co., W. Va., has been appointed a district mine inspector, by Chief Earl Henry. He has not yet been assigned to a district. For the past three or four years Mr. Phillips has been general superintendent at the Century Co.'s mine and has acted as manager at other collieries.

A. R. Miller, superintendent of the Leisenring No. 3 plant of the H. C. Frick Coke Co., has tendered his resignation and upon its becoming effective, will become associated in the operations of Francis M. Ritchey, Jr. Mr. Miller will have charge of the physical end of the Ritchey coal and coke operations.

J. M. Webb, foreman for the United States Bureau of Mines, who has been assigned to the Knoxville station has been notified to instruct the miners in the Jellico district in mine rescue work. Four or five teams have already been organized and the coal companies in that locality expect to send more men to learn mine rescue work during the next four or five weeks.

Howard Millington, cashier of the Pittsburg Northern Coal Co., was held up, near Pittsburg, Kan., while carrying the weekly payroll of $6000. The bandits, who proved to be a couple of miners, were repulsed, one being fatally wounded and the other landed in jail. An unusual motive was back of the robbery, one of the miners, two brothers, saying that he needed the money with which to get married.

OBITUARY

John Fallon, prominent for over a decade in the affairs of the United Mine Workers of America, died in Wilkes Barre on Oct. 14, after an illness of but a few days. Peritonitis, following an operation for gall stones, was the cause of his death. For fourteen years Mr. Fallon served in official capacity for the miners. As a member of the national executive board for this district, he had a prominent part in the stirring times of 1902, when as a close associate and confidant of John Mitchell, he was a leader in the great strike conducted by the miners. He is survived by his wife and six children.

CONSTRUCTION NEWS

Benscreek, Penn.—The Juniata Coal Co., of this place, has started work on two fine new mines which will be in operation within the next few months.

Logan, W. Va.—The seven mile extension of the Chesapeake & Ohio up Main Island Creek into the coal and timber land of Cole & Crane, of Cincinnati, is almost completed.

Lehigh, Okla.—The local coal company is now building new bath houses at mines Nos. 1, 5, 6 and 8. When finished, these will be the best in the state; all will have concrete floors, hot and cold shower baths, steam heat, and double rows of lockers.

The company is also preparing to put in a complete telephone system in all the mines. To accomplish this will require 21 miles of wire. A large new boiler, much bigger than ever before used here, is being put in place at mine No. 6.

Radley, Kan.—The Mayer Coal Co. is planning to add two new mines to its present developments. The additional mines will be sunk at Radley Kan., during the next month. The company is in the market for necessary equipment and will operate the new developments throughout the winter.

Johnstown, Penn.—The Berwind Coal Mining Co. has just ordered the erection of 10 more modern houses with all conveniences for miners' families at Mine No. 42. The investment will amount to about $25,000 and will bring the total expenditures of the company for the year up to about $100,000. Plans for extensive building are being drawn up already for next year.

Whitesburg, Ky.—The Elkhorn-Kentucky Coal Co. has been incorporated by Welch, W. Va., parties with a capital of $100,000 for the purpose of developing coal and timber land along Troublesome Creek and Carrs Fork in Knott County. A large area of fine property has been purchased, and it is the intention to induce the Lexington & Eastern R.R. to build at least two branches into the property, and to begin developments early next spring upon a large scale.

Logan, W. Va.—John Laing, ex-chief mine inspector of West Virginia, has recently been elected to the head of a new coal corporation that has under development 27,000 acres of coal land in Logan county, about five miles from Logan. The coal to be developed is known as the Island Creek seam, and 3200 acres will be opened immediately. Two tipples are being erected, each with a capacity of 3000 tons daily. The new firm expects to be able to ship coal by Jan. 1 of the coming year.

Welch, W. Va.—It is understood that the Norfolk & Western expects to double track its Tug Branch line next spring. This improvement will be necessary to care for the ever-growing output of coal in the field which this line serves. The United States Coal & Coke Co., whose mines are located upon this branch, is making great developments, and the coal tonnage is rapidly growing heavier every day. This field is immensely wealthy in coal, and promises to become, in a short time, the heaviest producer of any tributary branch to the Norfolk & Western.

NEW INCORPORATIONS

Houston, Texas—An ammendment has been filed by the Belknap Coal Co. of Witchita Falls decreasing its capital from $200,000 to $50,000.

Marietta, Ohio—The Iron Chest Mining Co., of Marietta, Ohio, has been recently chartered with a capital of $30,000 to engage in all kinds of mining including that of coal.

Indianapolis, Ind.—The Public Fuel Co. is a new concern with $10,000 capital stock, to do a wholesale and retail trade. The directors are A. R. Nicholas, L. E. Kirkpatrick and W. H. Nicholas.

Chicago, Ill.—The Rudenga Coal & Material Co. has been organized in Chicago with a capital stock of $50,000 to deal in and handle all kinds of fuel, building material, etc. The incorporators are William Rudenga, Reider Schoonveld, and John Heck.

Pittsburgh, Penn.—The Coal Bell Co. has been organized at Pittsburgh for the purpose of mining coal, with a capital stock of $600,000. The incorporators are W. B. Beecher, S. B. Kelly, W. H. Young, M. J. Holliday, and George H. Wolf all of Pittsburgh, Penn.

Johnstown, Penn.—The Ajax Coal Co. has been reorganized under the corporate title of the Ajax Consolidated Coal Co. and has increased its capital stock to $275,000. Under the plan of consolidation, the company has taken title to the Fort Hill mine of 300 acres and arranged for the purchase of nearly 1000 additional acres adjoining. The company's mines in Maryland and West Virginia comprise over 900 acres. Richard M. Duvall is president, James B. Pugh, vice-president, Fred E. Rowe, treasurer and Daniel Cloud, secretary.

INDUSTRIAL NEWS

Springfield, Ohio—Fire recently destroyed the round house of the Detroit, Toledo & Ironton Railway Co., causing considerable loss and wrecking two engines.

Earlington, Ky.—The Victoria Coal Co. has, upon the recommendation of its engineer, decided to cease work at its present mines and to open an entirely new operation on its property near Madisonville.

Johnstown, Penn.—Coal operators in this section are becoming alarmed over the scarcity of miners, and they predict that, if they cannot obtain more men to work in the mines, there will be a shortage of coal this winter.

Butler, Penn.—One of the largest coal deals in Butler County, involving 10,000 acres, is to be closed up soon by a syndicate now in the field. The operation will mean the building of several coal towns, and the employing of 1000 miners.

Patton, Penn.—Because eight men refused to unite with the union, 800 employees of the Pennsylvania Coal & Coke Corporation recently went on strike. There is a possibility that the trouble may spread to other operations of this concern in Cambria, Clearfield and Indiana counties.

Johnstown, Penn.—John Lochrie, of Windber, and John Reese, of Scalp Level, purchased the mineral and surface rights of the George Meyers' estate in Solomon Run Hollow, above Walnut Grove, consisting of 30 acres and containing, approximately, 300,000 tons of coal in three seams. Development of the property will be begun at once.

Connellsville, Penn.—The Crescent Coal & Coke Co. has been granted a charter in Delaware and will develop a tract of 122 acres. Steps will be taken at once to operate. For the present the company expects to take out the coal and will not engage in the manufacture of coke. If conditions warrant, a battery of coke ovens will be built later.

Toledo, Ohio—The Toledo Fuel Co. has moved from the former location on St. Clair St. into handsome new quarters in Toledo's new skyscraper, the 22-story building of the Second National Bank. This building is the tallest in the city and being of rather small ground dimensions, is quote noticeable. It overlooks the Maumee River and all the big docks and railroad yards in that section of the city.

Princeton, W. Va.—A new set of scales being built by the Virginian R.R., at Princeton, is said to be the only equipment of its kind used by any railroad in the United States. These scales are of two-car capacity, devised with double platforms working independently of each other, and the tonnage of both cars is registered on the inside of the scale house. This expedites the weighing of a train of coal to such an extent that it can be performed in less than half the time required by the one-car scales.

Wilmington, Del.—The United States Coal Co. which was incorporated under the laws of Delaware, in 1910, recently held a meeting at Wilmington, for the purpose of electing a board of directors. This company's coal property consists of 2280 acres situated about four miles southwest of Kemmerer, Lincoln County, Wyo., on the tracks of the Oregon Short Line R.R. The property is underlaid with 11 seams of bituminous coal aggregating 210 ft. in thickness. Reliable engineers estimate that the property contains 478,000,000 tons of marketable fuel.

Baltimore, Md.—To supply the increased demand for its products, the Davis Coal & Coke Co. is opening an additional mine at Franklin, West Va. This will become a part of the lower Potomac branch of the company. No statement is made as to what the tonnage will be. Simultaneously, the same firm is enlarging its mines at Henry, W. Va., so as to double the output, thus giving a daily output of about 1000 tons. The electric power used in connection with these operations will be furnished by the company's central power plant at Thomas, W. Va.

Pineville, Ky.—The Cumberland Telegraph & Telephone Co., in response to the repeated requests and petitions of coal operators and business men in the Harlan field, has announced that it will construct long-distance lines to Harlan and points in that vicinity as soon as possible. This section has heretofore been practically cut off, as far as telephone communication is concerned, by the fact that the Cumberland lines did not go further than Pineville. It is probable that the work of constructing the necessary new lines will begin in the spring, as the winter months are not favorable to that work.

St. Louis, Mo.—Before Commissioner Harlan, of the Interstate Commerce Commission, in Chicago, has come up the hearing of the Business Mens' League, of St. Louis, vs. the St. Louis Terminal Association for the removal of the twenty cents per ton bridge toll on coal for St. Louis.

A large delegation of St. Louis business men and manufacturers are fighting against the toll and the business interests of East St. Louis are lined up with the Terminal, fearing that the roads may be able to prove that the rate to East St. Louis is not a paying one in the event that the bridge toll is removed.

Upon the outcome of this contest depends the future of the manufacturing enterprises on the east side of the Mississippi River, and to some extent the development of St. Louis proper on the other hand. This is the first time that the St. Louis bridge toll question has got to a hearing before the Commission, the Terminal having always been successful in getting the proposed hearings blocked.

COAL TRADE REVIEWS

GENERAL REVIEW

An abrupt and general decline in temperature, in all parts of the country, checked a weakening tendency in the market. Anthracite stimulated into activity. Bituminous feeling the effects of the uncertainty in the business outlook and the continued heavy movement.

The week opened with a general storm in all parts of the country, accompanied by a sharp fall in temperature which arrived at the crucial moment. Under the combined influence of unseasonable weather conditions and a heavy production at the mines, the broadening tendency of the market had suffered a check, and the trade was beginning to mark time pending further developments. While prices were being well sustained, there was a notable contraction in the absorbing power of the market; activity was confined more closely to the higher grades, and the fact that a number of these were being offered in the outside markets was significant evidence of the trend of conditions. There has been no potential disturbance in the week's developments, and with the added stimulus of the changed weather conditions the strong latent power, which has been the distinguishing characteristic of the market for the past two months, will be revived.

The anthracite trade is momentarily dormant, but with a strong undertone. The last rush is on to the Atlantic Coast ports which close to navigation, and the trade only needs the reviving influence of colder weather to start the usual winter activity.

There is less anxiety apparent in the Eastern bituminous situation; stocks are said to be larger than usual, and no shortage is anticipated provided the car supply remains moderately good. Consumers are showing a tendency to go slower because of the decrease in industrial activity, particularly in the iron and steel lines, and the uncertainty in the business outlook generally. Production is restricted, however, by car and labor shortages, so that the market will probably continue on the same firm basis until the closing of navigation on the Lakes, at least.

Advanced circulars have been announced by most of the operators in Ohio, and the new quotations are being well maintained by slow deliveries which show indications of becoming even worse. The dumpings over the Hampton Road piers are heavy, both plenty of vessels and coal being available; the piers are working practically continuous. The southern markets continue rather quiet.

The effects of the changed weather conditions, which were particularly severe in the Mississippi Valley, are not available at this writing. They will no doubt have a material influence upon the situation there. The car shortage is not as bad as was anticipated, and the market has been holding steady with the possible exception of the steam grades. The supplies on the docks at the head of the Lakes are heavy, but it is conservatively estimated that the movement to the interior has been 25 per cent. less up to Oct. 1 of this year than last year.

BOSTON, MASS.

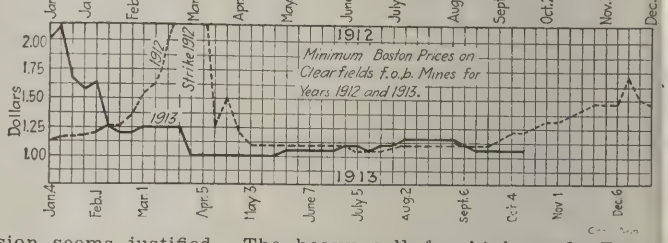
An easier situation on Pocahontas and New River, with the outlook doubtful. Shipments of Georges Creek from Philadelphia another sign of a relaxed market. Bunkering demand at New York holds prices, on the better Pennsylvania grades about where they have been for several weeks. The poorer grades are off. Anthracite continues strong.

Bituminous—Whether due to a slackening demand or purely to the slow movement of water transportation, supplies of Pocahontas and New River are notably easier than a week ago. The loading dispatch at Hampton Roads has improved and tonnage is being freely accepted for the balance of the month. With some of the agencies, too, there has been a recession in price so that $2.85 is again heard in scattered instances for spot coal. This is the more surprising when recent heavy consignments for the Government and an active demand for export are both taken into account.

Whether the market will get firmer again when transportation gets moving regularly, remains to be seen. There is apparently no anxiety in New England over coal for November except in the relatively few cases where navigation will close soon after Dec. 1. Stocks are understood to be larger than normal in most directions and anything approaching a "flurry" is now hardly possible unless a really serious car shortage develops in the next month or two. A scarcity of mine-workers is still reported from West Virginia but output seems to be kept up to the usual mark for this time of year.

For inland shipments there is very light demand and distributors with cargo balances to dispose of find the going rather hard. Prices are off somewhat in consequence.

Georges Creek has been available on contract requisitions at Philadelphia this week, the first invoices there of this grade for coastwise shipment since late August. That is another factor in the general easing up that is evident all along the line. There are a number of shippers who are quietly looking around for small orders to relieve a possible pressure of coal later and in many ways their apprehension seems justified. The heavy call for high-grade Pennsylvania coals for bunkering purposes at New York, transatlantic business especially, is holding prices up to the level that has prevailed now for several weeks. The poor grades however, are selling pretty well down and the increasing differential between "good" and "poor" is one of the interesting developments of 1913.



Anthracite—The situation is quite as strong as when last reported. Interruptions to barge movement have caused a rather sharpened demand for prompt cargoes. The last rush for shipments east to the Penobscot and the Kennebec taken together with urgent calls from the larger cities make a situation that grows harder to manage as the season advances.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.65	$1.30@1.75	$1.67@1.77	
Philadelphia*	2.30@2.90	2.55@3.00	2.92@3.02	
New York*	2.60@3.20	2.85@3.30	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.95
Providence†				3.73@3.88
Boston†				3.83@8.93

*F.o.b. †On cars.

NEW YORK

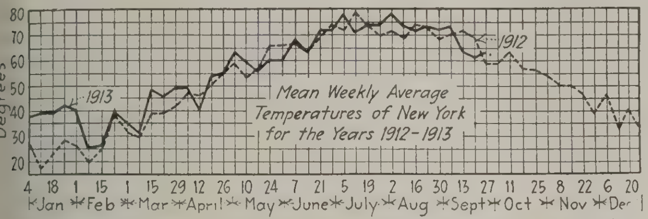
More seasonable weather has had a stimulating influence upon both branches of the local trade. Stove continues the shortest in supply with steam grades all fairly long. Bituminous moving freely but the general tone is not so assured.

Bituminous—There is a notable feeling of hesitancy in the local soft-coal market. Prices are nominally stronger at the moment than last week, but the market seems to have encountered unexpected cross currents, and the general tone is by no means so assured. The trouble is ascribed to a variety of causes; the main difficulty seems to be in the currency legislation. It is even rumored in some places that pressure is being exerted on the market by large interests for the purpose of creating adverse sentiment regarding the new laws.

Despite these unfavorable factors, coal continues to move freely and the local supplies are temporarily reported at an unusually low point. Production for the current month seems to be falling behind both the preceding two months; this is not due to the lack of orders, but to the inadequate car supply and labor troubles in the mining regions. This latter phase of the situation is becoming more accentuated and operators are inclined to a pessimistic view of the outlook. The trouble is not so much in obtaining men, as in the difficulty of keeping them at work.

There is little doing in contracting, and those who have not already covered their requirements probably will not do so this season. We continue quoting the New York market on approximately the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.



Anthracite—The hard coal companies have had a few good days, but the trade is hardly up to normal yet. The appearance of more seasonable weather the early part of the week had a stimulating affect upon the retail branch of the market, but on the other hand, the big wholesalers have had orders cancelled by the dealers, and complaints of slow business are general. The heaviest trade of the year normally develops in October, but such is not the case the current year. Although it is conservatively estimated that the difference in consumption between a hard and easy winter in New York does not exceed 10%, the local agencies seem to be agreed that the situation is now hinging entirely upon the weather.

In the prepared sizes, stove continues the leader, with egg and broken rather weak; nut is easy, but can be moved with stove. The lower grade steam sizes are nearly all in long supply, with the possible exception of No. 2 buckwheat, which is rather short.

We quote the New York hard-coal market moderately firm, according to weather conditions, on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	$4.95
Egg	5.25	$5.15@5.25	5.20	5.10@5.20
Stove	5.25	5.25@5.50	5.20	5.20@5.45
Chestnut	5.50	5.50	5.45	5.40@5.45
Pea	3.50	3.35@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.65@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25@2.35	1.95@2.20	1.60@2.20
Barley	1.75	1.70	1.50	1.50@1.70

PHILADELPHIA

Anthracite inactive pending the arrival of more seasonable weather. Supplies adequate. Uncertainty over the new Pennsylvania state tax.

Local anthracite dealers are waiting anxiously for the appearance of cold weather. During the past week the volume of business increased, but failed to equal that of a year ago. Reports from the mines state that the production this month will be larger than in September and the consumption of coal will be greater. Stove coal is reported scarce and has been sold at a premium. Egg has not been active in the local market contrary to expectations. During the week there was some cutting of prices. It is thought here that the trade will not be embarrassed for coal this winter as was the case last year.

There have been many complaints from the retail dealers in anthracite coal over the state tax on all anthracite mined in Pennsylvania. Many dealers declare that they lose 10 and 12c. on every ton they sell. A year ago they were making more money than at the present time, they assert. It is said that a number of the dealers are going to organize and make the consumer pay the additional 10c. per ton. Several large companies have already announced their intention of levying the extra charge next month.

With the circular at $7.25 a ton for nut, stove $7, egg $6.75 and pea $5.25, the market is more nearly quotable at $7.35 for nut, $7.10 for stove and $6.85 for egg coal. Only the arrival of cold weather will create an active market. Wholesalers report increased demand although retail dealers assert they have had few inquiries worth while during the past week.

BALTIMORE, MD.

Trade conditions remain excellent. Predictions of a drop in the market are again delayed. Demand strong for all classes of fuel and consumers are showing more and more anxiety to get under cover.

The better grades of coal are quickly taken up as offered. Producing interests are being forced to refuse to ship any excess fuel on contracts, and for this reason a number of concerns who have wanted coal above their usual weekly or monthly allotment have been forced to the open market. The heavy call from the Lakes keeps up, and for the present at least there seems to be no disturbing element in sight. West Virginia coals, even of medium grade are easily commanding from $1.05 to $1.15, and three-quarter, is good for $1.20. The Pennsylvania steam coals are worth from $1.15 to $1.25 for the least desirable grades, and better coals are reported farther out of the market now than for many seasons past at this time of the year. Cars were short on certain days in both the Fairmont and Somerset districts. The trouble was not as acute as some time back, but is still an uncertain feature.

Announcement of a new freight tariff from the mines to Baltimore was made by the Baltimore & Ohio R.R. this week. Eight cents is added to the all-rail rate to Baltimore and inside the Virginia Capes deliveries through this city, while seven cents is added to the tariff on both coastwise and foreign shipments outside the Capes.

The anthracite business here is normal for the season. No great rush is to be expected until real cold weather sets in, and in the meantime a fair delivery is being made for the household trade, gaps in yards being filled easily under a steady movement from mines to the city.

PITTSBURGH, PENN.

Car supply poorer, restricting production. Demand less than expected, but easily absorbing current production; recently advanced prices maintained. Temporary weakening expected at close of lake shipping season. Connellsville coke dull, but not particularly weak.

Bituminous—The car supply has decreased somewhat in the past week and is decidedly inadequate at the majority of mines. It is commonly accepted that there has been a slight decrease at least in general industrial activity, and that otherwise the car shortage in the coal industry at present would be greater. Demand for coal has not improved as much as expected, consumers showing a tendency to go slow on account of the general business outlook which, particularly in iron and steel, is not as bright as it was. With lake shipments very heavy and production somewhat restricted by car and labor shortage there is room for all the coal mined, and more, so that the recently advanced prices are secured without much difficulty for such limited tonnages of free coal as are available.

It is not improbable that there will be a little slump in the market when the lake shipping season closes, but operators expect this to be of brief duration at most; consumers are all imbued with the idea that there will be an unusually long suspension next year at the time of the biennial wage adjustment, and stocking against this contingency is expected to steady the market eventually.

We quote for prompt and near forward delivery the advanced prices announced Oct. 1: Slack, $1@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The market continues extremely quiet, but prices are not without some firmness, particularly when strictly standard coke is required. For instance, it is understood that a furnace interest which only buys on exceptionally rigid specifications has made a number of purchases of prompt furnace in the past fortnight at $2.25. November requirements yet to be filled are not large, and interest in the market now centers upon price prospects on contracts to be made for 1914. While a large number of operators, probably representing about two-thirds of the total merchant output, are understood to be committed to a price of $2.50; consumers appear firm in the belief that they will be able to cover at not much if any above $2. We quote the market largely nominal at present: Prompt furnace, $2.15@2.25; contract furnace, $2.25@2.50; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 11, at 386,890 tons, an increase of 28,592 tons, and shipments at 386,890 tons, a decrease of 3055 tons.

TOLEDO, OHIO

Demand for domestic grades curtailed by warm weather. Car shortage the feature of the market. Transportation problem becoming steadily serious. Lake shipping continues heavy

The recent warm weather has put something of a damper on the demand for domestic coal. However the real difficulty of the situation here is the car shortage. Few dealers are receiving anything like normal shipments and this is especially true of the Pennsylvania field. Coal is also difficult to get from the southern Ohio fields. The alarming thing about the whole situation is that conditions seem to be growing worse instead of better. Railroads do not deny that cars are scarce and say that this will continue for about 90 days. There seems to be a shortage of motive power rather than an actual scarcity of cars.

Lake shipping continues as active as possible under the circumstances but many more boats would be loaded at the Toledo docks if coal supplies could be secured. During the present month there has been about 905,634 tons of coal sent up the lakes from the Toledo docks. There have of late been some unverified rumors of embargoes on some of the local railroads and it is feared that a little bad weather would tie the coal market up in bad shape. Prices are holding firm and there are practically no offers below the list.

DULUTH—SUPERIOR

W. W. Broughton, of Minneapolis, vice-president of the Pittsburg Coal Co., and one of the best traffic men in this country, comments on the coal situation at the head of the lakes as follows:

"The country is short and the Duluth-Superior docks long on coal supplies, and as a result we shall see less than the average tonnage on the docks Dec. 1. To look at the docks one would be impressed that there is a large supply, but much of this should be in the yards of the country coal dealer, and in the bins of consumers, at this time, to make room on the docks for additional supplies to meet the winter demand. We will go into the winter with a larger demand for coal, and only a normal supply, or less, to meet it. Last season there was a free movement to the interior with the result that we had sufficient coal on docks to meet the winter demands. The movement to the interior this season to Oct. 1, has been less by 25 to 30% than a year ago for the corresponding period."

COLUMBUS, OHIO

Many of the operators in the Ohio district have announced an advance in quotations effective, Oct. 20 and others are expected to follow; as a result the price levels are considerably higher in the face of rather unfavorable weather. Car shortage continues severe.

The feature of the coal trade during the past week was the announcement by a number of operators of an advance in the circular, effective Oct. 20. Others are expected to follow suit and all will probably be asking higher quotations by Nov. 1 if not sooner. While the warm weather has not been the best for the trade, still the congested condition was only partially relieved and the demand still continues insistent.

The new circular issued by some of the Hocking Valley operators provides for an advance in domestic lump to $2 and three-quarter inch to $1.75 to $1.85. Other grades have also been increased. These prices are expected to be maintained because of the shortage of equipment which delays deliveries to a large extent. In fact very few shipments are going through to their destination promptly.

Lake demand is still good although the shortage of equipment is having its effect on the tonnage moving to the Northwest. Dockmen at the upper Lake ports are asking for as large a tonnage as possible before the winter weather closes navigation. Dock prices are still strong and no weakness of any sort has appeared. Interior movement is good although reports show that the car shortage is prevelent in that section also.

Manufacturing plants are running along steadily as far as their fuel requirements are concerned. Many are ordering a larger tonnage although no especial effort is being made to accumulate a surplus to take care of the plant in case of a marked car stringency.

Dealers demands are steady in all of the Ohio markets. While retail business has been adversely affected by the higher temperatures, still orders to the operator and jobber are up to the mark for the time of the year. Reports from the mining districts indicate a car supply of between 55 and 65% and those figures show the output as compared with normal. In Eastern Ohio the shortage is very marked and the production is believed to be but 50%. The Hocking Valley is the best off as far as car supply is concerned.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$2.00 @ 1.90	....	$2.00 @ 1.90	$1.75 @ 1.70
3-4 inch............	1.85 @ 1.75	$1.50 @ 1.40	1.85 @ 1.75	1.55 @ 1.50
Nut..............	1.30 @ 1.20	....	1.60 @ 1.55	1.25 @ 1.20
Mine-run..........	1.50 @ 1.40	1.30 @ 1.25	1.50 @ 1.40	1.25 @ 1.20
Nut, pea and slack..	0.90 @ 0.85	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack........	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.70 @ 0.65

HAMPTON ROADS, VA.

Loadings at piers fairly heavy. Virginian Railway breaks all previous records at Hampton Roads for fast loading. Prices firm on all grades.

The movement from Hampton Roads during the week was heavy. There was a good supply of coal with an ample number of vessels arriving which kept all piers working coninuously practically all week. The heaviest shipments have as usual been made to the New Englnd market although there have been a number of large cargoes loaded for foreign ports. Quite a fleet of bunker steamers have also been taken care of.

Prices on all grades have remained firm with a good demand for New River and Pocahontas mine run. Inquiry has not been so heavy, however, for the high volatile coals.

Record time was made by the Virginian Ry. at Sewalls Point on Oct. 17 when they loaded the steamer "Melrose" with 7238 tons of cargo and 238 tons of bunker coal in five hours. A total of 157 cars of coal were loaded which made an average of 31⅔ cars dumped per hour. The coal loaded was supplied by the Chesapeake & Ohio Coal & Coke Co. and was consigned to Everett, Mass.

LOUISVILLE, KY.

Operations in the eastern Kentucky field seriously restricted by the inadequate car supply. Western Kentucky better fixed in this respect. A large shortage of river coals due to the low water.

While the abnormally warm weather is giving way to something of a more seasonable character, the coal men are not much cheered over the prospects, because of the poor car supply. As a matter of fact, the light demand for domestic grades has been rather a relief than otherwise. Because of the poor supply of equipment the eastern Kentucky operators have been able to work on only about half time. Operators generally in all parts of the state are perplexed to know how the situation will be handled when the heavy winter demand opens up.

Because of the low stage of water in the river there is an almost acute shortage of the river coals at Louisville. The supply is practically exhausted at the moment, which is a most unusual situation at this period of the year. It is stated in some quarters that consumers demanding the Pittsburgh products are being furnished with Straight Creek and other eastern Kentucky coals. If the car supply continues short in that district the operators there will be pushed to meet their own requirements, so that any surplus demand will have to be furnished by the western Kentucky producers.

The better grade eastern Kentucky block coal is selling up to $2.50 f.o.b. mines, with the others ranging down to a minimum of $2.25 for the large sizes of good coal. Contracts may be negotiated at the low point, but sales for prompt delivery are more likely to bring the higher figure. Good grades of nut and slack from the eastern part of the state are quotable at 70@80c., with the second grades at from 50@60c. a ton, f.o.b. mines; western Kentucky screenings are at a very low point.

BIRMINGHAM, ALA.

Steam and domestic coals quiet with blacksmith about normal. Little doing in furnace or foundry coke except in small lots. Pig iron quiet, with small buying for next year. Railroad commission or Alabama takes a hand in the car shortage.

The market on both steam and domestic coal has assumed a rather stagnant condition; while fairly good, it is not up to the normal for this season, due to the continued warm weather, and the large output. A little cool weather will bring a decided change for the better on both grades. Blacksmith coal is in fair demand, with sales slightly over last week. Due to the number of furnaces out of blast undergoing needed repairs, there is a surplus of furnace coke for the time being, and several of the large companies have curtailed production. There have been some sales of fair tonnage at satisfactory prices. Foundry coke is in demand in small quantities, no large contracts being made.

Pig iron is quiet, and although numerous small sales in quantities of 100 to 500 tons are being made for the balance of this year, little tonnage was booked for next year, during the past ten days.

The car shortage continues serious on some roads, while others have improved to some extent. The Southern Railroad is causing the most trouble at the present time, mines on that line running only about three or four days in the week, due to lack of cars. The Alabama State Railroad Commission has just issued a letter giving advice to shippers and railroads in regard to quick handling of empties and loads; it is hoped that this will have some good effect, on both the railroads and the shippers, and increase the car supply during the next three or four months.

NEW ORLEANS

Domestic and harbor demands contribute to activity. Upriver companies' stocks low and an early rise will be necessary to save an embarassing situation.

Domestic demand opened strong last week and the delivery departments of the different agencies were kept busy.

Orders from the towns and cities in this territory came in large volume, almost invariably marked "rush." Cotton began to move in earnest and the demand from the waterfront was heavier than has been the case in some time.

Much concern is being felt by the Pennsylvania and other up-river companies' agencies. Stocks are forty per cent. below the average figure for this time of the year and business is heavier than ever before. An early rise in the river will save an embarassing situation but should this be delayed as late as some years the Alabama interests will have to be called upon to fill out contracts. Such a situation would be interesting, to say the least, considering the feeling that exists, and probably would result in the exacting of a profit that would be limited only by the cost of rail transportation from Pittsburgh.

INDIANAPOLIS

Warm weather the first half of the month cut down both the domestic and steam trade but conditions are better now. The railroads are relieving congestion at junction points and giving improved service at the mines. Prices hold strong. Screenings have advanced from their low point.

The first half of October did not produce as much business for Indiana coal operators as the last half of September, due principally to the warm weather which cut down the quantity of coal required for steam purposes. The second half of October is giving something more like seasonable weather and the trade expects the month as a whole to show up more normal.

The continued mild weather resulted in finally relieving the car trouble to the extent that it is only bad in spots now but production is still restricted to 75 to 85 per cent. of normal. It is said in extenuation of the railroads that much money was spent on making good the losses of the March floods, and they are further handicapped by the lack of borrowing facilities in the financial market, due to circumstances over which they have no control. There is much complaint about the Chicago & Eastern Illinois and roads that bring Ohio coal into this state.

Prices are strong except on screenings, though these have improved, ranging from 50@65c. f.o.b. mines, as compared with 30@50c. a short time ago. Bituminous lump commands $1.60@1.85, with the top price higher on urgent orders. Mine run is $1.10@1.15; nut and egg, $1.30@1.50; washed coal, $1.65@1.75; Brazil block, $2.25@2.40. The immediate market is regarded largely as a weather one. Retail prices in this city remain at the advanced figures of Sept. 20.

CHICAGO

Heavy buying orders for various grades still coming in. The movement of splint coal to this market unusually heavy. Steam grades somewhat unsteady, but prices are at a satisfactory level. The demand for Hocking is strong. Prices for coke have not been altered.

Despite Indian summer weather there has been little recession in the strong demand for various grades of coal. Orders for anthracite are plentiful and chestnut is a trifle scarce. Although shipments have been heavy, the volume of orders has been in excess of receipts and a number of dealers are looking forward to premium prices. There has been an increase in the movement of splint coal and quotations range between $1.75@1.85. Although there has been some decrease in the buying of coke, prices remain firm. A number of Springfield operators are attempting to obtain $2 a ton for domestic lump, but, as a rule, $1.75 is the market.

Buying of steam coal has been somewhat unsteady and prices, after a decline of 15c. a ton, have returned to the basis of two weeks ago. Many mines still have a large amount of low-priced orders for screenings on hand. On mine-run the majority of Western operators are averaging $1.10@1.15 a ton. Smokeless lump and egg prices range from $2.25@2.50. Many orders are being received for smokeless mine-run, small lots selling at $1.50 and larger orders at $1.40.

Carterville operators are selling lump, egg and No. 1 washed at $2, the mines; No. 1 washed is given the preference over either lump or egg. The demand for Hocking coal continues steady and prices are firm. Quotations by Franklin County producers for lump and egg vary from $2@2.25, the mines.

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.12@1.22	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byproduct, egg, stove and nut, $4.85; gas house, $4.65@4.75.

DETROIT, MICH.

Warm weather and approaching end of the Lake shipping season is having a depressing effect on the soft-coal market. Car shortage becoming more evident. Domestic coals and better grades generally continue strong.

Bituminous—A slight slump has been noticed in soft coal, and the situation is uncertain at the moment. There has been a distinct falling off in the demand during the week, and the near approach of the closing of the lake shipping season is having an undeniably depressing effect upon the immediate outlook locally. However, the slump seems to center around the low-grade West Virginias, the better qualities holding firm, with a few spot sales being negotiated on the basis of $1.10 for mine-run.

The bituminous market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.75	....	....	....	....	$2.75	$2.50
Egg	1.75	....	....	....	....	2.75	2.50
Nut	1.35	....	....	....	....	....	....
Steam lump	1.50	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	$1.10	1.10	1.10	....	....
Mine-run	1.05	1.05	1.00	1.05	1.05	....	....
Slack	0.75	0.90	0.75	0.80	0.80	....	....

Anthracite—Because of the unseasonably warm weather the situation in hard coal is rather disappointing at the moment. The trade is in fair shape, however, and the advent of cold weather will certainly create some activity. The general tendency seems to be to store liberally in anticipation of a rather severe winter.

ST. LOUIS

Market conditions looking better the present week. Car shortage still continues, and the steam market seems to have no foundation. Conditions bad in general, with a supply that exceeds the demand.

The present week brought about a better condition in the coal trade, but only to a slight extent. The trade became demoralized last week because of the warm weather and the forcing of the market on several sizes from the different fields. Some mines are sold up on lump and have no market for the other sizes; others have taken no advance orders at all in hopes that the market would go up. The result has been that with every additional day's work there is more coal forced on the market than there is a demand for.

This applies especially to the Carterville and Franklin County fields. In the Standard field, coal is still going at the cost of production or less, and several mines have shut down until the market gets better. This shows what a demoralized coal market the St. Louis operators are playing to when, at this season, they cannot get cost of production.

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.05@1.15
3-in. lump	....	....	$1.50	....
6-in. lump	$1.65 @ 1.85	....	1.60	1.30@1.40
Lump and egg	1.50 @ 1.60	$2.25	....	....
No. 1 nut	1.25 @ 1.50	....	....	....
Screenings	0.45 @ 0.50	....	....	1.10@1.20
Mine-run	....	....	....	0.90
No. 1 washed nut	1.65 @ 1.85	....	1.40	....
No. 2 washed nut	1.30 @ 1.45	....	1.60	....
No. 3 washed nut	1.15 @ 1.20	....	....	....
No. 4 washed nut	1.05 @ 1.15	....	....	....
No. 5 washed nut	0.35 @ 0.40	....	....	....

Anthracite—Quotations f.o.b. St. Louis are: Chestnut, $7.54; egg and stove, $7.27; grate, $7.01.

Coke—Gas house is quoted at $4.50@4.75, and byproduct at $4.85@5, both f.o.b. St. Louis.

KANSAS CITY, MO.

Market stiff with an advance likely. Larger sizes of steam coal, slow. Other movement good. Car shortage still interfering.

Demand is brisk and practically all lines are moving nicely. A possible exception may be the larger sizes of steam coal. However, a little snappy weather will give impetus to the marketing of these grades. The ideal weather which has prevailed for the past month has come to an abrupt end and the indications now are for the beginning of winter. Cooler weather already has arrived and a continuation will probably result in another 25c. advance. This is likely to take place about Nov. 1.

Prices are the same as those of a week ago, Kansas deep shaft fancy lump being held at $2.50; Arkansas Russellville anthracite grate, $4.35; Missouri Richmond and Camden block, $2.25 and Iowa Mystic and Centerville block, $2.25. All quotations are f.o.b. mines.

OGDEN, UTAH

Demand exceeds production. Colder weather causes increased demand for lump and nut. Sugar factories consuming surplus of slack and steam coal. Strike of the Colorado miners causing shortage there and in Nebraska. Car shortage at Wyoming mines.

All of the mines are now receiving plenty of orders to take care of the full production and many of the operations are even getting behind on shipments. Colder weather throughout the territory is the general cause. This has enabled the operators to force the market demand for nut coal and the surplus of this grade has been moved.

The sugar factories are all running full time, and are consuming all the steam and slack coal produced. The strike in Colorado has caused a heavy demand for Rock Springs coal in Colorado and Nebraska; winter is approaching rapidly in these two states, and it is evident that they will have quite a shortage.

The Wyoming mines were visited by a car shortage this week and several of the operations lost two days on this account. However it is not expected that this will continue for any length of time as there are plenty of cars en route.

On Oct. 13 quotations for shipment in Nevada advanced to: Lump, $3; nut, $2.50; mine-run, $1.85; slack, $1. For the balance of the territory the quotations are: Lump, $2.75; nut, $2.25; mine-run, $1.85; slack, $1.

PORTLAND, ORE.

Small shipments from Australia this fall may effect prices to some extent. Elimination of duty will not have any extensive bearing on situation.

The sailing schooner "George E. Billings" arrived in the Columbia River this week from Australia with a cargo of coal of about 1500 tons, part of which was discharged at Astoria and the remainder will be brought to Portland. This is the first water shipment received here since early last spring. It was announced today that a second shipment of about 1500 tons will arrive in a couple of months.

General indications here are that there will be a scarcity of coal in this market during the winter and retail dealers are notifying customers accordingly. The weather so far has been mild in the western part of the state, but snow fell in the eastern sections during the week. Receipts of coal are rather light for the present owing to the difficulty in getting cars promptly.

FOREIGN MARKETS

GREAT BRITAIN

Oct. 10—Steam-coal market conditions are not materially changed. A good demand continuing for admiralty list coals, while inferior classes are plentiful and prices on the easy side.

Best Welsh steam	$4.58@4.80	Best Monmouthshires	$3.84@4.08
Best seconds	4.44@4.56	Seconds	3.78@3.90
Seconds	4.20@4.32	Best Cardiff smalls	2.46@2.58
Best dry coals	4.32@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for August and the two months ending Aug. 31, 1913, in short tons:

	August		2 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	319,616	356,296	558,254	18	644,989	22
East	172,249	200,216	364,040	12	364,964	12
West	1,066,671	975,301	1,933,543	63	1,907,186	65
Total	1,558,536	1,531,813	2,855,837		2,917,139	
Coke	26,723	22,082	56,668		42,058	
From connections						
Bituminous	106,989	21,079	200,391	7	36,620	1
Anthracite	1,642	808	3,213		1;597	
Total (except coke)	1,667,167	1,553,700	3,059,441	100	2,955,356	100

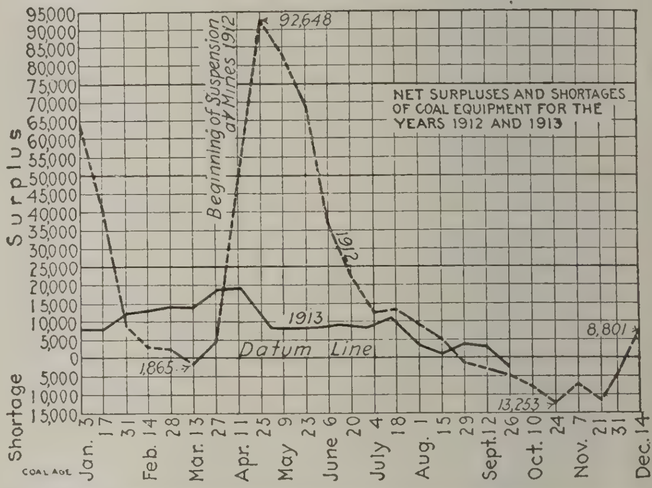
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Oct. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	0	100	100
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	748	950	202
Ohio; Indiana; Michigan; Western Pennsylvania	300	2,103	1,803
West Virginia, Virginia, North & South Carolina	859	4,573	3,714
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	265	628	363
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,064	857	**207**
Montana, Wyoming, Nebraska	544	0	**544**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,451	216	**1,235**
Texas, Louisiana, New Mexico	476	4	**472**
Oregon, Idaho, California, Arizona	2,226	70	**2,156**
Canadian Lines	20	892	872
Total	7,953	10,393	2,440

	May 15	June 14	June 30	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15
Surplus	12,267	11,098	11,055	13,203	8,810	8,293	8,689	8,714
Shortage	4,226	2,033	2,821	1,826	4,029	7,038	5,209	7,731
Net*	**8,041**	**9,065**	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**	**983**

*Bold face type indicates a surplus.



COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Oct. 18.

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	84	84	84	87	80
American Coal Products Pref.	102	100½	100½	109¼	105
Colorado Fuel & Iron	29	28	28	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102¼
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com	51	49¾	49¾	53½	47¼
Island Creek Coal Pref.	84	83½	83½	85	80
Pittsburgh Coal	21⅜	19⅝	21	24⅜	14½
Pittsburgh Coal Pref.	90¾	88½	90	95	73
Pond Creek	21	19	19	23¾	16½
Reading	166	160⅞	160⅞	171	151⅜
Reading 1st Pref.	85	84¾	84¾	92½	82½
Reading 2nd Pref.	..	..	91	95	84
Virginia Iron, Coal & Coke	43	43	43	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	95	98	98	Sept. '13	93½	99⅛
Colo. F. & I. gen. 6s	104	104½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	80	Sale	80	80½	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	85½	85½	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77⅗	Sale	77⅜	77⅜	73	80½
Tenn. Coal gen. 5s	99	Sale	99	100	98½	103
Birm. Div. 1st consol. 6s	..	101⅞	101⅜	Sept. '13	100⅝	103
Tenn. Div. 1st g 6s	..	102	102	Sept. '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	84	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	95	93	93	92	98

The Reading Co.—Regular quarterly dividend on the first preferred stock of 1%, payable Dec. 11 to holders of records Nov. 25.

Consolidation Coal Co.—Regular quarterly dividend of 1½%, payable Oct. 31 to holders of record Oct. 25.

Consolidation Coal Co.—According to a statement made the early part of the current year this company operates 82 bituminous coal mines. It also owns 32 miles of railroad and two thousand 60-ton steel coal cars. The aggregate of both road and cars is valued at $5,000,000.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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A New Departure In Coal Washing

About 30 to 40% of the tonnage handled in every coal washery today is too fine for a successful separation by the use of jigs. These tailings, heretofore a waste product, can now be successfully treated, making a product of very low ash content, excellent for coking purposes.

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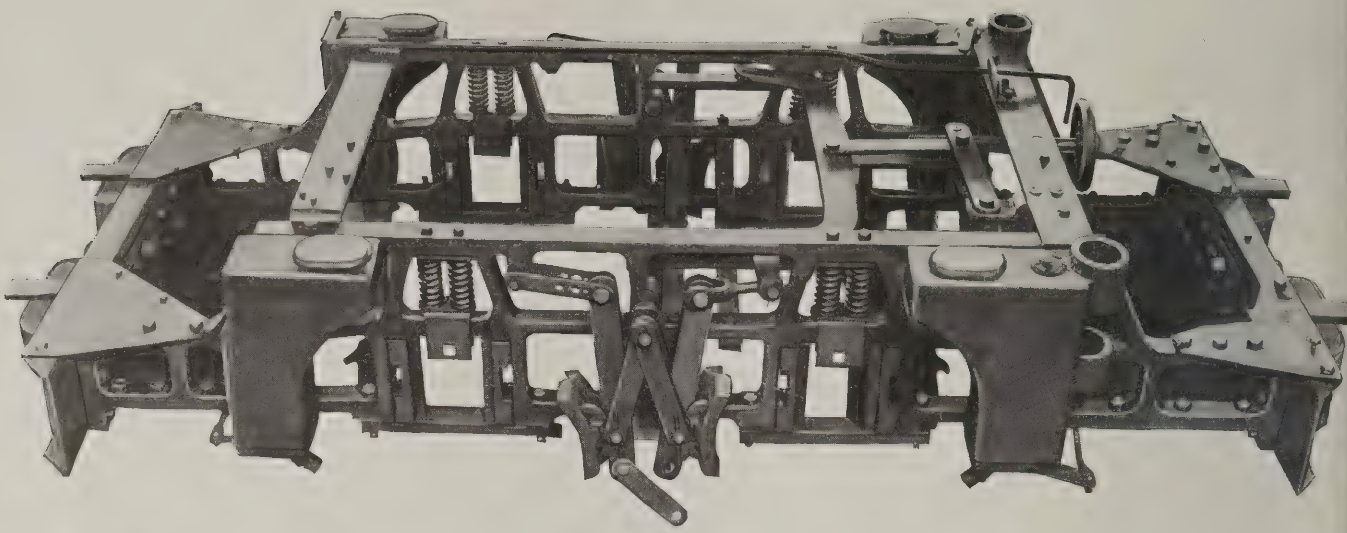
Eastern Representative; American Coal Washer Co., Alton, Ill.
N. W. Representative: Mining Machinery Co., Seattle, Wash.



The Cast Steel Bar Frame

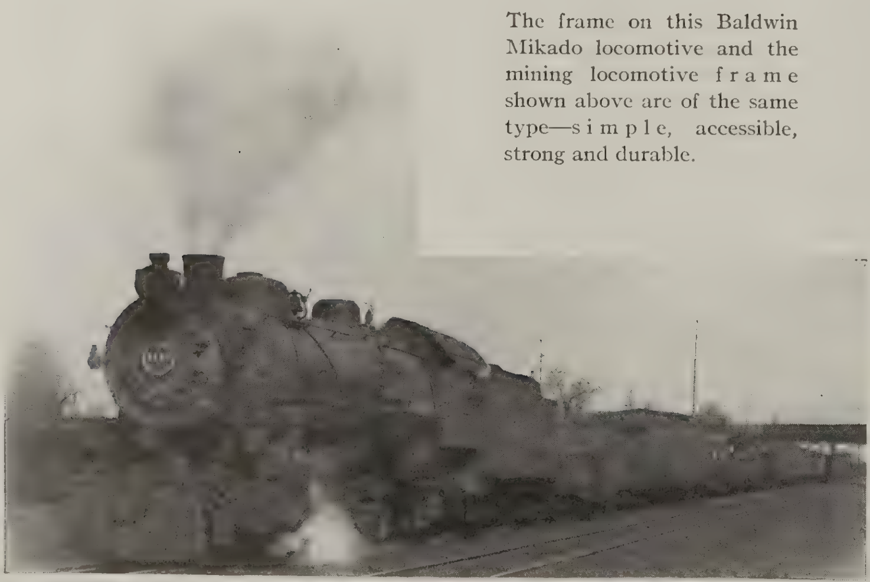
(*Barsteel*)

of Baldwin-Westinghouse Mine Locomotives

This frame is of the same type as that used on the famous Baldwin Mikado steam freight locomotives. It is designed to give greater strength than any other type of frame for a specified weight of locomotive and to allow easy access to all parts so that the locomotive can be inspected or overhauled, when necessary, with the least possible cost of time and labor.

The motors; brake shoes; brake rigging and sand boxes are all quickly reached, and excellent ventilation is given to the motors and resistance, through the openings allowed by the ***Barsteel*** frame construction. The journals and the motor armature and axle bearings are also easy to get at for thorough lubrication.

The ***Barsteel*** frame is only one of the important features of Baldwin-Westinghouse Mine locomotives, which give the user the greatest possible service.



The frame on this Baldwin Mikado locomotive and the mining locomotive frame shown above are of the same type—simple, accessible, strong and durable.

Full information can be obtained by addressing either Company.

Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada.

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CIRCULATION OF THIS ISSUE 12,250

None sent free regularly, no returns from news companies, no back numbers

The Weekly Ad-Talk Page

The Price Cutter

By Berton Braley

You have met him I am sure
He's the salesman who would lure
Orders from you with a discount,
round and fat.
Who would whisper in your ear
So none else could ever hear,
The special price he'd quote for
this or that.

He's the man who tells you straight,
That for *you* he'll pay the freight,
If you never breathe a word to
Smith or Brown.
And you find as time goes by
This was just the same old lie,
That he told to every customer in
town.

He will tell in the convention
How he's strongly for prevention
Of price cutting with its wrongs
and useless ills.
But he can't resist temptation
And he'll cut his "best" quotation
By perhaps a special discount on
the bills.

But there's hope for us at last
For his kind is fading fast,
And the salesman who will win
out in the end
Is the one who knows his biz
Knows what isn't and what is
And upon whose price quotation
you'll depend.

COAL AGE

ol. 4 NEW YORK, NOVEMBER 1, 1913 No. 18

The technically educated mine manager is uch in evidence these days. We hasten to dd—this is as it should be, in fact, when we onsider the extent and possibilities of mehanical equipment, as applied to mining at he present time, it is hard to believe that it ould be otherwise.

We are far from agreeing, however, with he official who insists that he desires an entire rganization of superintendents and foremen who can boast an engineering education. The viewpoint of the man with a technical training is so radically different to that of the so called practical man, that unless an organization contains able men of both classes, errors of judgment are sure to develop sooner or later—generally sooner.

We gave an illustration of this in our "Foreword" of Sept. 6, in discussing the possibilities of getting clean coal: The mechanical expert, with his picking belts and washeries, was compared with the practical man, who knows absolutely the kind of coal his miners *ought* to load.

The ventilation problem often brings out noticeably the two viewpoints:

If a mine inspector unexpectedly demands that the quantity of air in a certain mine be generously increased, the engineer of technical training will immediately tabulate water-gage readings, investigate fan efficiencies and live for days with fan catalogs. In contrast to him, the practical man will don his overalls and start on a personal inspection of all air courses in the mine. When you recall that the fan engineer requires eight times the power to get twice the volume, if he makes no change in his air-course areas, while the fellow with the overalls can often get double the volume with the same power, providing he can discover that his air-course area is obstructed unnecessarily. You must admit, therefore, that the overalls are about as important as the slide rule, to say the least.

Many a mine has been taxed with a new fan installation that would not have been required had an intelligent examination of airways been conducted by a competent man, with authority to carry out his recommendations.

One more example: A mine is to be greatly enlarged, and as the mine cars that have been in use are pretty well worn out, besides being of obsolete design, it is decided to purchase new cars throughout. (You'll find mines in this transition stage near at hand, if you investigate.)

The technical engineer compares prices of steel cars, as against wood, investigates the average life of each and then makes a decision. The practical man interviews the miners to see just how well the wood car, about to be discarded, suits his requirements. Is it so heavy that it can not be pushed in and out of rooms without exhausting the miner, before a fair tonnage is loaded; is it too high, requiring unnecessary effort in loading; is its wheel base too long, or too short? If too long it is difficult to put on the track when derailed, if too short it will jump the track too easily.

We know of a case where steel mine cars were purchased for a low-seam coal mine, upon the recommendation of a competent mining engineer. The cars were so heavy that the men could not handle them to advantage in and out of their rooms and the mine became so unpopular with miners that the cars eventually were replaced with wooden ones.

College men, as a rule, are clannish, when it comes to choosing between college men and practical men, just as the practical fellows are clannish, when choosing between men of their ranks, as against those with a college training; this, no doubt, explains that "birds-of-a-feather" tendency, in so many coal mine organizations.

The Madison Coal Corporation Mine No. 9

By James Taylor*

SYNOPSIS—Brief description of the surface plant and underground arrangements. The checking system, to show the number of miners and other employees in the mine, and to avoid accident by a miner going unwarned into a place where danger exists. Fire rules in force.

⁂

The property known as Mine No. 9, of the Madison Coal Corporation, St. Louis, Mo., is located at Dewmaine, Williamson County, Illinois, and embraces 1560 acres of coal and surface. The seam of coal is that known as the Williamson County coal No. 6. This seam varies in thickness from 7.5 to 9.2 ft., and is found at different depths up to 276 ft. below the surface.

The Surface Plant

The plant of this company, two illustrations of which adorn the front cover of our next issue, is one of the most complete in the state, having a maximum capacity of 3500 tons, for an 8-hour day.

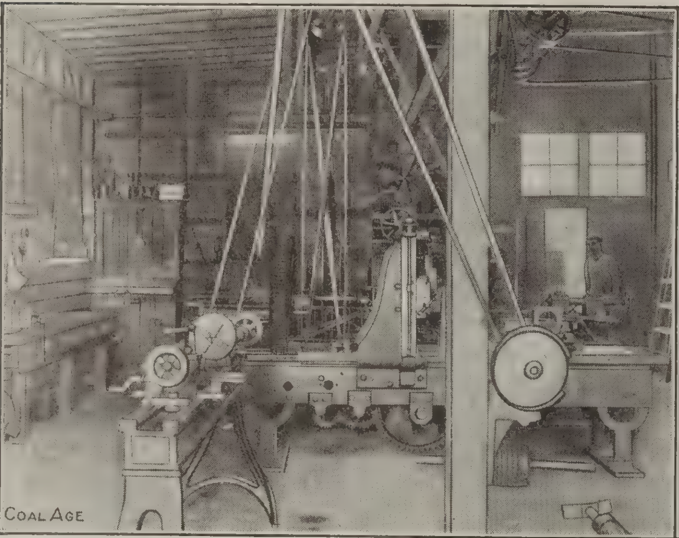


Fig. 1. Showing Interior of Machine Shop

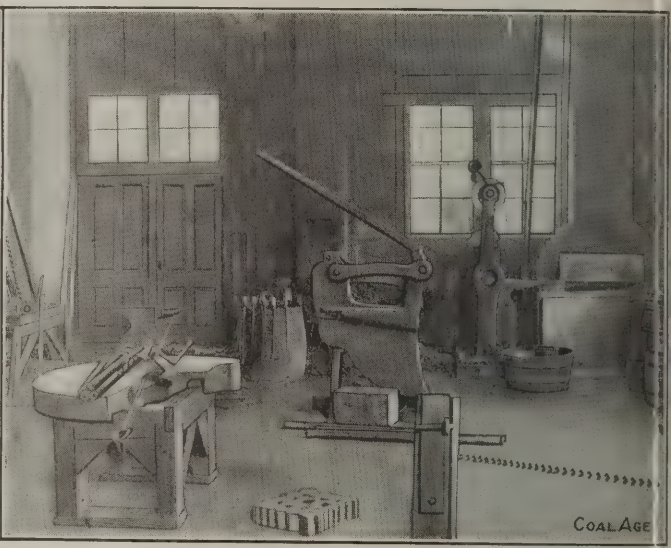


Fig. 2. Showing Interior of Blacksmith Shop

The office contains a large concrete vault, for preserving maps and documents of value, and two large bedrooms furnished with five single beds for the accommodation of the mine officials or entertainment of visitors.

The hoisting engines are equipped with automatic engine stops to prevent overwinding, and the cages are fitted with a signal device so arranged that the men on the cage can signal the engineer, at any point of the trip, to stop, raise or lower the cage, as desired. The plant is equipped with an electric concrete-mixing machine, adapted to either underground or surface use. Figs. 1 and 2 are views of the interior of the machine and blacksmith shops, respectively.

The machine shop (Fig. 1) is 38x27 ft., inside measurement, built of brick and concrete. It is equipped with an electric motor, for power purposes; a steam engine to be used when the generators are out of service; a 26x28-in. by 12-ft. planer; a 26-in. lathe; a 13-in. by 6-ft. lathe; a power hacksaw; and a 27-in. swing-drill press. Ther are, besides, a complete set of tools for winding arma tures and a complete set of machinist's tools.

The blacksmith shop (Fig. 2) is a building 38x21 ft. inside measurement, of brick construction, and i equipped with two forges; a shaper for pit-car iron; power hammer for sharpening machine bits; a swag block; a power grindstone; an emery wheel; a power saw for cutting wood at any angle; a portable electric drill for both wood and iron; and a crab for handling cars There is, besides, a complete set of tools of every description, required for repairing and building cars, as well a for repairing and building dwellings.

System of Mining and Underground Construction

The system of mining is that known as the "panel system." The mine workings are laid out in panels 60 ft. square. The main and stub entries are driven 12 ft. wide and 25-ft. pillars are left between the entries of each pair. Rooms are turned off the stub entries on 40-ft. centers, at right angles to the road, and driven a distance of 250 ft.; these rooms are 20 ft. wide, with 20-ft. pillars between them.

The sides of the main entry, at the shaft bottom and in the runway or cutoff for the entries, are protected with concrete walls on which are placed steel I-beams, to support the roof over the tracks. Fig. 3 shows these concrete walls and the I-beams in position. This construction is used for a distance of 1800 ft. on the main entry. The automatic trap doors used in this mine are provided with side entrances or doors, for the use of men only.

The mining law of Illinois provides that all crosscuts, connecting inlet and outlet air courses, except the last one nearest the face, shall be closed with substantial stoppings, to be made as nearly air-tight as possible. In the making of the air-tight partitions or stoppings, no loose material or refuse shall be used.

Fig. 4 shows a crosscut closed with "Pyrobar" blocks,

---

*State mine inspector, Fourth district, Peoria, Ill.

3x10x16 in. The floor in the crosscut in which the stopping is to be erected is first leveled off, and the rib coal cut away to a depth of 6 in. and the full width of the block. A concrete foundation is then made 12 in. wide by 14 in. high, on which the blocks are placed. The blocks are laid in a good portland cement, and the work finally sealed so as to be air-tight. These blocks have proved the best stopping material ever used where it is dry.

The mining law of Illinois requires that the mine manager (mine foreman) shall provide a suitable checking system whereby the entrance into and departure from the mine of each employee shall be correctly recorded for reference. In compliance with this requirement, the Madison Coal Corporation have adopted the following system: Two duplicate check boards are provided, one being placed at the top and the other at the bottom of the main hoisting shaft.

One of these check boards is shown in Fig. 5. It is made in the form of a cabinet, having two folding doors, which when thrown open expose the checks to view, as shown in the figure. The entire board is subdivided, according to the different classes of employees. The miners' checks occupy the center of the board. The spaces are numbered in consecutive order and each is provided with a hook on which the corresponding check is hung. The check is a brass tag with a hole in it and numbered, as shown in the center of the figure. There is, also, a special tag designed to be used to notify the miner of any danger in his place. On the face of the tag is the date, check number and acknowledgment of the man that he is informed of the danger existing in his place. On the reverse side, the existing danger is explained by the mine examiner (fireboss).

When going on shift in the morning, the men receive their checks from the board at the top of the shaft, present them to the cager, who then permits them to go on the cage. At the bottom of the shaft, the miner hangs his check in its proper place on the board there provided and proceeds to his work. On leaving the mine, each man takes his check from the board at the shaft bottom, presents it to the cager, who permits him to go on the cage. Arriving at the top of the shaft, the miner returns his check to the board on the surface and goes home.

Should it happen that the mine examiner find a dangerous place, on his inspection of the mine, he removes the corresponding check from the board at the surface and hangs in its place the tag previously mentioned, on which he has written a brief description of the nature of the danger existing in that place. The checks removed by the examiner are given to the mine manager and, before the man can enter the mine, he must go to the mine manager for his check. His tag is then examined and, if he is unable to read, the nature of the danger existing in his working place is explained to him, after which the man is given his check and allowed to go below; and the tags are filed for reference.

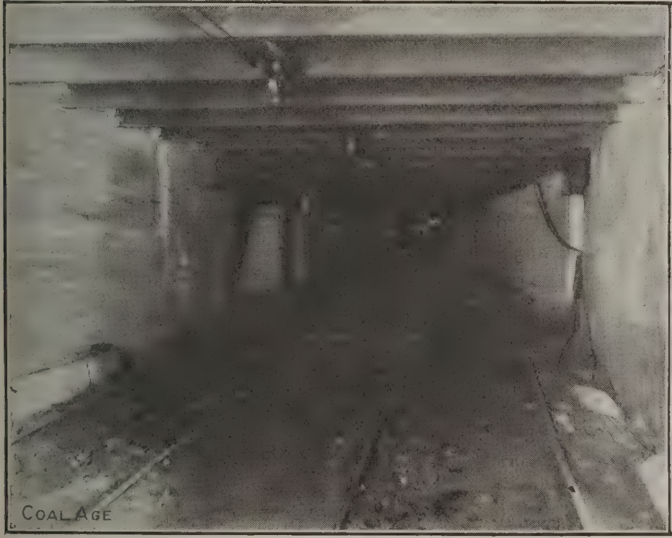


FIG. 3. SHOWING CONCRETE AND STEEL UNDERGROUND MAIN-ENTRY CONSTRUCTION

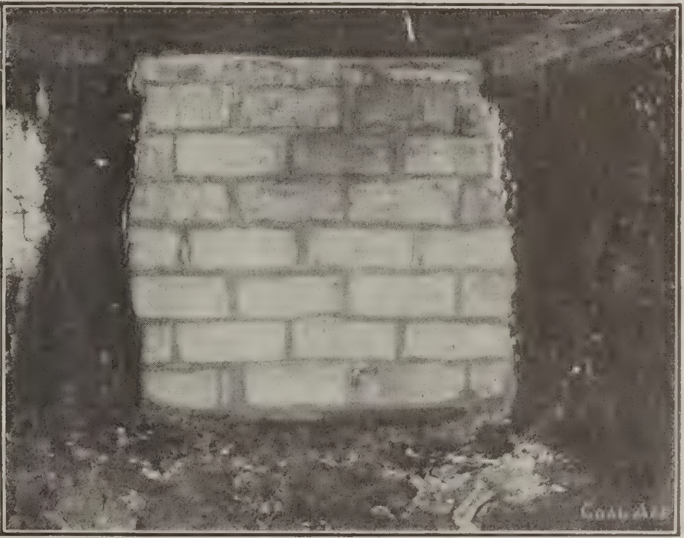


FIG. 4. SHOWING A "PYROBAR" PERMANENT FIREPROOF ENTRY STOPPING

FIRE RULES OF THE MADISON COAL CORPORATION

The Mining Law of Illinois requires fire-fighting equipment and other means for the prevention and control of fires and to avoid the loss of life from this cause, in coal mines.

1. All fire equipment shall be tested in actual drill "not less than once every fourteen days," both on the surface, as well as in the mine workings.

2. The alarm of fire on the surface shall be short, continuous blasts of the steam whistle.

3. When fire is discovered underground it must be immediately made known by telephone to the cagers at the bottom of the shaft, and by them to the mine manager and his assistants, who will immediately give such telephone instructions as will best protect the men in making their escape. Whoever first gives the alarm of fire by telephone must stay at the telephone to receive and convey such instructions as are required and in addition must notify all drivers to go into their respective territories and warn all who are working there.

4. Telephones must be kept at each "parting" and in good working order.

5. The head cager must test the telephone every two hours during each working shift, making the first test before hoisting commences in the morning. The mine manager in charge of the night shift must make frequent tests and know that the telephones are in working condition in districts where men are employed.

7. The mine managers are charged with the duty of testing the telephones and making report of their condition each day.

8. After the alarm has been given either on the surface

or below ground, no coal except that on the ascending cage must be hoisted, and both cages must be immediately relieved of cars.

9. All men upon hearing the alarm of fire must immediately go to their respective stations and prepare the pumps, hydrants, hose and chemical extinguishers for action. Drivers, motormen, trip-riders and others must immediately give notice to all employed in their respective districts and exert their best efforts to aid in the safe escape of the entire force.

10. Hoisting engineers must remain in the engine room and obey regular signals and the orders of the district superintendent or mine manager.

11. The firemen must remain at the boilers unless otherwise directed by the district superintendent or mine manager.

12. The head dumper or weigh boss, as may be directed, shall have charge of the gates and guard the shaft at the surface landing, and attend mine signals.

13. The head bottom cager will retain charge of the cages and attend to fire alarm and other signals at the shaft bottom.

14. The machinist's duty will be to attend the fire pumps only.

15. It shall be the duty of the head blacksmith or his helper (as may be designated) to open valves for conveying water to the fan house and all water pipes on the surface and in the mines.

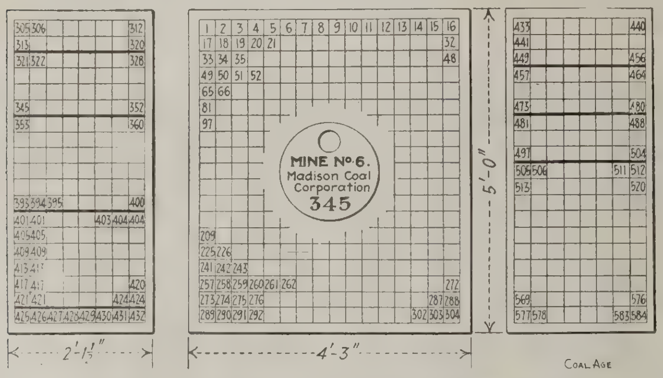


Fig. 5. Showing the Check Board Open

16. Certain assigned duties shall be given to a sufficient number of men to take charge of valves connected with all underground fire pipe lines, handle the hose on the surface and in the working buildings, as well as in the mine.

17. Under no circumstances must hay or straw be permitted to be loaded into the mine until all miners of the day shift are on the surface, and then must only be lowered into the mine after it has been inspected by the hoisting engineer or top foreman to see that the hay and straw are in bales and contained in a closed forage box with lid securely fastened to make it impossible of ignition from any cause, and the hoisting engineer on duty at the time is charged with the knowledge of such inspection.

18. The first duty of the night watchman or such other person as may be designated by the district superintendent or mine manager (when the weather permits) shall be to unreel two lines of hose (one on each side of the mine) and open the hydrant valves.

19. On the discovery of fire at night, the steam whistle must be blown and alarm also given as provided in rules 2 and 3.

The night forces must, upon the alarm of fire, go to their regular stations and duties assigned by the district superintendent or mine manager.

The greatest degree of protection and safety to life and property can only be secured by the cool, prompt action of those in charge of the forces and the fire apparatus; as well as calmness and good order on the part of all employees leaving the mine. Fire apparatus must not be handled by anyone except those authorized to do so, and then only in case of fire or for the purpose of drill and repairing.

Any person known to mutilate or damage any part of the fire machinery and appliances will be prosecuted, and if an employee, in addition thereto, will be discharged.

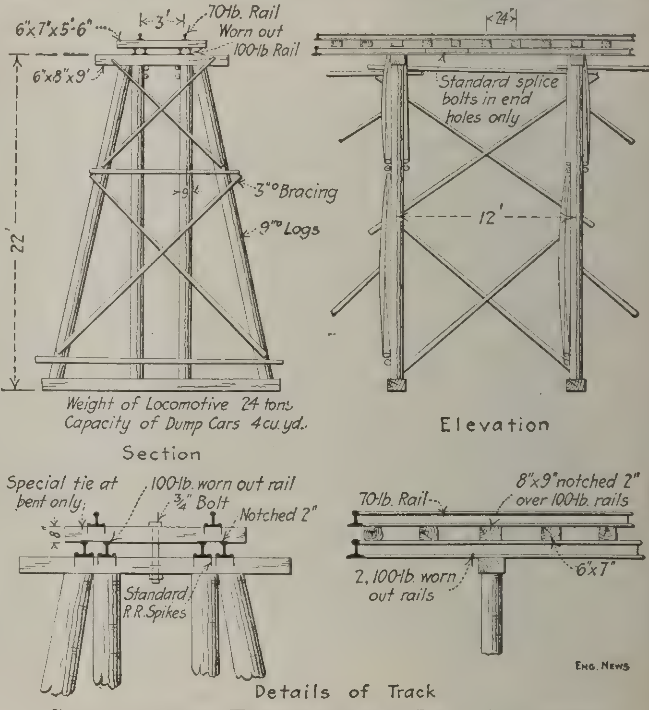
Among the numerous improvements the Madison Coal Corporation has installed at No. 9 mine is a Jeffrey 14x5-ft. double-inlet, reversible, underthrow fan. This fan is installed in an absolutely fireproof building of brick, concrete and steel, and has a capacity of 200,000 cu.ft. of air per minute, at a speed of 150 r.p.m., against a 4-in. water gage. This fan is driven by two Skinner high-speed automatic 19x20-in. direct-connected engines. With both engines running, it will be capable of delivering 250,000 cu.ft. of air per minute, against a 6-in. water-gage.

⁂

Trestles with Old Rails for Stringers

In the reconstruction of the line of the Pennsylvania R.R. at Rahway, N. J., the Keystone State Construction Co. has a considerable length of timber trestle in which the stringers are made of old rails discarded by the railway. These trestles are of two types, one used as a construction railway and the other as a filling trestle which is covered by the fill as it progresses.

The construction-railway trestle is the heavier of the two (Fig. 1). It is made up of the usual framed bents with round log uprights and sapling braces and a squared 6x8-in. cap. On this cap run the stringers, four old 100-lb. rails, in groups of two, spanning the 12-ft. opening between bents. These rails are spiked with standard railway spikes to the cap, and are spliced wherever the breaks come with the standard rail splices with bolts only in the end holes.



Construction Trestle with Rail Stringers

(Pennsylvania R.R. track elevation, Rahway, N. J., The Keystone State Construction Co.)

The 3-ft. gage construction track is built of old 70-lb. rails spiked to 6x7-in. ties with an 8x9-in. tie dapped 2 in. over the stringer rails at the bents. These latter ties are bolted with ¾-in. bolts to the bent caps, and this is the only fastening of the track to the bents or stringers.—*Engineering News.*

⁂

Relation of Big Business to Mining

Coal Age next week will contain an address on this subject, delivered by Charles Richard Van Hise, to the annual convention of the American Mining Congress held in Philadelphia last week.

Administration of Public Mining Lands

By J. F. Shafroth*

SYNOPSIS—Coal lands are not now to be obtained in the West as they were formerly acquired in the Central States. They are either held at an unreasonable price per acre or withheld from entry entirely. They are not selling and the Western States are unable to tax them for revenue. It is proposed that a royalty by some evaluated at 37 billion dollars shall be ultimately paid by the operators of Colorado to the national government, the lands meanwhile being exempt from taxation.

⁂

It was Daniel Webster who eternally damned the Rocky Mountain region, the greatest mineral-producing area of our country. In consigning this great empire of states to the limbo of outer darkness he used the following language:

> What do we want of that vast, worthless area, that region of savages and wild beasts, of deserts, of shifting sands and whirling winds, of dust, of cactus and prairie dogs? To what cause could we ever hope to put those great deserts and those endless mountain ranges, impenetrable and covered to their very base with eternal snow? What can we ever do with the western coast, a coast of 3000 miles, rockbound, cheerless and uninviting?

The American pioneer, braving every danger, overcoming every hardship, meeting with fortitude and courage the difficulties and perils of the wilderness has returned sufficient answer to the doubts of the New England statesman. Where lay the barren desert now thrives a fruitful land of promise. But the spirit that prompted the harsh dictum of Webster is still alive in activities of later statesmen. Where he lacked imagination and vision they refuse to accept the evidence of their own senses. And so they have added to the pioneer's burden, discouraging rules and regulations which seek to deny to him the fruits of his toil.

Western Mining Conditions Once Favorable

The government recognized that it was the explorers, settlers and developers who made the value of everything in a wild and uninhabitated country; that if the lands were not exploited and improved they would remain as worthless as they had been for 6000 years.

Under this general policy of rewarding the pioneer citizens of the United States in the development of the natural resources of the public domain, thousands of people crossed the trackless desert for California, and there discovered the richest gold fields ever known in the history of the world. These gold mines were upon the public domain. There was no law providing for the location of mining claims. The miner locating gold fields in California could have been considered by the government a trespasser and liable to refund to the government the value of all the gold extracted; but under the policy of the government as to the settlement of lands in Ohio, Indiana, Illinois and Missouri no one ever suggested that the miner was not entitled to the fruits of his discovery; and the miners themselves proceeded to frame rules and regulations as to the manner of locating and developing the mines. These provisions were afterward enacted into laws by Congress, not to provide a profit to the national government, but for the purpose of promoting the production of the greatest wealth to the nation and benefitting all the citizens thereof.

Under that policy there has been a development of the Western country unparalleled in the history of the world. Three billions of dollars in the precious metals, produced at a cost of perhaps that amount of money, but turned into the channels of trade, have contributed largely toward making this country the most prosperous nation on earth. It is the increase of basic money that has always given a quickening impulse to business and commerce. An enormous development has been produced in all the other industries of that region.

The Lands Are Now to Be Leased

Now it is proposed, by bills introduced in Congress, and advocated by followers of Mr. Pinchot, to change this policy, to impose royalties upon powers generated by falling water, and to lease the oil and phosphate lands and the coal and metalliferous mines upon a rental basis payable to the treasury of the United States.

No other states have had their resources taxed by the national government, and we deem it is unfair that the people of the states which had all the products of their natural resources for themselves should now require, through their senators and representatives, these less favored states in the West not only to undertake the development of the natural resources of these states, but to pay into the federal treasury a tax upon the very development thereof.

Exemption from Taxation

What does the leasing of the natural resources of the mountain states mean? It means perpetual ownership in the national government, and that means exemption from taxation forever. Perpetual exemption from taxation of vast territory in a state is almost destructive of its development. It is an injustice which, it seems to me, every fair-minded person must recognize. The state must maintain government for state, county and school purposes over all the lands within its borders, whether reserved or not.

In the West the taxes upon land for a period of 30 years, including reasonable interest upon each yearly payment, amount to the value of the land. Therefore, when the lands privately owned must pay all of the taxes for state, county and school purposes it is equivalent to their paying every 30 years, in addition to their just taxes, an amount equal to the value of the public lands. Thus the people of these states must pay for these public lands every 30 years and yet never own a foot of the same. Is that right; is it just; is it the way a parent would treat a child? Is it a compliance with the enabling acts which provide that each state is "admitted into the Union upon an equal footing with the original states in all respects whatsoever."

This new policy would not only deprive the states of the means of raising the necessary revenue to establish and maintain good government, but in addition to that injustice the advocates thereof propose to make revenue for the federal treasury by taxing the natural resources of the West. By so doing they propose to make the mountain states pay an undue proportion of the burdens of the national government.

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*Senator from Colorado.

Note—Paper read before the American Mining Congress, Oct. 22.

WHAT A TEN-CENT ROYALTY WILL RAISE

It has been estimated by the geological survey at Washington that there are contained within the boundaries of the state of Colorado 371,000,000,000 tons of coal. More than three-fourths of this coal is upon the public domain. If a rental of 10c. per ton is to be imposed upon that natural resource of the state of Colorado, it would mean ultimately that the citizens of our state must contribute $37,000,000,000 to the federal treasury. This tax is advocated on the ground that it will prevent waste. According to the geological report, Colorado alone has sufficient coal to supply the world for 300 years, at the present rate of consumption of about one and one-quarter billion tons per annum. Although my state is now mining 11,000,000 tons of coal a year, yet our production for 50 years has exhausted only one-half of 1 per cent. of our coal deposits.

If royalties are to be paid for the extraction of the precious and base metals, other millions will be turned into the federal treasury from the natural resources of our state. It may be that it will be proposed, as is done in the forestry department at Washington, that one-fourth of the receipts will be turned over to the state treasury, to be used only for certain purposes to be prescribed by the federal government. But is it equal or fair treatment to our commonwealth for the government to impose any tax whatever upon our natural resources, which it has never imposed upon the older and richer states of the Union? It must be remembered that the act of Parliament of Great Britain imposing duties upon goods shipped to the 13 colonies, against which our forefathers rebelled, provided that the revenue derived therefrom should be expended in America for its protection and defense.

The policy of the nation holding in perpetuity great forest reserves and coal, gas, oil, phosphate and mineral lands, and rights-of-way for water-power plants, and controlling the same, is an interference with local affairs which, according to our theory of government, should belong to the states.

THE STATE SHOULD CONTROL THE LANDS WITHIN ITS BORDERS

It was the late Justice John M. Harlan, of the supreme court of the United States, who said:

> A national government for national affairs and state governments for state affairs is the foundation rock upon which our institutions rest. Any serious departure from that principle would bring disaster upon the American system of free government.

The permanent administration of public lands in a state, sovereign as to all functions except those which were delegated to the national government, is an interference with local affairs never before attempted in the history of this country. Such administration by a bureau at Washington, with its thousands of guards imported from other states patrolling these gigantic areas, can never be satisfactory to the people of the states in which such lands are situated. The bureau will always be controlled by officers who are not in sympathy with the people of such states. Carpetbag government of such local affairs is bound to follow with its antagonism to everything that interferes with the national government's control and use of these reserves, which we think are so destructive of the development of our states.

The discouragement to the prospector of mineral lands, by reason of the rules adopted by the forestry bureau, has been so great in Colorado that there are now practically no prospectors left. And yet we know that the hills of our state have hardly been scratched in prospecting for the minerals therein contained. It is impossible for these reserves to be managed to the best interests of our people by a bureau administered two or three thousand miles away.

HOW CONGRESS IMPOVERISHES THE NATION

The effects of this bureaucratic administration of our mineral lands are evidenced in great distress not only to the states directly concerned but also to the commerce and industry of the entire nation. The prospector has been driven from the hills. Under the rules and regulations promulgated by absentee guardians of our estate he has become a trespasser upon the lands of his commonwealth. He dare not go into the hills to scratch for precious metals lest some ranger lately imported from Connecticut or New Jersey warn him off.

Against the physical obstacles which nature placed in his path the pioneer prospector pitted a stout heart and a willing hand, and came victorious from the encounter. But the artficial barriers raised up by the government of the United States have proved too strong for him and he has succumbed in the unequal struggle. His state is poorer by his passing, and industry and commerce move in sluggish channels with the cutting off of his contributions to them.

Appointment of Mine Inspectors in West Virginia

Following is a list of district mine inspectors appointed by the new chief of the Department of Mines, in West Virginia, Earl A. Henry. The appointments are for a period of four years.

Name	District	Address
Karl F. Schoew	First	Fairmont
Frank E. Parsons	Second	Clarksburg
L. D. Vaughn	Third	Grafton
W. B. Plaster	Fourth	Elkins
R. B. Cobb	Fifth	Montgomery
Enoch Carver	Sixth	Charleston
James Martin	Seventh	Charleston
E. J. Flanagan	Eighth	Montgomery
L. B. Holliday	Ninth	Beckley
Arthur Mitchell*	Tenth	Bluefield
John Phillips	Eleventh	Welch
E. C. Lambert	Twelfth	Williamson

Mr. Henry has served the state, as district mine inspector, for a number of years, and is thoroughly familiar with the conditions of mining throughout the state. Much is to be expected, during Mr. Henry's administration, in the work of continuing the systematizing of the mine-inspection service in West Virginia. The chief of the Department of Mines has always had the hearty coöperation and confidence of the entire body of district inspectors, and to this fact is largely due the rapid advance that has been made in the state, during the incumbency of John Laing, formerly at the head of the department. We bespeak the same hearty support, during the present administration.

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*Resigned; see Personals, p. 675.

The Costs and Profits in Coal Mining

By Edward W. Parker*

SYNOPSIS—An illuminating study of some of the business aspects of the coal industry. Despite the well known fact that the anthracite companies are growing stronger financially each year, Mr. Parker presents figures showing that anthracite mining yields practically no profit. The same rather incongruous condition prevails in the bituminous industry. Western operators fare the best.

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In order to do justice to the subject and to the occasion, a paper on the cost of coal mining prepared for presentation before the American Congress should be based upon an intensive study of the records, not too many, of typical operations in a sufficient number of states to get results capable of analytical comparison and deduction.

Unfortunately, when I was asked by the Secretary of the Congress to prepare this paper there was not time to collect data from which such a study could be made, and I have been compelled to adopt as the basis of this discussion the latest official statistics available, those of the Thirteenth Census of the United States, which covers the calendar year 1909. Since that time wages have been advanced in both the anthracite and bituminous districts, and prices for the product have been raised to compensate for (and in some cases, possibly more than offset) the increased cost of production.

Necessity for More Careful Accounting

If at the outset I may be permitted to make a suggestion, as to one thing needed in the coal-mining industry (looking at it from the standpoint of the statistician and economist) it is a standardization in the methods of accounting. It is difficult—one might say impossible—to compile accurate statistical data regarding cost and value of product when operators themselves cannot tell what their product costs nor what they actually receive for it, and when their only means of judging whether they are making or losing money is by their bank accounts.

Within the present year the Geological Survey was requested by one corporation, whose value of production is measured by the tens of millions, to furnish statements of its output some ten or fifteen years ago, which it was unable to ascertain from its own records. The only reason that the Survey could not comply with the request was that the schedules and tabulations are kept for two years only, for purposes of comparison, and are then destroyed, as there is no place where they can be safely stored and the best method of maintaining their confidential character is to burn them.

In the anthracite region particularly is it difficult to secure accurate information, not only in regard to mining cost, but also the value at first hand of the output. A large proportion of the anthracite is sold at so much a ton delivered at Buffalo, or Chicago, or Milwaukee, or wherever it may be, and the sale price of the coal at the mines includes the freight to the point of delivery and is so entered on the books. Until the recent action of the United States Supreme Court abolishing the contracts between the anthracite companies and the transportation interests, all the anthracite shipped to New York harbor ports for a number of years has been sold on a percentage basis of the tidewater price, the railroads taking 35 per cent. for the freight and returning 65 per cent. to the operators.

The magnitude of the task of determining what the actual value of the product is, was rather forcibly brought home to me last spring, when I called at the New York office of one of the big anthracite companies for the purpose of urging the expediting of that company's report. It had furnished complete reports of production, by sizes, for its numerous mines, but had omitted any statement of values. I had written a letter urgently requesting as accurate a statement of the value as I had received of the production, and had been promised the additional information. The auditor brought for my observation sheet upon sheet of closely written figures, upon which the calculations necessary to get the data had been made. It had taken the entire time of one clerk more than two weeks to do the work.

Difficulty in Computing Costs

What goes into mining cost is in many cases as difficult to ascertain. As many here well know, the old type of wooden or corrugated-iron breakers in the anthracite regions of Pennsylvania is giving way rapidly to modern structures or reinforced concrete or other fireproof construction. I have been reliably informed that the investment in most cases is charged, not to capital account, but to mining expenses. It must, of course, eventually go into the cost of mining, but it seems to me that it is an investment, not an expense, and when charged into the cost of mining should be in the form of depreciation, and of interest on the investment.

These are cited merely as examples of the complexities which confront the economist when he undertakes to annalyze such statistics as he finds available. There is a somewhat general impression that the mining of coal, both anthracite and bituminous, is a highly lucrative vocation, and that the principal occupation of the so called coal barons is to look pleasant as the golden stream flows into their coffers. I venture to state, taking the industry as a whole, that there are few lines of industrial endeavor where, during the last ten years, there have been smaller returns for the capital invested and for the energy, mental and manual, that has been put into it, than in the business of coal mining.

As has been already observed, the only recent official statistics of relative cost and value available are those presented in a recent bulletin published by the Bureau of the Census and which cover the calendar year 1909. This report shows that the value of the Pennsylvania anthracite produced in that year was $148,957,894. The total gross expenses amounted to $139,110,444, from which should be deducted $4,864,844 made up from charges to miners for explosives, oil and blacksmithing, making the net expenses $134,245,600.

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*Statistician, U. S. Geological Survey, Washington, D. C.

Note—An address before the 16th annual convention of the American Mining Congress, Philadelphia, Oct. 20 to 24, 1913.

The gross expenses are itemized as follows:

Services:		
Salaries	$4,572,489	
Wages	92,169,906	$96,742,395
Supplies:		
Fuel and power	3,189,279	
Other supplies	23,472,809	26,662,088
Royalties		7,969,785
Miscellaneous		7,736,176
Total gross expenses		$139,110,444
Deductions		4,864,844
Net expenses		$134,245,600

Earnings of the Anthracite Operators

The total production in 1909 amounted to 72,215,273 long tons, so that the average value per ton for the output in that year was $2.06; the average cost per ton was $1.86; and the net returns on the operations for the year were $14,712,294, or an average of 20c. per ton. This at first glance looks like a fair return, but attention must be called to the fact that the Census figures of cost make no allowance for interest on capital invested or borrowed, and no offsetting charges for amortization or depreciation.

According to the returns to the Bureau of the Census, the entire capital invested in anthracite mining in 1909 was $246,700,000, which may appear rather inadequate when one considers the magnitude of the industry, and an annual production of $150,000,000 (in 1911 the output was valued at $175,189,392 and in 1912 it was $177,622,626), but I am taking the figures reported by the Census Bureau. If on this capitalization an allowance of 4 per cent. be made for interest, the net returns for the year amounted in round numbers to $4,844,000.

If, as I suggested at the outset, new breakers and other equipment are charged into operating expenses no allowance need be made for depreciation, but surely the exhaustion of from 75,000,000 to 80,000,000 tons from the reserves every year should have some amortization charged against it and if 5 cents a ton be allowed the margin of $4,800,000 is practically wiped out. At least it may be said that from the operators' standpoint there may have been some reason for the recent advances in the price of anthracite, the effect of which the author of this paper has felt as keenly as any other consumer of anthracite.

The figures covering the cost and value of bituminous coal show even more striking comparisons. I may remark here that there are some slight differences in the statistics of production between the Census figures and those published by the United States Geological Survey for the reason that the Census investigations excluded mines having a production of less than 1000 tons, whereas the Survey rakes the country with a fine-tooth comb and includes every small country bank, from which it can secure a report. For 1909 the Survey showed a bituminous coal production of 379,744,257 short tons valued at $405,486,777, and the Census Bureau showed a production of 376,865,510 tons valued at $401,577,477, the difference being about 3,000,000 tons in quantity and $4,000,000 in value—less than 1 per cent. in either case. As the Census figures for cost of mining are the basis of this discussion, the Census figures of production are also used.

Profits in the Bituminous Industry

The total value of the bituminous production, as already stated, was $401,577,477, and the mining expense of producing this value, including salaries of officers, was $378,159,282. As in the case of anthracite, the expenses of production do not include any charges for depreciation, amortization, or interest on capital invested or borrowed. The expenses are divided as follows:

Salaries	$20,417,392
Wages	282,378,886
Supplies	45,345,932
Royalties	12,035,90
Miscellaneous	17,961,17
Total	$378,159,282

From this it appears that 75 per cent. of the total cost and 70 per cent. of the total value was spent in wages. Salaried officials got less than 5.5 per cent.

Now, let us see what capital got. The total capital invested in the bituminous coal mines of the United States in 1909 was, according to the Census bulletin, in round numbers $960,000,000 ($960,289,465), and I do not think that looks as if there were very much over-valuation, whatever the capitalization may be as represented by stock issue. The difference between the value of the product and the expense of producing it was $23,440,000 in round numbers or a fraction over 2.5 per cent. on the capital.

The average value per ton of all the bituminous coal produced in the United States was $1.07 and the costs averaged a fraction of a cent over $1, so that the margin of profit to cover interest, depreciation and amortization was a little less than 7c. a ton. In some states the expenses exceeded the returns. Take Arkansas, for instance, where the expenses totaled $3,630,526 and the value of the product was $3,508,590. Other instances were:

	Value of Product	Expenses
Iowa	$12,682,106	$12,816,076
Kentucky	9,940,485	10,127,987
Tennessee	6,548,515	6,691,482
Oklahoma	6,185,078	6,536,441
Virginia	4,336,185	4,392,440

Conditions in the Leading States

Pennsylvania, by long odds the most important producer, wth an output of 137,300,000 tons, showed a total of expenses of $117,440,000 and of value of $129,550,000, a balance on the profit side of a little over $12,000,000, or about 3½ per cent. on the capital invested, $358,600,000. The four competitive states, West Virginia, Illinois, Ohio and Indiana, which rank second, third, fourth and fifth, respectively, in producing importance, all show such narrow margins between income and outlay that profits are visible only with a microscope. The figures follow:

	Value of Product	Expenses	Difference
West Virginia	$44,344,067	$43,024,716	$1,319,351
Illinois	53,030,545	51,697,504	1,333,041
Ohio	27,353,663	27,153,497	200,166
Indiana	15,018,123	14,906,831	111,292
	$139,746,398	$136,782,548	$2,963,850

These four states with an aggregate production of a little more than the bituminous output of Pennsylvania, showed a total of less than $3,000,000 as the excess of receipts over expenses. The capital invested in the coal-mining industry in these states was something over $310,000,000, so that the returns on the capital were less than 1 per cent.

More Profitable Conditions in the West

There is one other fact to which I desire to call attention, and that is to the conditions in the public-land states, which are also coal producers. They are California, Colorado, Idaho, Montana, New Mexico, North Dakota, Utah, Washington and Wyoming. All of them showed favorable comparisons with other states. They produced in round numbers 25,000,000 short tons of coal in 1909. The value of the product was $37,000,000; the expenses, $32,400,000, the difference being, say, $4,600,000. The capital reported was approximately $70,000,000, so that the average earnings on the capital invested in these states was between 6 and 7 per cent., as compared with less than 1 per cent. in West Virginia, Illinois, Ohio and Indiana, and of about 2.5 per cent. for all the bituminous coal mined in the United States in 1909.

I have not prepared this paper as an advocate of the coal-mine operators of the United States. I must, in fact, confess that when I began, less than three weeks ago, a study of the Census bulletin, I was somewhat surprised at the facts presented therein, though I was familiar with the general situation. If there is any other branch of the mining industry conducted on such narrow, not to say dangerous margins, I should be glad, yet sorry, to know it.

When these figures are considered one must feel that if there is any mulcting of the people in the coal industry the operators are not the robber barons. And when the dividing line between profit and loss is so faint, all the more credit is due to the men in authority who are throughout all of the coal-mining regions spending thousands of dollars to reduce the hazard and improve the conditions under which the miners work.

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The Taxation of Coal Lands

By R. V. Norris*

SYNOPSIS—Former suggested basis of valuation of coal lands for taxation purposes. Valuation on a sales basis legal but unequal. The foot-acre rule inadequate, unjust and prohibitive. Valuation on a royalty basis illegal and illogical. Valuation on estimated profits objectionable and has never been applied in Pennsylvania. Conclusions—Taxation of mineral in place logically and economically wrong. Suggested basis for assessment valuation of mineral properties.

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The proper method for the taxation of mineral land is, and always will be, a difficult problem. Unlike other property the value of such land is not readily ascertainable from sales and offerings, and many conditions may radically affect its true value.

The assessment of lands in the anthracite district of Pennsylvania is a good illustration of the difficulties inherent in attempting to arrive at a proper taxable value for coal lands. Up to 1907 the assessed valuations in this region, while irregular and in many cases unjust, were not so excessive as to create an unendurable burden on the industry and, therefore, were not seriously resisted. In 1907, however, a general revision of the assessed valuation was attempted and the resulting assessments were so high that they were resisted in the courts, with the result that taxes under this assessment are still in litigation, and appeals have been filed from all the later assessments, with a resulting condition of almost intolerable chaos.

The assessment of lands for taxation, in Pennsylvania, is made under acts of the legislatures of 1841 and 1842, by which the assessors are required to "assess, rate and value every subject of taxation according to the actual value thereof and at such rates and prices as the same would bring at a *bona fide* sale after due notice." In actual assessment four methods of taxation have been attempted or suggested: 1. Valuation based on actual sales. 2. Valuation based on foot-acres of coal remaining in the ground. 3. Valuation based on royalty values. 4. Valuation based on capitalized estimated profits. All of these methods have proved unequal and unsatisfactory and it is the purpose of this paper to discuss them and to point out their impracticability.

Valuation Based on Actual Sales

This method, which under various decisions of the Supreme Court of Pennsylvania is the only strictly legal one, has resulted in an almost hopeless tangle of the testimony in the tax-appeal cases. Sales have been shown from a few hundred up to over ten thousand dollars per acre, for coal land. The smaller values are usually for lands containing relatively thin coal; medium values, from two to three thousand dollars per acre, for relatively small areas with normal coal contents but unopened and not generally of sufficient area for separate operations; while excessive values, in a few cases, are for going concerns or for lands strategically located and thus having inflated values to particular purchasers.

Valuation Based on Foot-Acres of Coal

It was early apparent that the mere sale values per superficial acre, for scattered tracts, could not properly be used as a criterion of value for lands containing widely different thicknesses of coal; and in the late eighties the assessment value was based on the foot-acreage holdings of a generally average blanket thickness, arrived at by the engineers of the operating companies, who returned under oath the average thickness of workable coal remaining unmined and calculated as spread equally over the area of each tract covered by the bottom bed.

This method, while more equitable than a valuation based on superficial acreage irrespective of coal thicknesses, is unjust in that it takes no cognizance of the varying thicknesses or qualities of the different beds of coal and the radically different costs of mining the same and, further, is distinctly objected to by the Supreme Court of Pennsylvania, which says:* "The foot-acre rule for ascertaining the valuation of coal lands of the appellant, for the purpose of taxation, is not a proper measure of their value."

As an illustration of the extent to which the thickness and quality of coal influence its value, the following diagram is presented, which shows the increased cost, in cutting and loading only, due to decreased thickness, in one particular colliery. This does not, of course, begin to show the total increased cost of mining in thinner beds, with the necessary greater development, more extensive haulage and ventilation, longer transportation, additional pumping, and greater cost of preparation; but certainly does indicate the irrationality of an assessment based on coal contents alone, irrespective of conditions.

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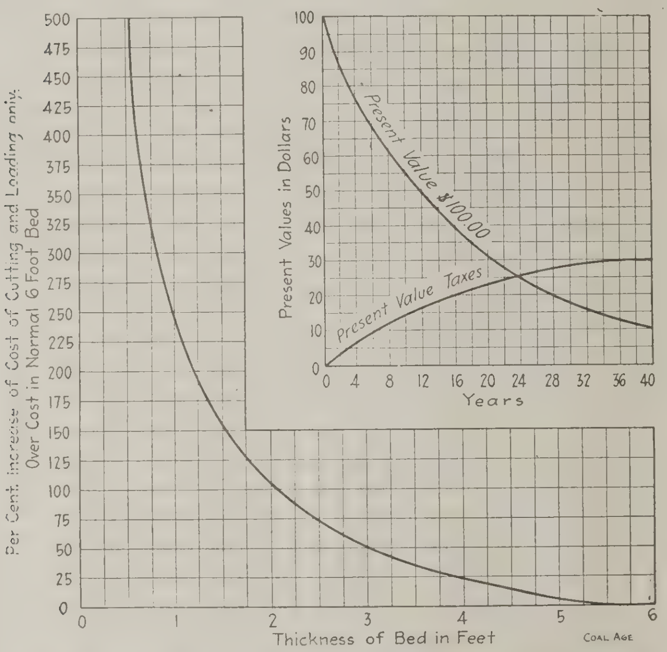
*Address delivered at the Sixteenth Annual Convention of the American Mining Congress, Philadelphia, Penn., Oct. 20-24, 1913.

*Penn. Supreme Court Report No. 229, p. 465, Reading Appeal.

The actual assessments per foot-acre, which under various subterfuges are still persisted in, despite the law as interpreted by the Supreme Court of the state, have gradually increased from about $50, to the 1913 assessment in Luzerne County, in the Wyoming field, where the assessed valuation was actually fixed at an equivalent present rate of $250 per foot-acre, or about 20c. per ton for all coal, of all sizes, estimated to be ultimately recoverable from the lands. Assuming that the average date of mining, for all coal will be but fifty years hence, and that taxes must be paid on this valuation at the rate of, say only 20 mills, the present value per ton of coal available in the ground on the basis of this monstrous assessment would be about $2.37, a figure many times greater than any possible value for mining purposes.



Diagrams Showing Increase of Cost in Thin Seams; and Valuation of Property and Taxes with Respect to Life of Mine

Valuations Based on Royalty Values

This method, which has been advocated by many engineers appears at first sight eminently logical and proper. It has been objected to, however, by the Pennsylvania Supreme Court,* and hence cannot be legally used for assessment valuation. This report says, referring to royalty basis of valuation:

> Its market value is its fair selling value for cash, not payable as royalty strung out through a long series of years, but payable at the time or as soon thereafter as the value could be determined. Such a method does not make allowance in undeveloped territory for the length of time coal may lie in the ground unmined, undeveloped and unprofitable. It is impossible to reduce to a scientific basis and to mathematical precision the elements of value entering into the present selling price of a tract of coal land. The question is not what earning power coal lands may develop in the future, but what they are actually worth in the market at present.

Further, this method presents inherent difficulties and objections, which remembering that, under the Pennsylvania Law, assessment on similar properties must be equal, appears to be insuperable. On a royalty basis of valuation, the time of mining is the controlling factor in calculating values. As an example, assume five exactly similar properties, each containing 2,000,000 tons of coal, to be worked out *seriatim,* at an average of 100,000 tons per year, each paying 30c. per ton royalty, making the annual royalty payment, during the mining of each tract, $30,000. On the basis of the Luzerne County, Penn., 1913 assessment, these properties would each have an assessment value of $400,000, and would pay approximately $8000 annual taxes, up to the average time of exhaustion. Their present values, on a royalty basis, calculated at 6 per cent. would be as follows:

Tracts	Start Mining Yr.	Complete Mining Yr.	Present Value Royalties	Less Present Value Taxes	Net Present Value
First..................	0	20	$344,100	$58,880	$285,220
Second................	20	40	107,360	110,120	12,760
Third..................	40	60	33,550	126,100	92,550
Fourth................	60	80	10,430	131,080	120,650
Fifth..................	80	100	3,250	132,550	129,300

Thus, even without any taxes, the coal held for future necessities is shown to have but small present value, and including the taxes to be paid (except the first assumed tract to be mined out within twenty years) is worse than valueless and would be held by the owners at a loss. This condition may be well illustrated by the smaller diagram showing the present values, and present tax charge on $100 to be paid at a future date, as on lands held for reserve.

Hence, the Supreme Court is unquestionably justified in rejecting a royalty basis for assessment valuations; and, taking the five example tracts above, it is apparent that, depending only on the element of time, the valuations on this basis vary from a value of $285,000 to a loss of $129,300. It is greatly to the financial interest of the owners to have the properties exhausted in the shortest possible time, practically regardless of the ultimate yield. From a financial standpoint, they are fully justified in taking only the most available and most easily and quickly mined coal, even at the cost of the utter destruction of thinner beds, which may be interstratified with the thicker ones and which would be irretrieveably ruined by the removal of larger beds below them.

Further, as a commentary on the justice and equality of an assessment based on royalty values, it is evident that a mere change of ownership, transferring a tract of coal land from a reserve for fifty years or more in the future under one ownership, to coal immediately available to another would radically change its assessed value. Also, a valuation on present royalty rates may result in absolute tax confiscation of lands leased at the going rates of many years ago, in many of which leases the taxes were covenanted to be paid by the owners, as many anthracite leases made in the sixties and seventies of the last century pay from 8 to 25c. per ton on the larger sizes only, while present royalties vary from 35 to 60c. per ton for prepared sizes, with about half these prices for pea and one-quarter for buckwheat coal.

Valuation upon Capitalized Estimated Profits

This method of valuation has been proposed, but as far as is known has never been applied to the assessment of bal land in Pennsylvania. It has all the objections aplying to royalty valuations, with the further very serous objection that the profits of mining enterprises are, nder similar conditions, largely dependent upon the ianagement that such a basis for assessment would reutl in, and unjustly penalizing good management, which ssentially involves good and economical mining with esulting lower losses and the recovery of larger perentages of the mineral in the ground.

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*Penn. Supreme Court Report No. 299, p. 470.

Conclusions

It appears that none of the suggested or attempted nethods of assessment have resulted or can result in an equitable valuation, fair and just to both the public and the owners of coal land; that even moderate taxation of the coal in the ground is opposed to all principles of conservation, as its effect is to put a tremendous premium on rapid mining almost regardless of ultimate recovery and to encourage the destruction of poorer and thinner beds interstratified with the better ones because of the enormous penalty entailed in slower mining, and because such taxation acts to discourage, by prohibitive penalties, the holding of lands in reserve for the future necessities of the people.

For these reasons, it appears that the taxation of mineral in the ground is logically and economically wrong, leading as it does to the rapid and uneconomical exhaustion of the mineral wealth of the country, and putting a premium on premature and wasteful exploitation. The proper method of taxation for all minerals appears to be *a tax based on the value at the mine of each year's product, at the local rate of taxation assessed for that particular year, including an assessment on surface lands, outside improvements and machinery, the value of which is readily ascertainable; but not including any valuation of mine openings or inside improvements, which are incidental to the mining process and which after the exhaustion of the mineral are of no value.*

Thus, a colliery producing 1,000,000 tons of anthracite in 1912, with a value at the mine of, say $2,500,000, and with surface and improvements valued at $1,500,000, should pay taxes for the year 1913, on $4,000,000 assessed valuation, regardless of the area of coal land tributary to such a colliery; and if, for any cause, the production in some later year should fall to $1,000,000 in value and the value of the surface and improvements decrease to $1,000,000 the taxes for the following year should be assessed on a $2,000,000 valuation.

This suggested method of assessment and taxation of coal lands is, of course, clearly illegal under the present laws of the state of Pennsylvania; and its adoption would require special legislation to put it in force. Also, while not absolutely just, in that it assesses coal from thin and impure beds that are costly to mine, at the same rate as that from the more cheaply mined thick and pure beds, the plan would, if legalized, possess the inestimable advantage of doing away with all uncertainty and litigation as to assessed valuations; result in the payment of taxes in greatest amount at the times of greatest production and consequent greatest population and public need for money; and, by concentrating taxation on the land most actively worked and relieving reserve land from its present crushing burdens, would tend to the conservation instead of the dissipation of the irreplaceable coal resources of the country, by encouraging the complete mining of lands when once opened, including all workable beds large and small, rather than encouraging the opening of the best beds, on all lands, to obtain immediate returns and avoid the burdens of accumulating taxation, even at the cost of the destruction of smaller and less valuable beds lying above the larger ones.

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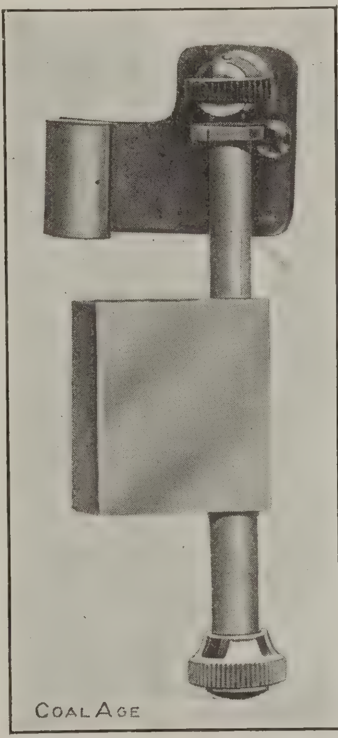
A Good Friction Igniter

The Vaughn-Miller safety-lamp igniter, recently placed on the market, combines some qualities that recommend it strongly to users of the Wolf or the Siple naphtha lamps. The igniter fits both of these lamps and is quickly inserted without difficulty or alteration of the lamp.



A Friction Igniter

This igniter, which is shown in the accompanying figure, is the invention of L. D. Vaughn, mine inspector, third district, West Virginia. Mr. Vaughn has had 42 years' experience in mines and has made a close study of the question of safety lamps. In his igniter he has employed a carborundum cart. [illegible] said to give 5000 flas [illegible] and can be replaced when worn out, at slight expense. One of the features of the igniter that insures the ready ignition of the wick of the naphtha lamp is the fact that the spark, which produces the ignition, is thrown horizontally against the wick. Another feature of this igniter is that when not in use it is lowered in the lamp, so that it will not obstruct the light. All that is necessary to relight an extinguished lamp with this igniter, is to push up the small rod that extends down through the bottom of the lamp, and twist it sharply to the right. A small spring keeps the cartridge pressed against the friction wheel of the igniter.

While this igniter has been on the market for several months, and has given good satisfaction, the sale has not been pushed until now, awaiting the results of tests made by the Bureau of Mines. The circular states that, on Aug. 14, this igniter was subjected to a series of rigid tests by the Bureau of Mines, at Pittsburgh, Penn. In an 8½ per cent. mixture of gas and air, in still air, 500 continuous flashes of the igniter in a safety lamp failed to ignite the gas outside of the lamp, the gas burning in the combustion chamber and filling the lamp with flame. Following this, the same tests were made in 600-ft., 1000-ft., 1500-ft. and 2500-ft. velocities of the air current, the last named being the highest velocity attainable at the testing station. In these tests of more than 500 flashes each, the lamp was continually filled with flame, which, however, did not pass the gauze, although the latter, in the last-named test, was almost at a white heat.

An Interesting Exhibition

SYNOPSIS—A trip through the machinery exhibition held in connection with the American Mining Congress in Philadelphia. Various machines and appliances used directly and indirectly in the production of coal were here seen to good advantage.

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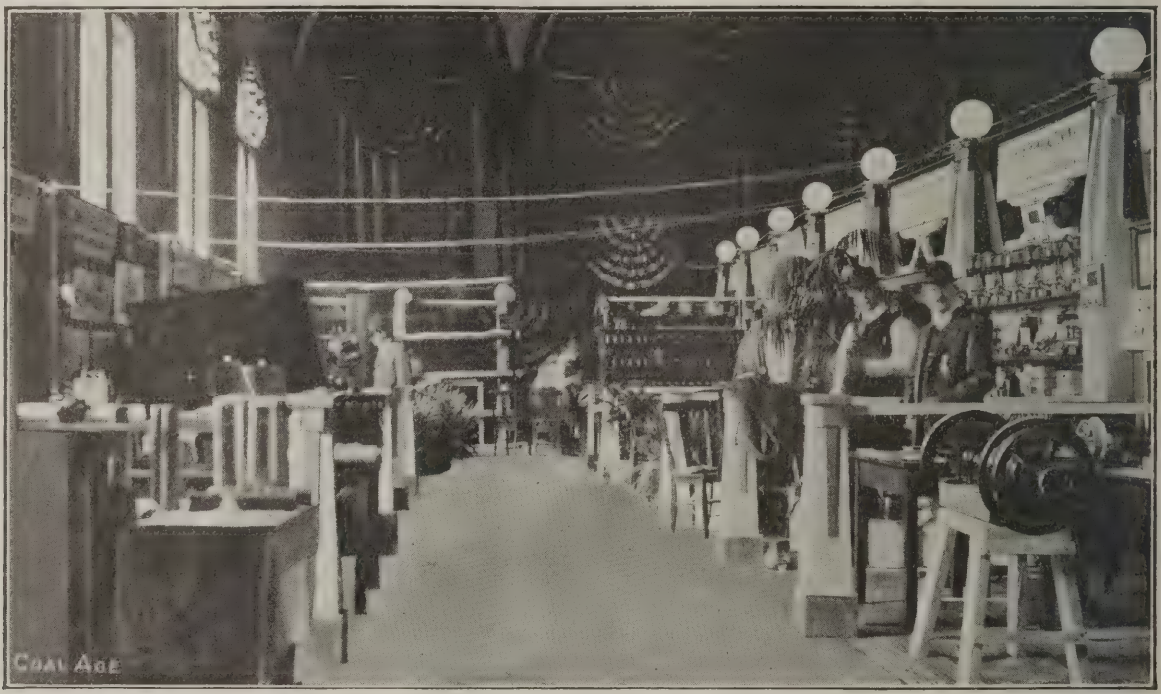
The machinery exhibition carried on during the past week in connection with the American Mining Congress in Philadelphia, although perhaps somewhat disappointing in the matter of attendance, was both interesting and instructive. The exhibits shown occupied two floors of Horticultural Hall; the heavy machinery being placed upon the first floor, and the lighter apparatus above.

Upon both floors the exhibitors' booths were arranged along the outer walls of the building or placed back to back in the room. Three aisles were thus formed upon each floor with exhibits upon either side.



Looking Down One of the Aisles

Entering the right hand aisle on the second floor, the first exhibits seen were those of the Commercial Museum of Philadelphia, and the University of Pennsylvania. The next exhibit was that of J. S. McChesney & Co., of Chicago, Ill.; this consisted of mine supplies and wire hose ties. Beside this booth was that of the American Abrasive Metals Co., of New York, which exhibited floor plates and locomative brake shoes.

The next booth was that of the Draeger Oxygen Apparatus Co., of Pittsbugrh, Penn. Here the oxygen helmet and mouth piece breathing apparatus were exhibited in proper working order upon suitable wax figures. A pulmotor was also shown with its various attachments and attracted no small amount of attention from visitors.

Passing on down the aisle the visitor arrived in succession at the booths of Adam Cooks Sons, of New York, lubricant makers; the Ball Engine Co., of Erie, Penn. manufacturers of high grade engines; and the Davis Instrument Manufacturing Co., of Baltimore, Md., wher a collection of high-grade anemometers and hygrometer might be seen.

The next exhibit was of the Scott rivetless manil transmission-rope sockets used in joining the ends c transmission rope. By means of these sockets, which ar steel drop-forgings, a rope can be spliced in approximat ly 45 seconds, whereas several minutes are required t do the same work with a riveted socket. These socke are manufactured and sold by John G. Scott, of Girar ville, Penn.

The Witherbee Ignitor Co. had the next booth and exhibited their storage battery and cap lamp. The exhibit consisted of the lamps, batteries, cases, wire, e showing clearly the method of manipulation of the lamps. Directly across the aisle was the booth of Ack royd & Best, Inc., of Pittsburgh, Penn., who had a go display of safety lamps and accessories.

At the extreme end of the passage was the exhibit o the Electrical Service Supplies Co., of Philadelphia Penn. This consisted of Keystone truss pins, lock in sulators, lamp-guards, porcelain strain insulators, protected rail bonds and the compressor for same, an au motoneer, Gargon-Daniels lightning arresters, a Keystone mine signal, also a mine telephone, an illuminate enameled "Safety-First" sign in several languages, Crouse-Hinds mine headlight, and an extensive line electrical material and specialties.

Along the second or center aisle of the building wer the following exhibits: The Fairmont Mining and Machinery Co., of Fairmont, W. Va. This consisted of small mine pump geared to a motor, both machines be ng mounted upon a mine truck for portable operation; a short section of track laid with this company's steel mine ties; also a model of a car retarder to facilitate oading railroad cars under tipples.

The next three booths were occupied by the Keystone ubricating Co., of Philadelphia, with an exhibit of rease and grease cups, the Cyrus Borgner Co., of Philadelphia, with a nice exhibit of fire brick and clay products, and the West Virginia Rail Co., of Huntington, W. Va., with an exhibit of rails and fishplates.

The next booth was occupied by the American Steel & Wire Co., of New York. Here specimens of wire cables for aerial tramways, together with the travelers and grips used in this type of transmission were shown. Not the least interesting part of this exhibit was a joint in a lock-coil cable.

The Bureau of Safety Relief Sanitation and Welfare of the United States Steel Corporation exhibited photographs of welfare work, a special type of stretcher, etc., in the next booth, while the one next to that was held by the Universal Portland Cement Co., of Chicago, Pittsburgh and Minneapolis. Here were shown specimens of crushed limestone, granulated blast-furnace slag, a mixture of these raw materials, portland cement clinker and the finished cement.

Exhibit of the Draeger Oxygen Apparatus Co.

Directly across the aisle from the exhibit of the Universal Portland Cement Co., was that of Johnson & Johnson, of New Brunswick, N. J. This was one of the most complete exhibits in the entire show, and consisted of various materials and appliances used in first-aid work, and also the first-aid cabinets, such as are kept ready for immediate use at many mines. The next booth was that of Henry Troemner, of Philadelphia, with a display of various sizes of laboratory scales and balances, while the Atlantic Refining Co., of Philadelphia and Pittsburgh, had an extensive exhibit of petroleum products in the next booth. Here was shown a working model of a series of oil wells pumped from a central station. A mine car wheel lubricated with some of this company's oil was kept continuously running (being belted to an electric motor) at the rate of approximately 30 miles per hour, and the journal box was absolutely cold.

The next exhibit was that of the Hazard Mfg. Co., of Wilkes-Barre. This firm is the maker of wire cables and hoisting rope. One of the most interesting parts of this display was a piece of hoisting rope which had broken loose accidentally from the drum of the engine and fallen down the shaft, and in so doing had become twisted and tied into an intricate knot, with many sharp bends. Despite this fact, however, a close examination of the rope failed to show the breaking of a single strand or wire.

The next booth was occupied by the Koehler Mfg. Co., of Marlboro, Mass., with an attractive display of safety lamps and igniters. The igniters above mentioned are built into and made a part of the safety lamps, and are so arranged that should for any reason the lamp become extinguished, the simple turning of a rod or thumb screw under the base of the lamp will cause a shower of sparks to fall upon the wick, reigniting it without the necessity of taking the lamp apart or of striking a match.

The Western Electric Co. in the next booth had a fine display of mine telephones for both surface and underground work, mine rescue telephones and the like.

The Hirsch Electric Mine Lamp Co., of Philadelphia, had the next exhibit in the side aisle. Here a small battery-charging plant was shown in operation. This consisted of a rack provided with suitable holders and terminals or fingers touching the terminals of the batteries.

The Streeter-Amet Weighing & Recording Co., of Chicago, exhibited in the next booth their automatic weight recorders for tipples, together with several photographs of various installations; while John Roeblings Sons, of Trenton, N. J., had the display adjoining. Here were shown steel cables and hoisting ropes and electric conductors.

The Justrite Manufacturing Co., of Chicago, Ill., occupied the next booth. An attractive display of various kinds and types of carbide lamps and lanterns with many unique features might here be seen. Among these latter might be mentioned a lamp which required no match to light, a vest pocket lamp-lighter and an ingenious pocket device for cleaning out the gas hole in a lamp tip.

The next exhibit was that of the American Concentrator Co., of Philadelphia. This firm is the manufacturer of coal and iron-ore preparation plants. No less than 13 types of jigging machines are built by this company, also magnetic separators, and to the best of their knowledge the only commercially successful centrifugal coal dryers upon the market.

The Lobdell Car Wheel Co., of Wilmington, Del., had a display of mine-car wheels and axles for locomotives in the next booth.

In the booth directly across the aisle from the one last mentioned, Keuffel & Esser Co., of New York, had an extensive and interesting display of surveying and drafting instruments. Among other devices of interest to mining men, they showed an improved anemometer with an increased range of accuracy. In the booth immediately adjoining this was a display of chemicals by Roessler & Hasslacher Chemical Co., of New York.

The Edison Storage Battery Co., of Orange, N. J., had the adjoining booth. Here were shown various sizes and types of the Edison storage battery varying in size from the single-celled battery for miners' head lamps to a 56-cell unit suitable for use on a mining locomotive.

The Link Belt Co. had the next booth. Here were shown photographs of various applications of this firm's hoisting and conveying machinery, covering practically the entire coal-mining field.

The Main Belting Co., of Philadelphia, occupied the remaining space upon this floor. Here was shown an apparatus demonstrating that Anaconda belts would carry wet material. A conveying belt was also exhibited which was approximately 8 ft. wide.

Upon the lower floor of the building the Jeffrey Mfg. Co. exhibited a 60-hp. storage-battery and trolley locomotive. This machine was designed as a combination haulage and gathering motor. A heavy-duty short-wall mining machine, a single-roll coal crusher, and Hess-Bright ball bearings as used for locomotive armatures were also shown.

The Goodman Mfg. Co., of Chicago, displayed a coal puncher driven by an electric motor, and built in 1888. Also a five-ton gathering locomotive with cable reel, and a short-wall coal cutter.

The Milwaukee Locomotive Co., of Milwaukee, Wis., had on display a seven-ton, 35 hp., gasoline locomotive. This machine was equipped and driven with an engine of four cylinders, each 6x6 in.

The Baldwin Locomotive Works and the Westinghouse Electric & Mfg. Co. exhibited an electric locomotive equipped with both the ordinary or straight trolley pole, and a jointed or type D-20 trolley. This machine was ten tons in weight, and equipped with an 86 h.p. motor. It was built with the bar-steel side frame.

An Elaborate and Attractive Exhibit

The Electric Storage Battery Co., of Philadelphia, exhibited their iron-clad exide battery for motor vehicles. A complete unit of 20 cells was here on exhibition.

A working model of an over-wind and over-speed controller was exhibited by the Welch Hoisting Controller Co., of Pittsburgh. This was a miniature hoisting engine, provided with a model of a shaft and head frame. The engine was equipped with a controlling device which effectually prevented either over-winding or over-speeding.

The Alexander Milburn Co., of Baltimore, had a good display of carbide lanters and headlights, and devices for illumination when isolated work must be done at night, or in dark places.

The exhibit of the General Electric Co. consisted of photographs of various installations which had been made, while the Williams Patent Crusher & Pulverizer Co., of St. Louis, had a full-sized crusher in working order and equipped with an improved belt pulley, also a small finished cylinder showing the arrangement and attachment of the hammers.

The C. O. Bartlett & Snow Co., of Cleveland and New York, had upon exhibition a large-sized working model of their coal-handling machinery.

The Hyatt Roller Bearing Co., of Newark, N. J., had an interesting exhibition of their roller bearings as applied to mine car wheels. They also showed the rollers, cages and bushings, separate from wheels of any kind.

The Lead Lined Iron Pipe Co., of Wakefield, Mass., had on display various lead- and tin-lined fittings, and sections of lead- and tin-lined pipes, while the Vulcan Iron Works, of Wilkes-Barre, Penn., showed photographs of their various installations, the attendant being ready to answer any questions which might be asked.

As stated in the beginning, the exhibition in whole and in detail was both interesting and instructive. It was well worth anyone's time to pass through the various rooms and see the types of machinery which are used in the mining and preparation of coal. The tools and appliances here shown were of course the most modern and up-to-date that are in use at the present time. Most of the articles exhibited, with the exception, of course, of the models, were stock materials and not built or finished especially for the occasion.

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The True Romance

By Berton Braley

From "American Machinist."

"Romance is dead?"—The Foreman smiled
As he would at the words of a foolish child;
"Romance is dead?"—Why, man you're blind—
If you'd listen and learn with an open mind
Instead of speaking in parrot phrase
Of the 'grand old times' and 'the good old days;'
If you'd look about you and SEE, you'd find
Romance is living right now and here,
Not dead and gone with the yesteryear!

"Man, O man! can't you look and see
What thousands of wonders have come to be?
These bolts and shafting that whirl and whir,
These chunky motors that hum and pur,
These lathes and punches which fill the floor
These hammers pounding, these rolls that roar,
Why—THEY'RE Romance—and they make it, too,
By the magic spell of the work they do;
These tools of ours and the men who run them,
Don't DREAM of miracles—they've DONE them;
They've put Romance in the shape of steel,
They've turned the shafts and they've forged the keel
Of many a ship that fights her way
Through surging combers and flying spray;
The train that thunders along the rails,
The ax that blazes the new-made trails,
The cages that carry the miners down,
The dynamos lighting the clanging town,
The aëroplane in the sky's blue dome,
The plowshare, turning the good brown loam,
The myriad wonders of the time
Have sprung to life from the workshop's grime;
And yet you sigh, and you shake your head
And murmur sadly, 'Romance is dead!'"

Coal-Mine Accounting Systems

By J. B. L. Hornblower*

SYNOPSIS—Some comments on accounting methods in general with particular reference to those of the Pittsburgh Coal Co. Systems of accounting vary widely with different companies and may lead to a great deal of confusion. Plant and equipment depreciation are especially troublesome items to handle intelligently.

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It is with some misgivings that I undertake, at the request of the officers of this Convention, to lead in the presentation of the subject "Mining Costs"; not that the subject is one unworthy of your time and attention, nor that my study of it has been meager or superficial, but because the matter of the proper construction of mining cost accounts and the use of the same by those vitally interested does not usually receive the attention and consideration which it deserves. Perhaps this fact influenced your officers in introducing a paper on the subject and inviting your attention to its consideration and discussion. However this may be, I believe that the subject is one of great importance and I therefore have consented to discuss it, more in the hope of emphasizing certain things, than of presenting any new or startling views upon it.

First. Who are interested in mining costs? The foremen, superintendents, general managers, executive officers, boards of directors and stockholders. The viewpoints of these respective classes are different, but all are, or should be, greatly concerned to secure the truth, the whole truth and nothing but the truth. Carelessness and indifference as to statements made are, in the last analysis, of the same texture as wilfullness and misrepresentation and frequently lead to the same disastrous results.

Second. How may these statements be made to most accurately and clearly set forth the information concerning actual conditions, which is so necessary to those whose capital and reputations are at stake?

The limit of time you will fix for the consideration of this subject, among the many other important matters which are to engage your attention, makes it necessary for me to avoid details as much as possible—to outline rather than elaborate.

INTEREST AND TAXES

Interest on capital invested in lands, mining rights, plants and equipments, and discount on bonds issued against such investments, should not be charged to mining cost. Interest on bonds sold for the purpose of constructing specific plants is commonly charged to such construction cost up to the time when the plants are ready for operation, but this practice easily runs into an abuse and a misrepresentation to bondholders, stockholders and the public.

An operating company will not err but rather commend itself to all concerned by holding to an absolute rule not to capitalize interest under any circumstances. Many companies in the past, which sold bonds for less than face value, charged such discount to property or construction account, but this practice is now less common and will doubtless gradually disappear in companies which wish to be credited with conservative management and frankness in reports to stockholders and the public.

Taxes in an operating company should be charged to operations, never to property. The amount of tax chargeable to the operation of a given mine ought to be, as nearly as may be, the tax upon the land which will ultimately be operated through that mine, and the tax for a given year should be apportioned in equal amounts over the divisions of the year for which cost statements are made.

ROYALTY OR PROPERTY DEPLETION

The value of coal or mineral rights, at cost, should be extinguished at a charge to operations in a fixed amount per ton or per acre as the property is exhausted. Some companies have revalued lands on their books and so created a surplus. This, in probably every case, was not a wise thing to do. Assuming that the transaction was thoroughly honest in intent, properly shown on the books of the company as a surplus not derived from operations, and properly followed up by increased charges to future operations for exhaustion, it will appear in the last analysis to be simply reaching into the future.

I would say, therefore, that while such revaluation in some cases may seem to be justified, in most cases it is a thing which ought not to be done. If the lands are really worth more from year to year than their first cost, the fact will be reflected in increased selling value of the product. The difference of value, believed or hoped to exist, ought not to be put into surplus account in advance of actual sales of product, thereby increasing, in a fictitious way the mining cost of the future. In other words, it is wiser and more conservative to book earnings as they are actually realized, not as anticipated or hoped for.

DEPRECIATION OF PLANT AND EQUIPMENT

There is, perhaps, no single phase of accounting, whether of mining or manufacturing companies, more complex or troublesome, than this matter of plant and equipment depreciation; hence nothing in which there are more differences of opinion and method of procedure among operating companies and I might add, nothing in which managements and accountants more easily, and with the best intentions, deceive themselves and each other. The views, plans and methods herein set forth are, therefore, not necessarily standard—they are more or less the result of my personal study and experience.

Up to the time when a mine is placed on an operating basis, ready to produce the daily tonnage for which its development, plant and equipment were planned (regardless of what it actually does produce at that time, determined perhaps by the law of supply and demand, labor or weather conditions or car supply) all expenditures for development, plant and equipment should be charged to construction account with credit to that account for product sold in the full sum realized for the same. After the projected development has been completed and the mine placed on an operating basis, all expenditures made during the whole course of its life, whether for development, air shafts, mine cars, power equipment or lines, or anything that may be installed, should be charged to operations, unless such expenditures result in positive increase of capacity; in this case they may be charged to capital investment with a proper regard to the question of the length of time that such additions may reasonably be expected to serve.

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*Comptroller, Pittsburgh Coal Co.

Note—An address before the 16th annual convention of the American Mining Congress, Philadelphia, Oct. 20 to 24, 1913.

Further charges should be made to mining cost monthly in fixed uniform amounts, with credit to a fund account generally known as plant and equipment depreciation fund, for the replacement of capital originally invested in such development, plant and equipment, or for the replacement of units which wear out or become obsolete. The extent to which this fund may be used for replacements or renewal in kind must be determined by the rate at which the fund is accummulated. If the rate is low and a long period, perhaps the entire life of the mine, is consumed in charging operations with the full amount of the original investment (less salvage), obviously no replacements or renewals should be charged against or paid out of the fund; all must be charged to operations. If the rate be made high enough so that a much shorter period is consumed in getting into the fund the full value of the original investment through charges to operations, certain replacements, renewals, or improvements may be charged against the fund.

The company with which I am connected now follows the uniform rule of charging operations with depreciation of plant and equipment at the rate of 6 per cent. per annum on net (or reducing) values, with credit to depreciation fund. This will cover into the fund about 70 per cent. of the original value in twenty years; it is contemplated that salvage values, that is, the values of all equipment scrapped, or removed for use at other points during that period, together with the remainder value, credited to the fund will make up the 30 per cent. of balance of original value not charged to operations.

We, therefore, do not charge any renewals or replacements against our depreciation fund accumulation, but charge them all to operations; when the charges are so large as to seriously impair monthly comparisons of cost they are spread over the operations of a few months.

Labor, Supplies and Fuel

In the Pittsburgh coal-mining district, labor costs fall into two general divisions: First, that which is paid on a unit basis of work performed, such as the scale rate for pick mining, machine mining, subdivided into cutting and loading, and dead work, such as yardage, room turning, breakthroughs, clay veins, etc.; and, second, that which is paid on a pier diem basis, such as motormen, drivers, general inside labor, tipple labor, general outside labor, electricians, etc. It would hardly be profitable to follow the subdivisions of labor in this paper; they differ, of course, with changing conditions.

All expenditures for live stock and supplies, after the initial installation at a new mine, should be charged to operations as made. For purposes of checking, and accuracy in monthly comparisons of cost, inventories should be taken at the close of each month and entries made debiting inventory account, with credit to operations, for unused supplies at cost and for live stock in the service at a fair valuation, taking to account wear and tear.

The mining-cost statement at a mine depending upon its own power plant, which does not include a charge for coal consumed in the same is incomplete and apt to be misleading in comparisons with mines purchasing power from central stations. For this reason it is proper to charge the fuel at a representative value to operations with credit to coal-sales account, notwithstanding that operations have already been charged with all the items entering into the cost of the product so consumed. This treatment of the individual power-plant fuel, of course must not be lost sight of in the general summary of business done.

Insurance and General Expense

Fire, tornado, boiler and employer's liability insurance premiums are increasingly important as items to be taken to account in mining costs whether these hazards are covered by insurance companies or assumed by the operator. In the latter case a fund or funds should be created and maintained at a charge to operations in sufficient amount to pay all losses, and, conservatism suggests, to accumulate a reasonable surplus.

General office expense and other general expense should be incorporated in mining-cost statements in order to get a total outside amount of cost upon which to base selling values; they should, however, be shown separately under appropriate headings, not being included in any of the subdivisions of "Cost at Mine." In a company conducted exclusively as a mining company it is, perhaps, better not to differentiate nicely between that portion of general office expense, which is chargeable direct to mining, such as the operating and engineering departments, and the expenses of departments of sales, transportation, finance accounts, etc. In a broad sense, the base of all the company's business is the production of its mines, hence all of its general office expense may properly be included as a part of its total mining cost.

FORM OF COST STATEMENT OF A TYPICAL BITUMINOUS MINE, PITTSBURGH DISTRICT

	Operating Days	
Production in Tons of Run-of-Mine		Ton
	1¼-in. lump	%
	Small sizes	%
	Total	%
	Pick mined	%
	Machine mined	%
	Total	%
	Cost per Ton	
Pick mining	$	
Machine mining		
Yardage		
Room turning		
Break through		
Clay veins, spars, etc.		
Drainage and ventilation		
Animal haulage		
Mechanical haulage		
General inside labor		
Tipple labor		
General outside labor		
Supt., clerks, pit and fire bosses		
Mining machine repairs		
Mining machine expense		
Pit car repairs		
Pit rails and ties		
Pit posts and caps		
"T" iron and spikes		
Power plant expense		
Stable expense		
General expense at mine		
General repairs		
Total direct charges	=	
	Labor	$
	Supplies	
	Fuel	
	Royalty	
	Depreciation	
	Taxes, insurance and other general Expense	
	General office Expense	
	Total	$

An Improved Anemometer

One of the most common and yet most important, intruments, in mining practice, is the Biram anemometer ith which every mine foreman is familiar. This intrument is to the mine foreman what the Davy lamp s to the fireboss—his constant companion. Many of the eatures of the old Biram instrument have always proved source of annoyance and error. Owing to these deects, which were often unappreciated by the foreman sing the instrument, it was common to find frequent lisagreement in the results obtained by the use of differnt instruments.

It is well known that this instrument, as formerly designed, would gradually fail by use; in other words, it would not stand up to its calibration, owing to the tendency of the twisted arms supporting the blades to untwist. This would cause the instrument to record a higher velocity than the actual. Another source of error was due to the fact that the dial hands did not cease to move instantly when the instrument was thrown out of gear. In some makes of these instruments, this formed an important defect; also the jewel bearings used were subject to considerable wear, in the hard usage common to mining practice.

A careful study of these defects has enabled the Davis Instrument Manufacturing Company, Inc., to design an instrument that is destined to give universal satisfaction. The movement is American, manufactured in the shops of the company, at Baltimore; and is peculiarly the design of Alfred U. Davis, vice-president of the company and superintendent of the shop. It will be remembered that the father, Herbert Davis, was formerly the American reresentative of the English firm, John Davis & Sons, where Alfred Davis served his apprenticeship before coming to this country.The latter has since been employed in the shops of the General Electric and the Westinghouse companies.

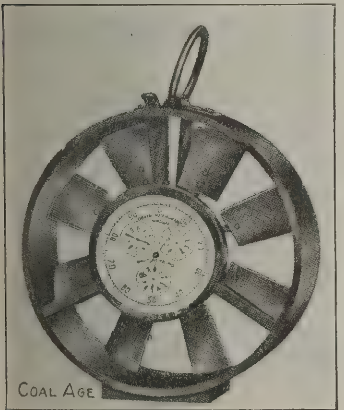

Fig. 1. The American Davis Anemometer

The American Davis anemometer, shown in Fig. 1, like the American watch movement, is standardized throughout, and each individual part is quickly replaceable, making the instrument easy to repair, in case of breakage owing to accident. An important feature in this instrument is that the arms, which are of hollow brass, are stamped at the proper angle to receive and hold the aluminum blades. The system of manufacture, in this respect, is so complete that the finished instrument needs no calibration; but when tested, as every instrument is tested before leaving the shop, the reading is found to be correct. This fact alone shows the precision of the system. Instead of jewels, the bearings are steel on hard bronze, which give greater permanency and satisfaction. These instruments, unlike others, do not give increasingly higher readings with continued use, and stand up better to their performance in the higher velocities common to mining practice. By an ingenious arrangement, the dial hands are brought to rest instantly when the instrument is thrown out of gear.

Have Stood the Tests

An interesting feature in connection with these instruments is the manner in which they have stood the tests of the Bureau of Standards, at Washington, D. C. The instrument is calibrated for an exact reading at a velocity of 500 ft. per min. In common with other anemometers, the dial readings, for higher velocities, are in excess and, for lower velocities, fall short of the actual.

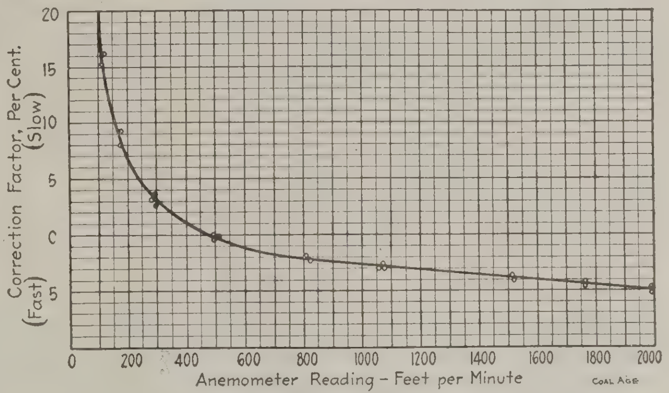

Fig. 2. Diagram Showing Percentage Correction of Anemometer Readings

The accompanying diagram (Fig. 2) shows the corrections to be made for such higher or lower velocities. For example, the dial reading of 500 ft. per min. is correct and corresponds to the actual velocity of the air current. A dial reading of 800 ft. per min. must be reduced 2 per cent., giving an actual velocity of 784 ft. per min. In the same manner, a velocity of 2000 ft. per min. must be reduced 5 per cent., giving a velocity of 1900 ft. per min. On the other hand, a velocity of, say 160 ft. per min., must be increased 10 per cent., giving an actual velocity of 176 ft. per min. The test of the Bureau of Standards corroborated this chart and the calibration of the instrument in a remarkable manner, as shown by the small circles that indicate the results of the test at several different velocities.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

The Engineers' Society of Western Pennsylvania will hold its bimonthly meeting in the Society Rooms, Oliver Building, Pittsburgh, on Tuesday, Nov. 4, at 8 p.m. The subject of the meeting will be, "Design of Linings for Mine Shafts," by W. A. Weldin, assistant chief engineer of the Pittsburgh-Buffalo Co. Discussion will be presented by a number of structural and mining engineers. Elmer K. Hiles, Oliver Building, Pittsburgh, Penn., is secretary.

The Engineers' Society of Western Pennsylvania and the **Cleveland Engineering Society,** at the invitation of the Pressed Steel Car Co. and the Universal Portland Cement Co., will inspect the works of these two companies Saturday, Nov. 1.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

Session of the American Mining Congress

By R. Dawson Hall

SYNOPSIS—The congress discussed the various politico-economic aspects of mining, such as the taxation of mining property, the sale of public mineral lands, the inadequate returns in the coal industry, the wages of labor and workmen's compensation. Carl Scholz was elected president. The association showed its interest in the promotion of broad national policies regardless of mere personal interest and manifested a sentiment in favor of governmental regulation which should control the profits and operating methods of all mines so as to protect the public and conserve resources.

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The American Mining Congress opened its 16th Annual Session on the afternoon of Oct. 20, in the ballroom of the Bellevue-Stratford Hotel. The meeting was called to order by F. H. Wigton, chairman of the local executive committee. After a few opening remarks, an eloquent address of welcome was delivered in the name of the mayor and citizens of Philadelphia by Ed. F. Cattell, statistician of the city. Mr. Cattell was associated in a mining capacity with D. W. Brunton in his earlier years.

Members and Delegates of the American Mining Con

Responses were made on behalf of the congress by D. W. Brunton, the president, and by the following representatives of the states taking part in the meeting: W. Malmey, of Alaska; W. H. Fluker, of Georgia; C. J. Norwood, of Kentucky; I. R. Burton, of New York; H. N. Lawrie, of Oregon; I. Broman, of Texas; Neil Robinson, of West Virginia, and P. J. Quealey, of Wyoming.

In the evening session, D. W. Brunton, of Denver, Colo., delivered his presidential address, and the members spent the balance of the evening at a theatrical performance.

Taxation on Output

On the following morning the congress met at 10:30 and R. V. Norris opened the meeting with a paper on the taxation of mining property. He reviewed the systems in use for assessing property and asserted that, though not conformable with the state constitution, the most correct method of assessment was by basing the taxes on the value of the output. He was not indisposed, however, to admit that such a method of taxation was open to criticism. It appeared to him as the best solution of a much vexed problem. Speaking, of course, from an anthracite standpoint, his conclusions could not be subjected to severe criticism, for most of the land is held in that section for future development, but in the bituminous fields the exemption of lands from taxation, which were not being worked, would render the holding of land for speculative purposes a more profitable business than it now is. Some sections of the country are already sufficiently retarded in development by speculators.

It is true, however, this delay assures us that when mining does commence, proper conservation of resources will have replaced present wasteful methods and moreover in places where mining is already commenced, there will be less waste of mineral as a result of reduced pressure from taxation. The present system tends to put a premium on rapid and incomplete exhaustion of resources, so that only the best of the mineral is removed.

Antiquated Tax Laws

D. L. Webb, of Denver, Colo., then read a paper, in which he said that taxation of mines was based on laws which were originally framed to apply to surface lands only. The value of mineral below ground is so uncertain that taxation should be not on the value of the holding, which is largely indeterminate, but on the value of the net output only. Taxes on mineral as land might be fixed at $5 per acre, but any larger tax should be based on mineral extracted and sold.

H. L. Smyth, of Cambridge, Mass., declared that the Minnesota taxes formerly ran 10c. per ton of output; this dropped slowly by steps to 1c., and finally was entirely removed. The specific taxes per ton were considered inequitable because they did not bear any reference to costs of production nor were they related to the value of the product obtained.

The Finlay System

The J. R. Finlay valuation is now generally acceptable, though made after too hurried an inquiry and having needed some modification. A change was desired and applied to his rules relative to the calculation of resources in depth and extent. Two suits are pending relative to his assessments. Although the burden of taxation was increased throughout the state from three- to twenty-fold, the mine operators realized that the taxes were based on a rule which would prevent exorbitant taxation, such as might be levied if the tax were dependent not on probable profits, but on output. Moreover, as the assessment was state-wide, there was now no fear that unequal taxation would result from divergences in local judgment of property values.

Taxes on Profits

W. L. Griffiths spoke in favor of taxes on output, saying that the burden should be placed, for the larger part at least, on the going concerns. Coal lands which were idle should not be taxed. A tax on profits would be welcomed by some coal companies in the anthracite region as they would escape such a burden entirely, seeing that mining was pursued year after year at a loss, the deficit being made good by railroad profits.

mbled outside Bellevue-Stratford Hotel in Philadelphia

H. M. Chance, of Philadelphia, Penn., read a paper on taxation of a character so comprehensive that it is impossible to brief his remarks. E. T. Conner, of Philadelphia, Penn., who was scheduled to speak in reply to the three papers, was unable to be present. He is laid up in the Hahnemann Hospital with appendicitis.

Interminable Mine Reports

S. A. Taylor then read a paper on "Uniform Requirements for Official Mine Reports," in which he said that there was excessive duplication in state and federal reports, so that it took a clerk 2 to 3 weeks each year to make the required returns. He proposed a consultation so that even if a number of reports had to be rendered, they would all follow similar lines, be based on the same period of time and so be mere replicas one of the other. He paid a tribute to the rapidity with which the statistical reports of the United States Geological Survey were produced.

In the afternoon the members took a trip to the League Island Navy Yard and other points of interest in the harbor of Philadelphia. When the evening session opened W. H. Wilson, engineer-in-charge of the Pittsburgh Station of the Bureau of Mines, urged the congress to join with all the other coal- and metal-mining bodies in meeting with the American Mine Safety Association, once every three years, and specifically in 1914, at a time and place to be determined at their mutual convenience.

Use of Explosives

Later R. W. Gunnell, of the Atlas Powder Co., gave a talk on "The Use and Abuse of Explosives." Mr. Gunnell said that the efficient and safe use of explosives was so important as to justify the continuous employment of an explosives' engineer by all large mining companies. He declared that the low-grade ammonia and gelatin explosives were least sensitive to shock and should therefore be fired by the strongest of detonators. Where different types of explosives are in use, the detonator chosen should be fitted for the least sensitive and not for high-grade dynamites.

Nos. 3 and 4 detonators have passed out of use almost entirely, and No. 5 will probably soon follow. Nos. 6 and 7 will be preferred and possibly No. 8 may be extensively used, for only a strong detonator and one fully equal to its work will effectually obtain the full power of the explosive used. Single-tape fuse is not recommended, for, though it is well suited for dry holes, it may, and probably will, find its way into wet places and then not being waterproofed may cause misfires.

Why Dynamite Is Not Moisture-Proof

By picking out the white crystals in dynamite and exposing them on a window sill for a few hours, it will be easily understood why dynamite is susceptible to moisture. In a short time the crystals will attract enough dampness to form a mass of water. The crystals are nitrate of soda or nitrate of ammonia and not parts of the dynamite proper, but are invariably found in the commercial article.

But there is another reason why dynamite is not absolutely resistant to moisture. The absorbent material is more willing to soak up water than nitroglycerin, and a certain 10 per cent. dynamite was found recently on analysis to have replaced 4 per cent. of the explosive material with water. At about 43 deg. F., dynamite will freeze and can be detonated only with difficulty or not at all, depending on the degree of solidity with which it is frozen. Blasting caps are cheaper than electric fuses and have no other advantages, the more expensive article giving far safer results in practice.

When the Fan Should Be Stopped

At the close of Gunnell's address, a paper was read on "Mine Rescue and First-Aid Operations," by J. W. Paul, engineer in charge of mine-rescue work of the Bureau of Mines. He made several interesting statements, and among them are the following:

The Congress Visiting League Island Navy Yard. "Minnesota" in Rear

> Incidents might be cited where lives would have been seriously jeopardized if the ventilating current had been restored to its normal course, prior to the exploration of the mines, by men wearing breathing apparatus. I have in mind several mines from which live men were rescued only because ventilation was not restored in the part of the mine in which they had remained following an explosion or mine fire. In these cases breathing apparatus was the important factor in their rescue.
>
> DELAY EXPLORATION OF WRECKED PORTIONS OF MINE
>
> Those parts of the mine which indicate the least physical violence should be the first to be explored, since in those quarters there is the greater chance of finding live men. In those parts of the mine where great physical violence is manifest, such as wrecked cars, distorted tracks and broken machinery, the probability of finding life is remote. However, after the outlying districts in which men were known to be at work or districts to which the men may have retreated for safety have been explored, the innermost workings should be examined to ascertain the presence of fire which frequently follows a mine explosion. The discovery and extinction of a fire by the rescuers may prevent a second explosion when the ventilation is restored, especially if the mine liberates explosive gas.
>
> A rescue crew wearing breathing apparatus should consist of a unit of not less than five well-trained men. Each unit when in the advance should be supported by a similar unit acting as a reserve at the base. The presence of a reserve crew has been fully justified in actual rescue operations as being most essential to the safety of the advance crew.
>
> A crew should not proceed into irrespirable gases a distance beyond which it would be able to carry one of its members to fresh air. This distance necessarily is governed by the character of the road over which the crew may travel and the nature of the obstructions passed over.
>
> PRECAUTIONS BEFORE ENTERING MINE
>
> The physical condition of the men composing a rescue crew should be determined by a physician prior to the crew's engaging in rescue exploration work. Only such are in good health and have no organic physiological defects should be permitted to engage in rescue work involving the use of breathing apparatus. During the progress of the work, at the beginning and termination of each shift, the pulse an respiration of each man should be taken and recorded.
>
> The apparatus should be carefully examined and teste by a competent person as well as by each member of th crew and a record kept of each test. Just prior to enterin the mine, the crew should wear the apparatus in the presen of formaldchyde gas to determine if all parts are secu against the admission of external air. Sulphur dioxide is n so well adopted for testing the apparatus since it is absorbed by the caustic potash or caustic soda in the regenerator.
>
> DIFFICULTIES IN USE OF BREATHING APPARATUS
>
> All types of breathing apparatus using compressed oxygen as the source of the breathable air should be so constructed that the entire circulating system may be put unde pressure by the admission of oxygen or compressed air. Th method would admit of determining a leakage under a pressure less than that required to operate the relief valve. water gage placed on the circuit would plainly indicate an loss of pressure due to leakage. The surplus oxygen whi is generally left in the oxygen-supply tanks could well used for making such tests.
>
> The flow of oxygen in two German types of breathing apparatus—the Draeger and Westfalia depends upon the join use of a reducing valve and an injector nozzle, whereas t English type of Fleuss-Proto depends upon the single actio of a reducing valve, the injector nozzle being eliminated.
>
> The above emphasizes the importance of frequent examination of the injector nozzle to insure against its cloggin with caustic potash which may be carried over from the regenerator and deposited in the injector compartment.
>
> HANDLING RESCUE SQUADS
>
> In order that rescue work may continue without cessatio the crews should be organized in parties of five including captain. Two crews should constitute a brigade and thei hours of work and rest should coincide. By the use of eigh crews, constituting four brigades, which will necessitate th services of forty men, the brigades may work in shifts o four hours and rest for six hours and have two hours i which to eat and test the apparatus.
>
> Recent mine-rescue maneuvers, held at Pittsburgh, Penn. and Rock Springs, Wyo., demonstrated that the above pla is practicable and that for continuous duty exceeding 48 hours, the crews should not be required to undergo more than two periods of 4 hours' duration in 24 hr. These periods of 4 hr. should be divided so that each crew will work alternately 1½ hr. at advance and reserve.

The Congress Inspecting the Harbor of Philadelphia, Penn.

Mr. Paul also advocated the use of joint rescue stations because some operators have, in the past, purchased equipment and not provided for its proper upkeep and for the efficient training of the men. George S. Rice then spoke on the urgent need for such training and emphasized the importance of maintaining breathing apparatus in the utmost efficiency while H. M. Wilson spoke of the work of the Bureau in spreading all over the United States those means of safety which had been developed here and abroad and on the creation of a sentiment toward better methods. While a strong presentation of the claims of the Bureau to public recognition and support, it may be safely said that there was not a vord of exaggeration in his claims. He stated that it was he only governmental organization which had been af-orded opportunity of having speakers all over the coun-ry proselytizing for safety and that as the Secretary of Commerce Redfield had recently said no great reform an come in the United States by force of law, however well that law may be backed by active officers. There must come such a change of viewpoint that the law will be practically a dead letter for most of the people. The bulk of the operators must first be induced to see that the law is an expression of a moral necessity before it is forced on the unwilling and negligent.

Following were two papers, one on "The Use of Concrete in Mining Operations" (illustrated), by E. C. Sargent, of Chicago, Ill., and another on "The Coal Resources of Alaska" (illustrated), by Dr. W. R. Crane, of State College, Penn. They are both too diverse and dependent on illustration to suffer any review.

On Wednesday morning the address of Dr. James Douglas, of New York, on "The Public Lands," was read by the secretary, and D. B. Rushmore, of Schenectady, addressed the congress on "The Industrial Corporation and Scientific Research." This latter was regarded as one of the most important presented.

At the afternoon session, George Otis Smith, director of the U. S. Geological Survey, gave a "Plain Talk" on the public lands questions. On the whole Mr. Smith's paper deserves approval but it makes no reference to the high price for which he thinks public lands should be sold or leased, and it does not pay any regard to the extended time during which land is held prior to classification and sale.

The Leasing System for Coal Lands

John F. Shafroth, the senator from Colorado, gave an address in reply. He stated that when he became governor of his state, he endeavored to find what was the cause for the inadequate tax return and he found in one county alone, 9-10ths of the acreage was withdrawn from entry and, as it belonged to the United States, could not be taxed. He did not oppose the placing of high valuations on coal land so much as he did its continued withdrawal from entry or its leasing by the United States government. Such a continuance of the national holding would exempt large areas from taxation and subject the citizens of Colorado to direct federal control in their business.

Why Coal Lands Should Be Sold

The burden of government was greater on the state than on the nation as the state had to employ more officials per thousand inhabitants than had the Federal government and the expenses could not be met if only a part of the state domain were subject to taxation, the cost of administration being dependant more on the density of population than on the actual numbers The interposition of vacant government land made administration extremely difficult. The $15,000,000 paid by Colorado in federal taxation brought her but little, seeing that the army and navy were of little avail to a people snugly placed in the heart of a continent, nor had Colorado much interest in harbors and rivers. She *was* interested however, in 50,000,000 acres of forest land, within her borders, which were idle and not open to entry; 40 per cent. of it was above timber line, 30 per cent. had only scrub timber, and the 30 per cent that remained would, according to the U. S. Agricultural Department, only grow a tree 19-in. in diameter in 200 years. She was interested in 9,425,000 acres of coal land in Colorado, which could not now be purchased at any price and might later be offered for $400 per acre, yet, if figured with all the land purchases of the federal government, it cost the United States only 4.7c. per acre.

Who Receives the Money for Coal Land

A delegate from the Land Office declared that this money paid in to the department was delivered to the reclamation service to be used in the irrigation of the Western arid lands, but Shafroth replied that eventually it was returned to the government by the farmers thus benefited so that it constituted only a loan and not a *return* of the capital to the settlers who had built up the West.

Several took part in the discussion and it was interesting to note that there was no attempt among Westerners to defend "dummy entries." The West, as one said does not wish to renew the past. While dummy entries are and were necessary to gather together a sufficient acreage for operation, it is better to change the law than to attempt its violation.

Thos. J. Walsh, senator from Montana and chairman of the Senate Committee on Mines and Mining, was willing to approve of a leasing system for oil and gas but not for coal and other minerals.

At the evening session, Dr. Chas. R. Van Hise, president of Wisconsin University, Madison, Wis., read his address on "The Relation of Big Business to Industrial Prosperity with Special Reference to Mining," in which he showed the fatuousness of a return to the small plants and small aggregations of capital of former years and doubted whether it would prove true that combinations of the largest size were too unwieldy for efficiency.

The morning session of Oct. 23 opened with the report of the Committee on Nominations which named 4 directors to serve 3 years or until their successors were elected. These were E. A. Montgomery, Los Angeles, Calif.; Hennen Jennings, Washington, D. C.; W. F. Richards, Pottsville, Penn.; and M. S. Kemmerer, New York, N. Y.

Chas. E. Van Barneveld, of San Francisco, Calif., then read an address on "The Mineral Division of the Pana ma-Pacific Exposition," inviting mineral displays on that occasion and asking that the American Mining Congress meet at San Francisco in 1915, during the life of the exposition. S. A. Taylor then proposed that as the work of the congress was constantly growing and as there was a continual deficit in the treasury, a Ways and Means Committee be formed to draft a scheme for making expenditures and receipts balance.

The Ills of the Coal Industry

Dr. E. W. Parker then read an address on "The Cost of Coal Production" and a substitute for John W. Boileau, of Pittsburgh, Penn., delivered his remarks on "What is the Matter with the Coal Mining Industry." Apparently he thought the main trouble was the abstention of the industry from the meetings of congress. As he was not present perhaps his opinion may be discounted; certainly his example should not be followed.

The discussion was lead by A. J. Moorshead. He regarded debate as of no value so long as the people of one state were rejoicing in the laxity of their own mining laws and chortling over the severity of those in neighboring states. Mr. Moorshead declared that the workmen 's compensation law and the requirement that fire-proof structures be erected near, within and around the shaft below ground met with due approval in Indiana. They were, the Indiana operators thought, good measures so long as Illinois alone confronted them. Moreover, the wage difficulty made coöperation across state lines impossible.

A Possible Self Cure

However, despite Mr. Moorshead's prognostications, gloomy, though cheerfully expressed, it would seem that when all the fields are opened up and territory adjusted, the question of meeting competition will be less fierce and ultimately the disturbing forces will be those very states, whose territory has been curtailed by adverse legislation and labor activity. When the less afflicted states move up slowly into line, their territory holding will be slowly and surely reduced, as they meet the increasing demand of the labor unions and the state.

It appears that in a few years, war will almost cease because to a large extent, as there will be no new fields to open up in the East, the lines of every field will be more firmly fixed and the mines established will be satisfied with the area within these lines. When new counties and states are being opened the balance of power is often rudely disturbed.

It is, however, to be hoped that state's rights will never be pressed to such an extent that unequal safety will result. The right to keep unsafe mines in order to maintain a market gained by such methods is not a right for which honest men will strive and it is time that the laws of all the states be made to give at least equal security, even if it is not necessary to impose equal burdens on all.

Coal Operators and Metal Men Part

For the afternoon session the meeting split, the coal operators assembling in another room and discussing the general business situation. Carl Sholz, of Chicago, Ill., occupied the chair. From all reports there was not so much harmony as good fellowship.

In the ballroom, W. H. Fluker, of Thomson, Ga., read an address on gold mining in that state. Dr. Martin M. Foster, chairman of the House Committee on Mines and Mining, read an article on 'The Federal Government and the Mining Industry." Prof. C. J. Norwood called attention to the need for federal aid of mining schools, comparable to the assistance now given to farming institutions. He said that the strength of the Kentucky coals to resist compression had not been determined and that when recommending as chief inspector an increase in size of ribs, he was unable to determine what that increase should be owing to lack of funds for the necessary experiments.

"The Radium Situation," by C. W. Parsons, of the Bureau of Mines, was extremely interesting, that organization being about to prepare radium for use in American hospitals. Most of the radium ores are found here. but only about one gram of the metal is to be found in America in its available form and all of that was extracted abroad.

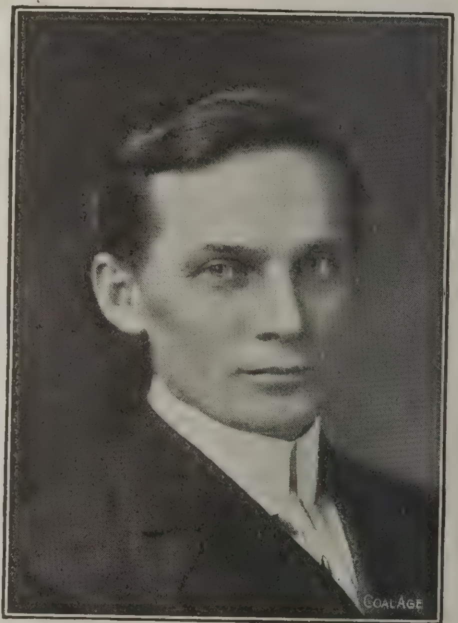
In the evening a smoker and vaudeville which was largely attended was held in the ballroom of the hotel.

Friday was the closing day of the meeting and in the morning session, Geo. R. Wood reported for the Committee on Standardization of Electric Equipment i Mines.

Compulsory Arbitration and Collective Bargainin

Wm. B. Wilson, Secretary of the Department of Labo then delivered an excellent address on "Arbitration a a Factor in the Mining Industry," in which he oppose compulsory arbitration, but said that there were mora business and political reasons for collective bargainin Without it, the working man was crowded to the wal without it business men did not know at any time wha labor disturbances might confront them, what reductio in wage scale might occur to aid a competitor, what i crease of wage rates might make it impossible to pr duce coal at contract rates.

He believed that when the working man was force by law into compulsory arbitration, he would be at disadvantage for while the operator had a well-defin boundary line between profitable operation and economi loss, the worker had a flexible line of resistance. H could reduce or decrease his living charges. Thus th arbitrator tended to keep in mind the defined boundary line of prices and to put the burden on the workingman. who by surrendering his standard of living, could continue to subsist.



Carl Scholz

Newly elected president of the American Mining Congress.

C. E. Maurer tried to discover on what basis Mr. Wilson figured a division between the "partners in industry" —capital and labor. Finally Mr. Wilson declared it was an "American living wage" but he admitted that the expression was extremely elastic and meant one thing in Illinois and another in West Virginia.

Should the Miner Be Held to his Bargain?

Mr. Wilson declared that it was not right to hold the miner rigidly to his bargain and to compel him by law to work at the scale he had signed because the operator could not be bound to keep his pledge, for he could not be compelled to operate at a loss or to run his mines when no coal was needed. Both parties, in his opinion, roke their bargains to some extent by suspending operaion, and usually without moral stigma. The contract ould only be interpreted to mean that when A and B chose o work in partnership, the terms should be as A and B ad laid them down. Any attempt to make the unions esponsible by forced incorporation, he regarded as ill dvised. W. L. Connell, of Scranton, said that the anhracite miner could move to the bituminous region if e did not like the contract but the operator of an anhracite mine could not thus move from place to place. Mr. Connell condemned the continued restriction in output which was, in the anthracite region, a fixed policy of the Union.

The Resolutions of the Congress

At the afternoon session several resolutions were introduced by S. A. Taylor on behalf of the committee appointed for that purpose. Sidney Norman's resolution placed the congress on record as favoring laws to give protection to minority stockholders by making directors more definitely responsible for their welfare and constituting infraction of laws to that end as a felony punishable by imprisonment. The resolution calls attention to recent Stock Exchange scandals in New York.

J. F. Callbreath
Secretary of American Mining Congress.

D. W. Brunton's resolution called for an attempt on the part of the mineral land-law revision committee of the congress to enlist the support of the American Institute of Mining Engineers and the Mining and Metallurgical Society. Another resolution introduced by D. W. Brunton urges upon President and Congress the enactment of legislation providing for a Department of Mines and Mining with a member of the President's cabinet at its head.

S. A. Taylor himself fathered the resolution that the Director of the Geological Survey and the Director of the Bureau of Mines be requested to coöperate with the heads of the departments of mines or the proper officers in the various states, together with a committee of the American Mining Congress in order to secure uniformity as to form and time of making mining statistical reports.

H. N. Lawrie's resolution urged immediate passage by Congress of legislation, providing for federal assistance to state mining schools. C. E. Maurer, of Ohio, declared in his resolution that as there were many systems of evaluating properties and as a tendency had been shown to put an undue load of taxation on the mining industry and as this burden was far from uniform, hence a special committee of the congress should be appointed to investigate and recommend a fair, uniform and equitable basis of valuation for taxation.

William Maloney presented a resolution, desiring that the federal government speedily enact laws granting redress to Alaska, so that private capital may be induced to interest itself in the development of the great natural resources. John E. Patton, of Tennessee, desired that the U. S. Internal Revenue collectors have instructions issued to them by the treasury, so that the Corporation Income Tax Law may be made uniform in its enforcement and may provide that a definite royalty or depletion charge be allowed as an item of the cost of production in arriving at the net income of mining companies for purposes of taxation. R. Dawson Hall introduced the following:

> Resolved: That we express our sympathy with the relatives and friends of those who have lost their lives in the terrible explosion at the Dawson mine and that we join with the officials and owners of the Stag Cañon Coal Co., in regretting that all their efforts and forethought have, in some unfortunate and inexplicable manner, been rendered of no avail and that the secretary communicate the matter of this resolution to the proper persons.

C. E. Maurer's resolution was passed urging upon the Congress of the United States and the State legislatures, the necessity of a modification of the so-called "Anti-Trust" laws as applied to our natural resources in order that they may be conserved and proper safeguards thrown around the employees and further providing that the address of E. W. Parker be sent to the President and Federal Congress and the governors of the coal-producing states. All the resolutions here discussed were unanimously approved.

In the afternoon an address on "Workmen's Compansation Laws and Accident Prevention Work," was read by David Ross, of Springfield, Ill. Lack of time caused S. A. Taylor to ask privilege to print his paper without reading it. In the absence of Dr. J. A. Holmes, director of the Bureau of Mines, Geo. S. Rice, read his "Lessons of the Year in the Mining Industry." In brief it deplores the "tardy and inadequate recognition and aid from the legislature and administrative branches of the general government" and stated that the bureau had been criticised for "failure to do numerous things of which there was serious need." "It is unfortunate, however, that our inability to do many of these things at the opportune time tends to discredit all our work and even the movement for greater safety among the miners, who appreciate less fully the cost of such investigations and whose goodwill, confidence, and coöperation are essential to the success of all our efforts."

Carl Scholz, who was elected president, occupied the chair throughout the afternoon session. The resolutions introduced by J. R. Burton, of New York, providing for the investigation of scandals by a committee of the congress and for the expulsion of members of the body who employed men who had been convicted of fraudulent mineral land selling, were tabled after no little discussion and debate.

The first resolution would have involved the Congress in bankruptcy and the second meant the establishment of a blacklist and was of doubtful legality.

The officers for the ensuing year are: Carl Scholz, president; Hennen Jennings, Washington, D. C., first vice-president; M. S. Kemmerer, New York, second vice-president; Harry L. Day, Idaho, third vice-president; with the following directors, D. B. Brunton, Colorado; D. H. Dern, Utah; W. G. Conrad, Montana; S. A. Taylor, Pennsylvania; John Mayer, Missouri; H. N. Taylor, Illinois; E. A. Montgomery, California; W. J. Richards, Pennsylvania and Dr. James Douglas, New York.

In the basement of the Horticultural Building, a "coal mine" had been prepared by the Bureau of Mines which gave the public a good idea of underground conditions. Rescue and first-aid demonstrations were made by the Lehigh Valley Coal Co., on Oct. 20; by the Susquehanna Coal Co., on Oct. 21; by the Lehigh Valley Coal Co., on Oct. 22; by the Lehigh & Wilkes-Barre Coal Co., in the evening of the same day, and in the afternoon of Oct. 23; by the Lehigh Coal & Navigation Co., on the evening of Oct. 23, and in the afternoon of Oct. 24. The Philadelphia & Reading Coal & Iron Co., demonstrated on the evening of Oct. 24, and both morning and evening of Oct. 25.

In the lecture hall lectures were given by J. R. Fleming, demonstrations of rescue apparatus and first-aid work by W. L. German and O. I. Young. Motion pictures were exhibited by J. R. Fleming six times every day. The features were supplied by the Bureau of Mines.

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Explosion at Stag Canon Fuel Co.'s Mine

SYNOPSIS—At the Dawson Mines of the Stag Cañon Fuel Co., in Colfax County, New Mexico, a severe explosion probably killed 261 men. All but 80 of these have been brought out. In all, 27 men were rescued. The explosion occurred at 3 p.m. on Oct. 22. The shooting in the mine was effected by electricity, no shots being fired till all the men were out of the mine.

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The mines of the Stag Cañon Fuel Co. are opened in Colfax County, near the northern or Colorado line of New Mexico, and, consequently, are not far from the well known workings of Trinidad and Walsenburg in Las Animas County, Colorado. The plant is located at Dawson on the Vermejo River and its branches, that watershed being an important tributary of the Red or Canadian River.

The coal mined is part of the southern end of the Raton coal field and is of the Laramie series of the Cretaceous system, these measures having a thickness of about 800 ft. in the vicinity of Dawson. According to Jo. E. Sheridan,* formerly the territorial inspector, the coal makes an excellent coke, and there are several sheets and sills of igneous rock intruded into the measures, these thickening in cases into masses like laccoliths and

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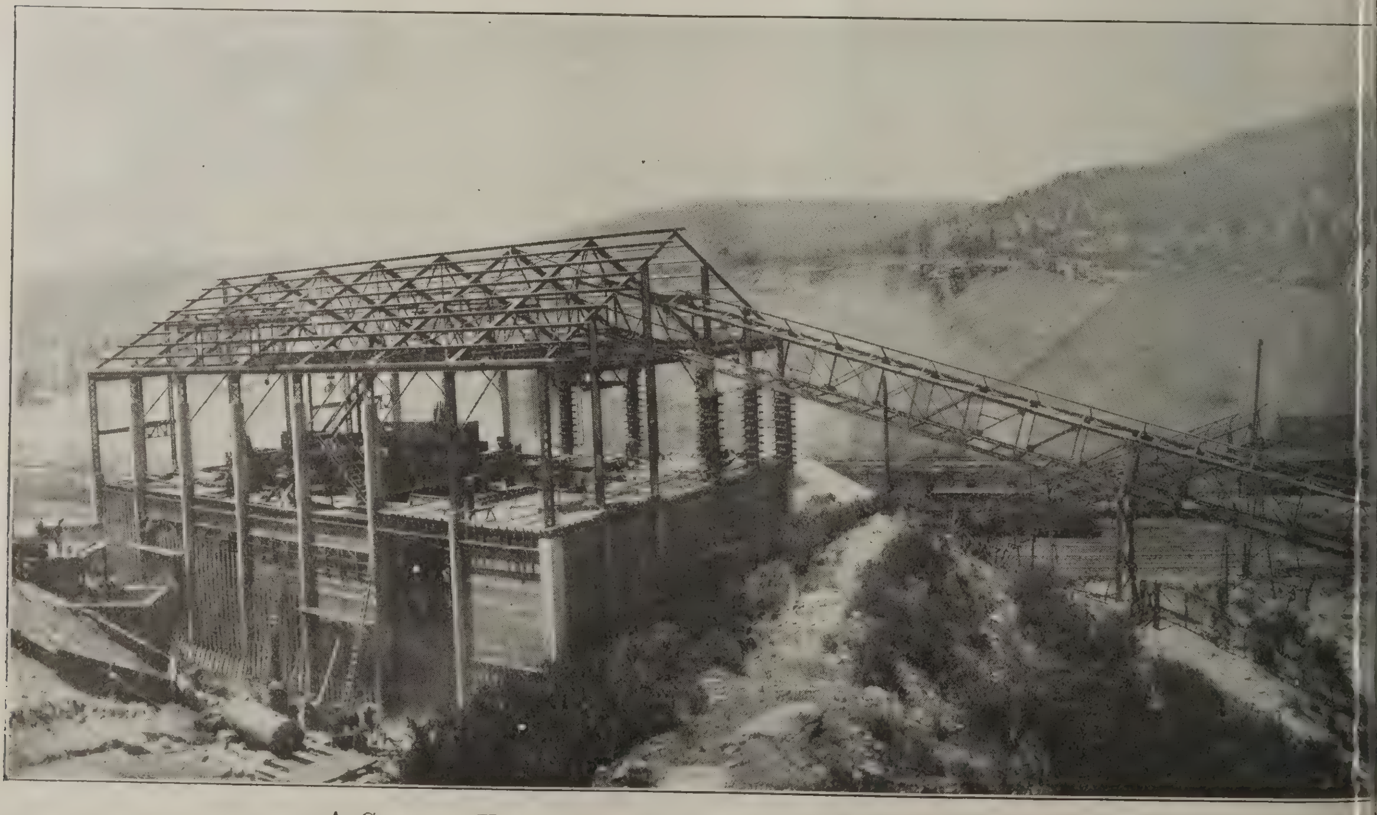
*Much use is made in this report of Mr. Sheridan's address before the American Institute of Mining Engineers, in February, 1909.—Ed.



A General View of the Washery and Tipples of the Stag Canon Fuel Co.'s M

Sometimes producing small areas of natural coke. Yet, there are few dikes throughout the entire southern portion of the field and little or no faulting occurs where hese appear.

Only one seam of coal is worked, the Raton or Blossbourg, and it varies from 6 to 8 and in places reaches 11 t. The other seams are of much less value. The holdings of the company aggregate 56,218 acres, and of this 38,500 are coal lands. The mines have been working for 18 years, but they were only purchased by the Stag Cañon Fuel Co. in 1905; at that time they belonged to the El Paso & Northeastern Company.

Several Escapeways

The Vermejo River and its tributaries cut heavily into the seam, and as the coal bed is comparatively level it can be attacked anywhere along a crop 40 miles in length. Consequently, it was hoped, that with so many opportunities for escape after the recent explosion, several men might be saved. The bulk of the workings are to be found in Rail Cañon, where are the washer, power plant and coke ovens. In this cañon are four important openings, but Nos. 2 and 3 do not constitute entirely separate mines but are connected by many headings. On the Vermejo River bank, not far from Lorita, two openings, Nos. 5 and 6, have been made. The former alone is working and forms an escapeway for mines 2 and 3.

The coal is hauled by mules from the rooms to partings within the mine, whence it is brought to the outside yards by Jeffrey, Westinghouse and Goodman motors. On the outside, coal is hauled from mines 1 and 2 to a common tipple over a tramway 6600 ft. long by two 28-ton Porter, one 20-ton Vulcan, one 18-ton Lima, and two 6-ton Porter steam locomotives.

The mines have been sprinkled by water cars and the dust has been removed from the roadways as far as is practicable. A complete telephone system having stations at the most convenient points within the mine, was installed to afford communication with the outside.

The shooting was done after all the men were out of the mines. Every man hung up his check as he went into the mine, and took it on leaving. If he failed to take his check, the mine was searched for him. The usual precautions were taken in throwing switches and a red light was displayed at the mouth of the mine to warn men from entering before the firing switch was thrown.

The air delivered to the mine was in 1909, 260,558 cu.ft. per min. Allowing 600 cu.ft. for each of the 59 mules this left an allowance of 306 cu.ft. for each man employed. The water gage at No. 4 mine was 0.8 in. and at No. 2, 1.2 in.

Information So Far Received

Despite all the care manifested by the company, at 3 p.m. on Oct. 22, there was a disastrous explosion in No. 2 mine, in which 261 men were probably killed, 27 being rescued. Heavy falls of roof near the entrance blocked the way to the rescuers. The fan was put out of commission, but was repaired and made available for the rescue work. The mine covered so large an area, 437 acres in Rail Cañon having been extracted before 1909, mostly from the mines where the explosion occurred, that it was for a long while hoped that many of the men might have wandered into remote sections of the mine and escaped. It is now feared that there is no such possibility. Apparently, Superintendent William McDermott and Henry P. McShane, of New York, and 16 miners and sub-bosses were about to escape when a fall of roof killed and covered them with débris.

It is reported that two of the helmet men were killed at their work.

Dawson, N. M., during Construction. No. 2 Mine Lies Further Up the Valley

EDITORIAL

Getting a Congress under Way

The American Mining Congress tried to devote one whole day to formalities and suffered the natural consequences of the attempt. An address of welcome from the city was to be followed by one from the state; the president of the congress was to respond and then three-minute replies were to be made by the delegates from 33 states. In the evening the president was to make his annual address and there was to be a reception to the officers and delegates by the citizens of Philadelphia.

Such an elaborate program of mutual gratulation does not attract anyone. The delegates and members agree to wait till, as they express it, "the convention settles down to business." They are somewhat inclined to put on the average presidential address, the unfavorable criticism of Dr. D. W. Brunton: If the outgoing president comments on the year's successes, he is thought to be guilty of self-laudation; if, on the other hand, he lays down the necessities of the hour, he is subjected to the accusation that he is trying to control by officious advice the conduct of an office which he is about to vacate.

So this function is rarely enthralling unless it is made, as we believe is true in England, rather an address from the president than a presidential address, the speaker forgetting his office and striving merely to deliver an utterance which will have an interest in itself regardless of its relation to any past or future action of the body to which he has been appointed president. He is thus often enabled to probe deeper into some subject than any earlier investigators and does not endeavor to cover all the objects of the society with a series of inadequate generalities.

Even though the address be as excellent as that of Doctor Brunton, it fails because the mind cannot be led to consider several problems at once and because all traditions are against the laying of stress on such official utterances.

Because of a knowledge that opening sessions are rarely important, the attendance of Tuesday was scanty and the citizens of Philadelphia, who, be it said, desire to correct the Universe without intimate knowledge of its affairs, were not encouraged by the scanty enthusiasm of the members and delegates. The interest of the press and of its readers flagged, whereas had Shafroth, Wilson, Parker or Moorshead spoken at the opening session, there might have been a keener interest shown.

It is to be hoped that in coming sessions the "pink tea" features will be wholly subordinated to business, that the 33 delegates-in-chief will not be called to give 99 minutes of oratory. It is still more to be desired that the meeting will be held where more coöperation is extended. The action of Philadelphia was not one to establish its reputation as a convention city. Its uncertain policy in reference to the mining show, the ruling of its papers that they would not mention the event till it was already in progress, and its almost studied indifference to what was transpiring, convince us that not for a long time will the management of the congress agai exhibit on its badge and program a picture of a mine hand-in-hand with William Penn.

Eventually the congress got under way, with a larg number of distinguished persons present and many paper of unusual value. It was not successful, however, in impressing on the public the broad sense of responsibilit to the nation existing in the coal industry and its desi to coöperate with the public in the promotion of all th national needs. This publicity must be obtained an the public learn that its most abused servant is the on which has served it most faithfully and received th meanest reward and the most carefully studied misrepresentation and abuse. The papers of the congress and it resolutions should appear in brief in the journals of al the cities of the Union, for mining is the second larges interest in this nation.

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Colorado Coal Strike Situation

Before the recent strike in Colorado was called, th United Mine Workers of America claimed a membershi in that organization, in the States of Colarado, Utah an New Mexico, of only 2048, out of a total of 23,000 me employed. Approximately 1000 of these members wer enrolled from the northern part of Colorado, where strike had been in progress for many months.

Some weeks ago an official of the Mine Workers' organization went to Colorado and announced that it wa his purpose to bring about the recognition of his union b the owners of all coal mines. The operators refused t sign a contract which would require them to employ onl union men in their mines.

The union official above mentioned then announce that he would refer the matter to a convention of miner of all the camps of the state. A meeting was held i Trinidad and 250 men were present. Of this numbe 100 men were striking miners from northern Colorado about 45 of the delegates were officers or paid employee of the union. The rest of the men present were selecte by those in charge of the convention, and in no sense actually represented the men at work in the collieries. Th convention voted to call a strike for Sept. 23, and on tha day approximately 50 per cent. of the men engaged i about the coal mines laid down their tools.

The demands of the miners include a 10 per cent. advance in wages, a semi-monthly payday, an eight-hou work-day, a check weighman and better working conditions.

There has never been a better example of how easil one or two men can upset a great industry and brin business over a large territory to a condition borderin on chaos and revolution. People who think that such result can only be brought about when the conditions o labor in the affected industry are unsatisfactory and unfair will be obliged to revise their opinion, providing they will take time to make a careful investigation. Ther is, of course, a restless element in labor circles that i ver satisfied and always ready for a change, or any nd of an adventure, that will bring with it temporary eedom from real work. However, there are not enough ch people to bring about a condition similar to the one w existing in Colorado. Something more must be sup-ied, and this is furnished in the form of intimidation id personal violence.

Conditions in Colorado are a replica of what occurred West Virginia some months ago. Since the inaug-ation of the strike, a number of men have been killed id considerable property has been destroyed; mine ildings are being fired upon; passenger trains carry-g mail have been stopped and searched by the strikers; cupants of stages have been dragged therefrom, kid-apped and taken to strike headquarters, and the lives all men who are desirous of working in the mines are reatened daily.

Labor conditions in this country have now reached a ass where one or more professional agitators can walk to a district or state where they are unknown and un-amiliar with actual conditions and succeed in the dis-uption of all business in the industry they attack. This a form of licensed violence that must be dealt with if e, as a nation, are to maintain our industrial supremacy mong the governments of the world.

We are earnest in our desire that labor conditions rougout the coal industry shall be satisfactory. We ant to see the men who work amid the dangers of our ines the best paid employees in the land. We never ave, and never expect to uphold, any coal company or ny individual officer that is unfair and selfish in the reatment of his employees. However, we seriously ad-ocate the enactment of such measures as will provide a ess destructive method of settling disputes between em-loyers and employees. A partial solution of the prob-em is "publicity." Newspapers, as a general rule, are ike politicians, somewhat shy on supporting the minor-ty, even though the "few" have right on their ide. There remains, however, one way in which pub-icity may be gained, and that is through advertising. t is surprising today that so few great corporations which need to place their cause before the people at large vail themselves of the advertising pages of the papers n their particular field.

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The Western Coal Lands

Of all the interesting features of the American Mining Congress, the debate between J. F. Shafroth, senator rom Colorado and G. O. Smith, director of the U. S. Geological Survey, takes leading place. Mr. Smith has ndirectly the selling of the patrimony of a nation and as managed after a long delay, to dispose of a solitary quare mile. Yet this one insignificant sale, he regards s a justification of the prices he has set on all the coal ands he is marketing.

If the followers of Henry George ever start to make Uncle Sam pay taxes, we shall soon see whether he will ind it possible to hold Western coal lands at $400 an cre. Land holding at outrageous prices has always been ound unprofitable where taxes had to be paid and this ation would find itself in the hands of the sheriff, if it ad to pay taxes on the coal lands of the West, if these were assessed at the extremely liberal valuation of the irector of the Geological Survey.

We are not surprised that the Western states which have to maintain their schools, their roads, their police and their courts, condemn the bureaucracy which holds so large a proportion of their lands inactive and yet refuses to pay taxes on them. Perhaps it would be right, certainly it would accord with our precedents, to let lands in the hands of the government go untaxed till they can be sold, if provision for their sale were immediately made and if the price was perfectly sane. But millions of acres are withheld from entry and other millions are evaluated at a higher price than is now paid in most of the best known coal fields of the United States.

We think it may be safely said that in only one state in the Union is coal land ever sold at $400 per acre. Anthracite and the Pittsburgh coking coals of Pennsylvania are sold, it is true, at higher prices, and some West Virginia coal, if it were offered for sale, would command almost that figure, but the bulk of the coal land even in those long developed states is nowhere so highly appraised. The majority of the fuel in the Appalachian states can be bought from $5 to $100 per acre.

We are giving the West special legislation of a most onerous and unfair character. Lands which if sold by individuals would barely bring $5 or $10 per acre to the vendors, are held for $400. Let us compare the situation in the Rocky Mountain section with the conditions in Ireland, a land where the desire for the control of its own affairs is even more rampant. By the enactment of special and unusual legislation, the imperial parliament has made every effort to secure land for the inhabitants at reasonable prices and to enable them to buy what land they need. And furthermore, that parliament is already expending on Ireland within the confines of its four seas, far more than the island contributes. In fact it is likely that the dominant kingdoms of England and Scotland will pay $10,000,000 a year to Ireland and receive not one penny for national defense or administration.

In contrast we take from Colorado $15,000,000 per annum for national purposes and are holding up its resources and those of other Western states at such a high figure that their development is throttled. At present they are talking home rule or states' rights in a mild way. They are aiding in the support of our national institutions, though most of these do not add in any material way to their happiness or security. Our army and navy afford little protection and our rivers and harbors bring little wealth to Colorado compared with that they assure the other states. Yet the Western people now pay and are willing to pay *pro rata* taxes with states more vitally interested in these institutions.

Let us be careful lest the Western states, whose interests are forgotten, become so angered at our unfair treatment that when they get justice, perhaps even more than justice, they will not be appeased. Indeed, let us make all haste to do our duty now for the concessions now rightly demanded by Alaska and the West will ultimately be granted, and the theories of Pinchot, Smith and the newspapers will fade away like an evil dream. For are we not all one people and are not the men of the West as well entitled to justice and as much our national concern as the inhabitants of Indiana, Ohio and Illinois? Is it expedient that we should demand of our citizens in the West a manner of sale radically different from that which has been our practice for a century?

SOCIOLOGICAL DEPARTMENT

Simplified Breathing Apparatus at Witkowitzer Mine

By Josef Popper*

SYNOPSIS—Details regarding a new breathing apparatus, the helmet of which is made tight to the face of the wearer by a sponge-rubber gasket. The potash cylinder has devices whereby all the alkali is made available for the absorption of carbon dioxide and the cooler is kept at a low temperature by the use of asbestos steeped in alcohol. The apparatus can be kept in continuous service from 3 to 3½ hr. and weighs 26 to 29 pounds.

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Previous improvements in breathing apparatus have not been based on any new fundamental principles. They have, however, tended to increase the weight with which the rescueman is burdened. In the laboratory of the Witkowitzer collieries in Maehrish-Ostrau, Austria, experiments have been made with a view to simplification of the commonest types of rescue apparatus. The objects have chiefly been to reduce the weight for equal time capacity and to cool the inhaled air to a lower temperature so as to reduce fatigue. The total weight of the apparatus has been kept down to about 27 or 28 lb., yet the designers have been able to use a larger steel cylinder and a new type of potash cartridge, which together make possible the use of the helmet for a longer period than has been hitherto possible.

A Rubber Sponge Instead of an Air Tube as Face Gasket

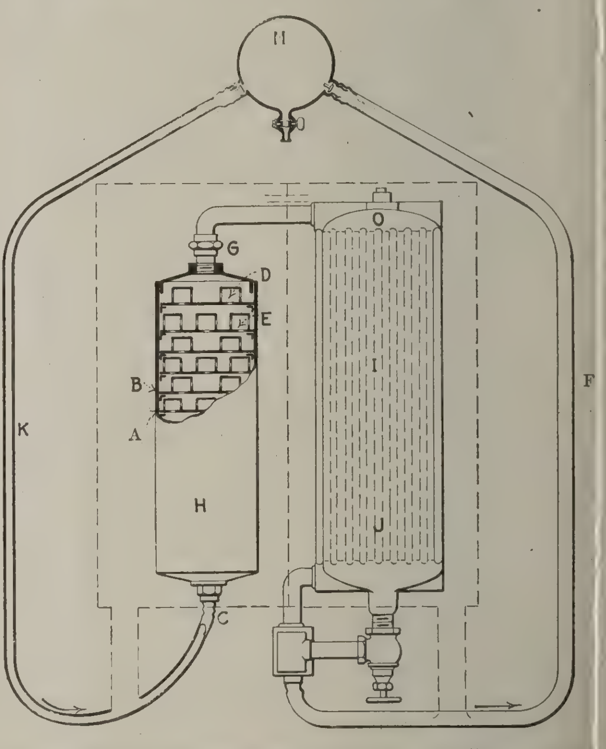
An improvement has also been made in packing the helmet so as to avoid the danger inherent in those packed with a rubber tube, should this tube become damaged. This pneumatic ring has been replaced by a rubber sponge, over the outside of which is drawn a sheet of rubber. But the side of this gasket which is in contact with the face is not so protected, and is left in a spongy condition. In hot mines it can be cooled by moistening. The sponge is pressed down by two bands. The helmet carries a window glass and a movable wiper.

The apparatus is carried on the back. The oxygen flask *O* weighs 11 lb. It holds 13.77 cu.ft. of oxygen at a pressure of 150 atmospheres. The pressure can be read by the man wearing the helmet from a manometer placed on a spiral tube. The reducing valve is so adjusted as to feed about 0.07 cu.ft. of oxygen per minute.

The fresh and the regenerated exhaust pass through the connecting tube *F* into a breathing bag of large size and thence to the mask *M*. The cartridge is fastened in place by a simple device, it being held and made gastight by the adjustable threaded tube *G*. The cartridge is of a new type patented by Nowicki, chief chemist of the collieries.

The Air Regenerator

The chemicals for purifying the exhaled air are held as usual in sheet-metal shelves with central or side openings, and by wire netting. Between the several shelves the air sweeps over the chemicals. To place these under the wire netting and simply pass air over them is an inefficient practice, for the chemicals are not completely utilized and take up gases only on their surface. This leads to the use of more alkali than is necessary, and thus adds to the weight of the cartridge.



A Breathing Apparatus Now Being Subjected to Experiment

In the new potash cylinders the chemicals are still used in granular form. The grains of caustic potash are placed on the shelves *A* and *B*, which have a series of holes covered with the little perforated spacing caps *D*. The holes *E* in one shelf are staggered with respect to those in the next. The side walls of the spacing caps let the gases pass easily through. The gas to be treated by the chemicals enters from below through the tube coupling *C* and passes up through a large number of holes *E* and through the spacing caps, which are fastened on the lower shelves. Hence it reaches the chemical between the spacing caps. In contrast with the common type of cartridge the air does not pass by or over the chemicals, but owing to the cap device is compelled to penetrate to the interior of the chemical layer.

Shreds of filter paper are mixed with the chemicals to take up such potash as is dissolved by the moisture in the expired air. Experiments show that after two hours the regenerated air contains no carbon dioxide, after three hours 0.2 per cent. of its volume and after four hours ly 0.6 per cent. In the experiments, cartridges of 2.2 4.4 lb. weight have been employed. The exhaled air sses into the cartridge *A*, where its carbon dioxide is moved. Thence it flows through a tubular cooler *I*, hich, to increase its cooling effect, is provided on the wer part with asbestos *J* which, previous to using the pparatus, has been saturated with a volatile liquid (al- hol). From the cooler the air passes to the injector d then to the helmet.

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*Engineer, chief mining inspector of the Witkowitzer collieries in Maehrish-Ostrau, Austria.

Note—From a paper before the International Congress of Rescue Work and Accident Prevention, Vienna, 1913. Translated expressly for "Coal Age" by E. F. Buffet, from the "Montanistische Rundschau."

From the helmet the exhaled air is first conducted by e action of the injector through a breathing tube *K*, to the exhalation half of a double bag. This half is nnected with the inhalation section by a little tube.† oth the inhalation and the exhalation halves are made in e, and divided in two parts by a separating wall. One art is placed under the steel flask, the other under the rtridge. The weight of the apparatus is between 26 and 9 lb. for a duration of three to three and a half hours.

The experiments have not been completed, but they in- icate that a distinct advance has been made in breath- g apparatus.

Welfare Work at Roslyn, Wash.

By Ralph W. Meyer*

Roslyn's new $10,000 Y. M. C. A. building was formal- y opened to the public on Oct. 7, the anniversary of the estruction of the old structure by fire. The Northwest- rn Improvement Co. contributed $4000 on condition that n equal amount be raised by the miners and citizens of he town. Over 700 persons responded and oversubscribed he amount, and the result was the construction of the nly Y. M. C. A. to be found in a mining camp in the orthwest. The company not only contributes the sum tated but also gives the site for the building, provides ree lights and coal, supplies steam for the baths without harge and pays the secretary's salary. Taking the old nstitution as a criterion, the building forms the best nvestment the company has in the town.

Y. M. C. A. Hall Erected by the Northwestern Improvement Co. and Its Employees

Description in Detail

The basement contains the heating plant, a large swim- ning pool, shower baths, clothes lockers and a drying oom. In this respect it is unique, being the only Y. M. . A. west of the Rockies which has a miners' bath and hange room. This department is well patronized by the niners.

A bowling alley is partitioned off from the swimming and bathing part of the lower floor. The main floor contains a large auditorium with a gallery around it and a stage at the end. It has capacity to seat about 700 persons, and Chautauqua lectures and other entertainments will be held in it. The chairs can be folded and moved out of the way when it is desired to use the place for a gymnasium or for basketball games. The main floor contains a large room for the circulating library, a reading room, a billiard and pool room, a ladies' rest room, and a large room for the secretary's office.

Other large mining companies in the Northwest are watching it with interest. If it is an undoubted success, they expect to start organizations of a similar nature in their villages. During the winter season, a teacher gives instruction in English to a large class of foreign-born miners, in one of the small rooms of the building.

Mine Rescue Maneuvers

The Bureau of Mines from its experience of the turmoil of impromptu rescue work, its uncertain discipline and later vain regrets, has decided that success in actual mine recovery can only come by duplicating the difficulties and conditions, commonly to be faced, at maneuvers carried out in an actual mine.

To this end a few days before the American Mine Safety meeting about 20 members of the Bureau of Mines, camped at Oak Station, near Pittsburgh, Penn., on the Charleroi branch of the Pittsburgh Railways Co., for 10 to 12 days for practice in rescue work. As soldiers and sailors should not wait for actual war, so rescue corps should have actual practice in the conduct of rescue work apart from mere helmet-wearing exercises.

Training in musketry should be supplemented by maneuvers if soldiers are to be prepared for war, and realizing the force of the analogy, the Bureau of Mines is endeavoring to develop the study of mine-rescue work apart from mere helmet practice.

The study of recovery of mines after mine explosions and fires, started by W. E. Garforth and extended by the American Mine Safety Association, is now to be made more vital by actual mine-rescue "field work" in real mine workings.

It is a poor time for planning when the thought of others dying makes concentration of mind difficult or impossible, when the peculiar immediate problems relating to the mine complicate matters and when danger threatens on every side. If the general principles have been thought out at a time when there is no mental or moral stress, the mind can meet these problems of the minute without confusion.

The difficulty of conjuring up conditions without enacting them resembles that of designing a machine without a sketch on paper. A few general ideas may be evolved by mere thought, but a mass of thronging details are made manifest by practice. Paper will refuse nothing but the test of field maneuvers can never be so deceptive.

For a purpose of this kind a small experimental mine is relatively of little value. What is needed are workings large enough to duplicate conditions likely to be met in actual rescue practice. The burden of carrying the apparatus long distances will prepare the crews for the severities of real mine recovery.

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*Roslyn, Wash.

†Apparently this is used when the potash cartridge is re- laced.—Ed.

DISCUSSION BY READERS

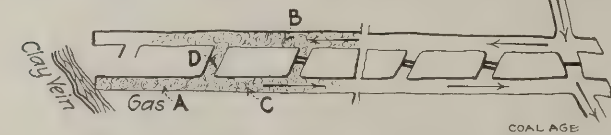
Collapsible Stoppings

Letter No. 7—Before discussing the question of the possible efficacy of "collapsible stoppings" in mines, it will be well to understand two points bearing on the subject. 1. What constitutes a collapsible stopping? 2. What features of an explosion will such a stopping affect?

A collapsible stopping may be understood to be one constructed to withstand the ordinary concussions incident to mining coal, but not permanent under the excessive stress of even a comparatively slight explosion of gas or dust. Such a stopping may be constructed (a) to conduct the ventilating current with a comparatively slight loss of air, to the working face or head of the entry; or (b) it may be built in such a manner as to allow a large percentage of loss where the working requirements will permit of such loss.

The stopping first mentioned, being comparatively tight and allowing but a small loss of air, will naturally make the void spaces in the breakthroughs reservoirs for the deposition of much dust, which will be drawn into these places and settle because of the reduced velocity of the air sifting through the stopping. The second stopping mentioned, having larger openings and permitting a greater loss of air, will not accumulate as much dust as the former. When we consider that coal dust is an important element in the propagation of an explosion, if not the chief element concerned, the danger presented in the use of either of these stoppings, as accumulating quantities of dust and distributing the same in the airways in the event of any concussion of the air, is clearly apparent.

The principal feature of an explosion that the collapsible stopping is expected to affect is the rapid expansion of the products of combustion. There are two incidental characteristics, besides, that should be considered; namely, the unburned combustible gas in the wake of an explosion and the fine coal dust floating in the air.



Illustrating an Explosion of Gas

It will be interesting, in this connection, to consider an explosion of gas as occurring at the face of the return heading, at *A*, in the accompanying figure. The gases produced by the explosion at *A* expand a certain distance down the return heading *C* and, at the same time, are driven through the open crosscut *D*, and outby along the intake airway *B*. If the stoppings on these headings are substantially built, the pressure due to the expanding gases being nearly equal on both sides, it may be assumed that these stoppings will not be thrown down. In that case, the expansion along the return airway *C* will be limited by the force of the initial blast and will die out for lack of air to support the flame. The expansion along the intake airway *B* will probably extend a greater distance, owing to the combustion being fed by the fresh intake air. Much will depend, of course, on the amount of fuel (gas and dust) fed to the flame in its progress along the entry.

Now, consider for a moment what would be the probable effect if these entry stoppings were collapsible. It seems clear that the throwing down of the stoppings in the crosscuts would result in blowing a large quantity of dust into the air, and this dust would feed the flame and add to the force and violence of the explosion. Moreover, the destruction of the stoppings would allow the fresh intake air to feed the explosion on the return airway, and both of these entries would then furnish a path for the explosive wave.

Although the suggested reasoning, in reference to collapsible stoppings, is based upon admissible data, the conclusions reached are not of general application in coal-mining practice. The existing facts and conditions will generally make a vital difference in the results. There is room for much practical experimentation, before the question can be satisfactorily solved in its different phases.

I. C. Parfitt.

Jerome, Penn.

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Mixed Lights in Mining

Letter No. 19—If not too late, I want to express my opinion on the use of mixed lights in coal mining, recently discussed in Coal Age, Oct. 11, p. 553. I consider it a pernicious practice to allow the use of open lights in any portion of a mine generating explosive gas in such quantities as to require the use of safety lamps at the working face. The number of accidents that have occurred and lives that have been sacrificed on the altar of mixed lights are legion.

To illustrate the danger of this practice, I will relate, briefly, one or two incidents that have occurred in my experience. A number of years ago, Chinamen were employed at the Union mine, in British Columbia. They were allowed to work underground and were probably no more an element of danger than the class of foreigners employed today, who cannot speak English. It was the custom, in that mine, to use naked lights on the levels and main air courses, while safety lamps were required in the pillar districts. A Chinaman was tramming on one of the levels. A number of boxes (cars) were off the track and to get some help to replace them, the Chinaman went into the pillar district with his open light. The result was an explosion that killed 21 men.

At Coleman, Alberta, several years ago, an explosion occurred resulting in the death of three men. This accident, also, was the result of using mixed lights in a mine generating gas. In this mine, each miner was provided with a safety lamp for the purpose of examining his place before commencing work, or after firing a shot, or on returning to his place after a short absence. It so happened that an old experienced miner neglected examining his place with the safety lamp, and entered with an open light on his head. As a result, a body of gas was ignited and the explosion that followed caused his death and that of two others.

Neither of these explosions would have occurred had safety lamps been used exclusively throughout these mines. The temptation to use naked lights in a mine whenever these are available is strong, not only among the miners but among mine officials as well. The list of those who have been caught taking this chance includes even mine inspectors. It seems more natural for many mining men to assume that no gas is present rather than to assume that gas may be present.

Such is the history of mixed lights in coal mining in the past, and it will probably repeat itself in the future, as long as the practice is continued.

The only remedy is to eliminate the cause. When it is necessary to use safety lamps at the working face, or in any district of a mine, the entire mine should be worked on safety lamps exclusively. It is common to see walking the streets, in districts where the mixed-light system is practiced, men who are or should be living, animated danger signals, warning all against such practice, by their parched glossy faces and shriveled hands and ears. On the other hand, a sense of security is experienced by most officials and intelligent miners where the practice of mixed lights is not known.

In conclusion, I want to state that a law should be put on the statute books of every coal-mining state, making it compulsory to use safety lamps exclusively where these are required in any portion of a mine. Such a law might seem to impose a hardship on the mining of coal; but, in general, it will prove a blessing in the end, by the lives saved.

J. W. Powell.

Windham, Mont.

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The Safety Lamp and the Eyesight

I cannot agree with John Rose, Coal Age, Sept. 27, p. 465, when he says that the safety lamp has no ill effect on the eyesight of the miner. My observation and personal experience compel me to a contrary belief. In every safety-lamp district in which I have worked or visited, I have observed that the eyesight of the miners has been impaired.

Mr. Rose claims that his use of the safety lamp, as fireboss and mine foreman, produced no ill-effects. I could say the same thing for myself, having worked for several years in the Hamilton district, Scotland, where safety lamps are used almost exclusively. In that district, however, the majority of the *miners* suffer from defective eyesight, while it is rare that the firebosses, drivers and other shiftmen are affected. I know many firebosses, personally, who have used the safety lamp for 20 years and more, and still retain good eyesight. On the other hand, I can recall very few miners whose eyesight remains unimpaired after using the safety lamp, at the coal face, for a much shorter period.

The verdict of eminent medical men, who have given much time to the study of this particular disease—for it is a disease among miners—is that the feeble light afforded by the safety lamp produces a heavy strain on the eyes. They claim that this is much intensified when the man is in a horizontal position, as when mining or undercutting the coal, or when stooping in shoveling. Again, it is well known that severe physical strain has a bad effect on the eyesight; and no one can deny the fact that the miner's occupation is one that produces such strain. Add this to the ill-effects of the feeble light, and it is not difficult to understand why the eyesight of miners is impaired.

Anyone who has lived in a safety-lamp district cannot have failed to have observed the defective eyesight of many of the miners. It is particularly noticeable when the lamps are lit on the street, at night. At such a time, the miner whose eyesight is affected can invariably be observed with his head thrown back and his eyelids drawn close, as though he were looking at something intently. The effect produced on the eyesight by the safety lamp is gradual. In the first stages of the disease, a light seen at a little distance appears for a while to be rotating in a circle, but becomes stationary after a short time. Later, as the disease progresses, the rotation is more or less permanent, and the miner is compelled to stop work. The difficulty seems to be wholly confined to or, at least, greatly aggravated by artificial light. Men who are badly affected and can hardly be trusted to cross the street alone, at night, can often read without the assistance of glasses, in daylight.

In my opinion, the fact that a large percentage of claims paid under the Miners' Compensation Act, in Great Britain, is for this disease, which is known as "miners' nystagmus," proves the bad effect of the safety lamp on the eyesight of miners. I do not remember of ever hearing of a case of nystagmus in naked-light districts. According to medical men, the only cure for the disease is absolute rest for a few weeks or months, according to the severity of the case. The miner must then seek employment on the surface, and away from artificial light. I hope that the attention drawn to the matter by this discussion will warn miners who are using the safety lamp, of the danger to which they are exposed.

James Dickson.

Nanaimo, B. C., Canada.

⁂

Another Letter

The question of the continuous use of the safety lamp affecting the eyesight, which grew out of the discussion of Mixed Lights in Mining, has proved an interesting one. It seems to me, however, that one important particular has been entirely disregarded. Personal experience has been offered, as more or less conclusive proof of the statements submitted. While such experience is often satisfactory to the person, it should not be offered or accepted as indisputable evidence, but an *opinion* based on experience.

Because a certain effect is not produced on one man or individual, he has no right to conclude that such effect will *not* result in the case of another man or individual. Such reasoning would be logical, were we all constituted alike; but the fact that we are not so constituted makes such reasoning illogical.

I have worked a number of years with a safety lamp exclusively, and can conscientiously say that, so far as I can perceive, no ill effect upon the eye has been produced.

However, an oculist might detect that such effect had been produced. We know that the eye, in conformity with the general structure of the body, is designed to adapt itself to varying degrees of light; and this requirement may produce an undue strain on a particular eye, that may injure the organ temporarily or permanently.

Before expressing a hasty opinion, let anyone who claims that the safety lamp is not injurious to the eyes, recall the sensations they have experienced in passing from the gloom of the mine, where the pupil of the eye is dilated to meet the requirements of the feeble light, into the scintillating brilliancy of a bright winter day, when the sunbeams glancing on the crust of the snow compel one to close the eyes to protect them from the glare. A similar effect, to a less degree, is experienced on passing from the glare of such a day into the subdued light of a room or into the darkness of the mine. Then, consider that the eyes of a large number of people may be unable to withstand the strain attending such a sudden transition from darkness to a glare of light or *vice versa*. I feel certain that such ones will be ready, then, to admit that personal experience, in this particular, is not of general application.

I. C. PARFITT.

Jerome, Penn.

The Mine Air Current and Explosion

My attention was called some time since to Robert M Cune's reply, COAL AGE, Sept. 13, p. 390, to my previo article on the above subject. I do not consider it wor while to reply to his comments, as your editorial note o p. 391 points out the fact that I attempted to expres far more clearly and comprehensively than any effort c my part could possibly accomplish.

I do not think, however, that the mathematics he pr sents helps to establish his claim that the compressiv system of ventilation as compared with the exhaustiv system counteracts, to any appreciable extent, the effe of a falling barometer. He assumes a fall of barometr pressure from 30 to 29 in. This corresponds to an a mospheric pressure of 0.49 × 144 = 70.56 lb. per sq.ft or a water gage of nearly 14 in. It is quite clear, ther fore, that the difference between the two systems of ve tilation, which he shows to be twice the ventilating pre sure or, say 4 in. of water gage, would have little e fect in counteracting the assumed change in atmospheri pressure, which corresponds to nearly 14 in. of gage. I is a dangerous thing to apply mathematics to mine ve tilation unless the application be correctly made.

I. C. PARFITT.

Jerome, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

FACTORING

The smaller numbers are readily factored by inspection. Following are examples of such simple factoring:

Number 8; factors, 2, 4; because 2 × 4 = 8;
Number 24; factors, 4, 6; because 4 × 6 = 24; etc.

Prime Factors—It is evident that the factors given above are not, in either case, the prime factors of the number; because the factors themselves can some of them be resolved into lower factors. The numbers 4 and 6 are not prime numbers and cannot therefore be prime factors. The following are examples of prime factoring:

Number, 8; prime factors, 2, 2, 2;
Number, 24; prime factors, 2, 2, 2, 3;
Number, 30; prime factors, 2, 3, 5; etc.

Factoring Larger Numbers—Numbers that cannot be factored readily by inspection must be factored by a process of continued division of the number by any exact divisor of the number and, finally, reducing each divisor to its prime factors, which are then the prime factors of the given number.

Exact Simple Divisors—A number is exactly **divisible by 2** when its last figure is a cipher or an even number; in other words, 2 is an exact divisor of any even number.

A number is exactly **divisable by 3 or 9** when the sum of its digits is divisible by 3 or 9; or, as we say, is a multiple of 3 or 9, respectively. Thus, 27 is exactly divisible by both 3 and 9; because 2 + 7 = 9 which is divisible by each. Again, the following number is divisible by 3, as shown, but not by 9:

Number, 38,769,576 divisible by 3; because

$$3 + 8 + 7 + 6 + 9 + 5 + 7 + 6 = 51;\ \text{and}\ 5 + 1 = 6$$

As above, the number may be so large that the sum of its digits may not be recognized, at once, as a multiple of 3, in which case, the digits of that sum may be added and this process repeated, if necessary, till the resulting sum is readily recognized as a multiple of 3 or otherwise.

The operation may be much shortened, however, by omitting to add any digit as 3 or a multiple of 3. For example, in the number above, adding all the digits except the multiples 3, 6, 9, gives:

$$8 + 7 + 5 + 7 = 27;\ \text{and}\ 2 + 7 = 9$$

If desired the operation may be further shortened by throwing out all multiples of 3 from each digit and only adding the excess in each case. Thus, in the above, instead of adding the digits 8, 7, 5, 7, we add

$$2 + 1 + 2 + 1 = 6,$$

which is the shortest and simplest of all the methods.

A number is exactly **divisible by 4** when its last two digits are so divisible; because the figures preceding the last two are a multiple of 100, which is a multiple of 4 and can therefore be cast out. Thus, 124, 332, 504, etc., are each divisible by 4; because 24, 32, 4, etc., are each multiples of 4.

A number is **divisible by 5** when its last figure is a cipher or a 5; as for example 105, 130, 375, etc.

The Coal Age Pocket Book

Reduction of Simple Fractions—To reduce a simple fra tion to its lowest terms, one of the three following methd may be employed:

(a) Divide both terms of the fraction by all the factor common to both; thus,

$$2\,\Big|\,\frac{32}{120};\quad 2\,\Big|\,\frac{16}{60};\quad 2\,\Big|\,\frac{8}{30} = \frac{4}{15}$$

(b) Divide, at once, by the **greatest common divisor** o both terms of the fraction, which is the product of all th common factors and will be explained later; thus,

$$8\,\Big|\,\frac{32}{120} = \frac{4}{15}$$

(c) The method by **cancelation** is to first resolve eac term of the fraction into its prime factors and, then, to ca out those common to both numerator and denominator. Th product of the factors remaining in each term will form th terms of the reduced fraction. Thus, reducing both terms o the fraction to their prime factors and canceling the sam number of common factors in each term gives the following

$$\frac{32}{120} = \frac{2 \times 2 \times 2 \times |\, 2 \times 2}{2 \times 2 \times 2 \times |\, 3 \times 5} = \frac{4}{15}$$

To Reduce a Mixed Number to an improper fraction, mul tiply the whole number by the denominator of the fractio and to the product add the numerator. Write the sum ove the denominator for the improper fraction required. Thus reduce 3⅝ to an improper fraction:

$$3 \times 8 + 5 = 29;\quad \frac{29}{8}$$

To Reduce an Improper Fraction to a mixed number, di vide the numerator of the fraction by its denominator; th quotient will be the whole number following which write th remainder over the denominator. The result is the mixe number required. Thus, reduce 29/8 to a mixed number:

$$29 \div 8 = 3\tfrac{5}{8}$$

To Reduce a Complex Fraction to a simple one, multiply both the numerator and the denominator, in turn, by the de nominator of each mixed number in the terms of the fraction

Examples—

Reduce $\frac{2\frac{3}{4}}{6}$; thus, $\frac{4 \times 2\frac{3}{4}}{4 \times 6} = \frac{11}{24}$

Reduce $\frac{8}{2\frac{1}{2}}$; thus, $\frac{2 \times 8}{2 \times 2\frac{1}{2}} = \frac{16}{5} = 3\frac{1}{5}$

Reduce $\frac{4\frac{5}{8}}{1\frac{2}{3}}$; thus, $\frac{8 \times 4\frac{5}{8} \times 3}{3 \times 1\frac{2}{3} \times 8} = \frac{111}{40} = 2\frac{31}{40}$

To Reduce a Compound Fraction to a simple one it is necessary to perform the several operations indicated by the signs in the numerator and denominator of the fraction, as explained later in Addition, Subtraction, Multiplication and Division of Fractions.

INQUIRIES OF GENERAL INTEREST

The Mine Foreman's Certificate

I want to ask for a little information in regard to the ine foreman's certificate required by law and for which ne must pass an examination. Is the certificate granted y an examining board in one state good only in that tate, or can it be used in any other state where a certificate is required?

Also, can a mine foreman hold that position in a state here certificates are granted, if he has not obtained his ertificate? As this is being done in some instances, at he present time, it would seem unnecessary to study and ass an examination to secure a certificate.

A MINE FOREMAN.

Scranton, Penn.

The law requiring the examination and certification f mine foremen is a state law in every case. The requirements are different in different states, and these depend largely on the conditions that exist in the mines of each particular state. As the law makes the examining board responsible for the certification of mine foremen, few examining boards will accept the certificate granted by a board in another state, although that is done in some states.

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Expansion of Air and Gas

Following my inquiry in regard to the unit weight of air, which was answered in COAL AGE, Oct. 11, p. 555, I have been puzzled in regard to the application of Gay Lussac's law relating to the expansion of air and gas. I reasoned as follows: If, under constant pressure, air expands $^1/_{460}$ of its volume for every degree of increase in temperature, a volume of 1 cu.ft. of air or gas at absolute zero (—460° F.) would become only 2 cu.ft. at 0° F. But a volume of 460 cu.ft. at 0° F. would, by the same law reversed, be contracted to nothing, at the absolute zero of the Fahrenheit scale.

Again, using the formula given for finding the weight of 1 cu.ft. of air at any temperature t and pressure B; and assuming $B = 30$ in., and $t = -460$ deg.

$$w = \frac{1.3273 \times B}{460 + t} = \frac{1.3273 \times 30}{460 - 460} = \frac{39.819}{0} = 0$$

Now, assuming a volume of 460 cu.ft. at 0° F., a *rise* of 460 deg., in temperature, will cause this air or gas to double its volume. But, assuming a *fall* of 460 deg., in temperature, if the contraction of volume follows the same law it would seem that the volume of the air or gas at absolute zero (—460° F.) would contract to one-half its volume at 0° F.; or ½ × 460 = 230 cu.ft. Will you kindly explain this discrepancy.

I. C. PARFITT.

Jerome, Penn.

The expansion and contraction of air and gas follow the same law, known as Gay Lussac's law, which is as follows:

For a constant pressure, the volume of air or gas expands or contracts $^1/_{460}$ of its volume at 0 deg. F., for each degree rise or fall in temperature (Fahrenheit scale).

Applying this law to the expansion and contraction, respectively, of 460 cu.ft. at 0° F., gives an increase and decrease, respectively, of 1 cu.ft. for each degree rise and fall of temperature. Thus, the increase is 460 cu.ft. for a rise of 460 deg., in temperature; and, likewise, the decrease in volume is 460 cu.ft. for a fall of 460 deg. in temperature; assuming that the law held true throughout this range of temperature.

With the improved means of obtaining very low temperatures, this law has been tested in relation to the contraction of volume in air and gas, and has been found to vary slightly as the temperature approached more nearly to the absolute zero. The contraction of volume becomes less and less as the temperature is decreased below a certain point. The accompanying diagram illustrates clearly this point. The expansion line is shown to assume a gradual curvature that may be supposed to slowly approach parallelism with the vertical line of temperatures. In the diagram, the horizontal lines drawn between the vertical and the expansion line may be taken as representing the volumes of the air or gas at the several temperatures indicated.

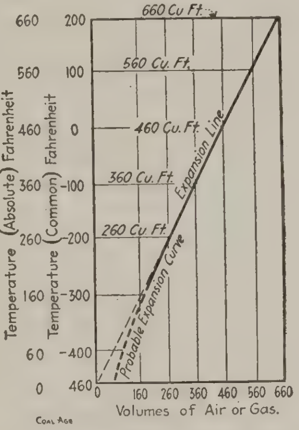


DIAGRAM SHOWING EXPANSION LINE FOR AIR AND GAS

The reasoning in this inquiry errs in two respects:

1. According to Gay Lussac's law, the expansion and contraction, is $^1/_{460}$ *of the volume of the air or gas at 0° F.*, which makes the increment in either case, constant. The total increase, in this case, is equal to the original volume at *0°* F. (460 cu.ft.) and the volume is, therefore, doubled; but it does not follow that a like *fall* of temperature would make the volume one-half of the original volume. On the contrary, assuming the law held true, the volume would reduce to zero, the contraction being 460 cu.ft.

2. Applying the formula for finding the weight of 1 cu.ft. of air, at a given temperature and pressure, our correspondent finds that air, at a barometric pressure of 30 in. and at a temperature of absolute zero would lose its weight, which he calculates would become zero; whereas, if the law held true at such a low temperature, the weight of the air, as shown by the formula, would be infinite. A finite quantity divided by zero gives infinity. But, as we have previously explained, the law of Gay Lussac does not hold true, as the temperature approaches the absolute zero.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—How would you proceed to examine a large anthracite colliery for the first time, for the purpose of making a report of the same to the State Department of Mines, assuming that you are wholly unacquainted with the colliery?

Ans.—Visit the mine without previous notice to the mine officials. Proceed at once to the office and examine carefully the mine map to ascertain the system of ventilation, distribution of air and the disposition of the men in the mine. Become thoroughly acquainted with the entire surface plant and its requirements; inspect the ventilating apparatus, hoisting arrangements, boiler plant; and give particular attention to the various safety devices installed and signal systems employed. Also, investigate the arrangements for the handling of supplies, such as timber, powder, hay, oil, etc. Investigate the general lighting system of the mine, the lamp house where safety lamps are used; and, if mixed lights are allowed, ascertain what precautions are adopted to prevent the occurrence of accidents common to this practice.

After a careful study of the entire surface plant and obtaining all the necessary information in reference to the mine, proceed to the bottom of the shaft and study carefully the general arrangements for the handling and hoisting of coal, tools, supplies and men. Observe carefully the manner of conducting operations at the shaft bottom; test the signal system; observe that all lights are well protected and investigate thoroughly all electrical installations. Visit all underground engine rooms, pump rooms, tool shanties, oil and lamp stations, to ascertain that the arrangements in each case are fireproof and otherwise safe. Visit the stables, observe their sanitation, with respect to drainage and ventilation; also, the method of lighting the stables.

Then proceed inby, following the general course of the air current and observing the conditions of the haulage roads, side tracks and air courses. Visit, in order, all chambers and other working places. Observe carefully the method of mining and blasting the coal, timbering the working places and note the condition of the workings with respect to gas and dust. See that every working place is thoroughly ventilated, the air being conducted to the face by brattices where necessary. See that all stoppings are properly built and of incombustible material, and that all crosscuts are of sufficient size and unobstructed. Investigate the practice of the miners in respect to the handling of powder, charging of holes and firing.

Ques.—A coal seam 6 ft. 6 in., in thickness, including 18 in. of dirt band, is standing on pillars. The rooms or stalls have been driven 14 ft. wide, and 15 per cent. of the coal has been taken out in the first working. Overlying this is a seam of coal that has been abandoned—"drowned out." The two seams are separated by 300 ft. of beds of soft shale and fireclay. State how you would proceed to extract the pillars in the lower seam with bringing the water down from above.

Ans.—The thickness and character of the interveni strata are such as to permit of drawing the pillars the lower seam on the retreating system. The soft, sha strata will favor the gradual subsidence of the roof, wh the beds of fireclay will form a good protection aga the inflow of water from above. It is important, ho ever, that the work of drawing the pillars should started at the inby end or boundary of the workin and that the pillar work should be kept in line so that subsidence of the roof will be uniform and gradual a that the strata will have no tendency to "draw." If rooms are 14 ft. wide and 15 per cent. of the coal been extracted, leaving $100 - 15 = 85$ per cent. in pillar, the width of the pillars is found thus:

$$15 : 85 : : 14 : x = 79.3, \text{ say } 80 \textit{ ft.}$$

The pillars should be drawn by taking a skip of, 6 or 8 ft. off the face of the pillar, extending this entire width of the pillar before another skip is start

Ques.—Two drill holes are put down, one mile apa to prospect a seam of coal. The depth of the first h is 634 ft., that of the second, 850 ft. The surface at first hole is 25 ft., vertical measurement, above tha the second. Find the inclination of the coal seam tween the two points, measured in inches per yard.

Ans.—Add the difference in surface elevation to depth of the second hole and from this sum subtract depth of the first hole. Thus, $850 + 25 - 634 = 2$ ft. The inclination of the seam between these t points is, therefore, 241 ft. in 5280 ft. (1 mile). Si there are 36 in. in a yard, the inclination or dip of seam, in inches per yard, is found by the proportion

$$5280 : 241 : : 36 : x = 1.64 \textit{ in. per yd.}$$

Ques.—With a fan of 50 hp., the water-gage sta at 1.75 in.; what quantity of air should be in circulati if the efficiency of the fan engine is 65 per cent.?

Ans.—Taking the 65 per cent. to represent the e ciency of the fan and engine, the power on the air is $Qp = 0.65\ (50 \times 33{,}000) = 1{,}072{,}500$ *ft.-lb. per m*

The unit of ventilating pressure is $p = 5.2 \times 1.7$ 9.1 lb. per sq.ft. The quantity of air in circulation, this case, is, therefore,

$$Q = \frac{1{,}072{,}500}{9.1} = 117{,}850 \textit{ cu.ft. per min.}$$

Ques.—We have a tank full of water in the morni when commencing work. Using 900 hp. per hr., long will it take to empty this tank? The tank is 10 in diameter and the water 15 ft. deep.

Ans.—The weight of water in the tank is $15\ (0.7 \times 10^2) \times 62.5 = 73{,}631.25$ lb. In the absence of ex data in regard to the style of engine, temperature of water, etc., it is customary to assume a consumption 35 lb. of water, per horsepower, per hour. On this bas the water in the tank will last

$$\frac{73{,}631.25}{900 \times 35} = 2.33 \textit{ hr.}, \text{ or } 2 \textit{ hr. } 20 \textit{ min.}$$

COAL AND COKE NEWS

Washington, D. C.

The first important step toward the application of the income tax was taken by Secretary McAdoo late on Saturday, Oct. 25, and consisted of the issuance of rules governing the application of the law and the collection of the income tax from individuals. The mechanism now in force for the collection of the corporation tax was not changed but it is understood that that is to remain practically in operation as now. The new rules applicable to individuals are however of great importance in their bearing on corporations, including those engaged in mining, because they lay upon these corporations the duty of collecting the tax at the source, by deducting from the amounts they pay to individuals the proportion which is due to the Government.

The new rules are elaborate and detailed, including a great many forms. These will be freely sent out to all corporations including mining companies which have bonds outstanding. The main part of the regulations, apart from the forms includes the following points:

Under the Income Tax Law, enacted Oct. 3, 1913, a tax of one per cent. designated in the law as the normal tax, shall be deducted at "the source," beginning Nov. 1, 1913, from all income accruing and payable to:

(a) Every citizen of the United States, whether residing at home or abroad, and to

(b) Every person residing in the United States, though not a citizen thereof, which may be derived from interest upon bonds and mortgages, or deeds of trust, or other similar obligations, including equipment trust agreements and receivers' certificates of corporations, joint stock companies or associations and insurance companies, although such interest does not amount to $3000, excepting only the interest upon the obligations of the United States or its possessions, or a state or any political subdivision thereof.

The term "debtor," as hereinafter used, shall be construed to cover all corporations, joint stock companies, or associations and insurance companies.

For the purpose of collecting this tax on all coupons and registered interest, originating, or payable, in the United States the source shall be the debtor (or its paying agent in the United States) which shall deduct the tax when same is to be withheld, and no other bank, trust company, banking firm, or individual taking coupons for collection, or otherwise, shall withhold the tax thereon; provided that all such coupons, or orders for registered interest, are accompanied by certificates of ownership signed by the owners of the bonds from which the coupons were detached. These certificates shall be in the forms prescribed and a separate certificate shall be made out by each owner of bonds for the coupons or interest orders for each separate issue of bonds or obligations of each debtor.

If, however, the coupons are not accompanied by certificates as prescribed above, the first bank, trust company, banking firm or individual or collecting agency receiving the coupons for collection or otherwise, shall deduct and withhold the tax and shall attach to such coupons its own certificate, giving the name and address of the owner of, or the persons presenting such coupons if the owner is not known, with a description of such coupons also setting forth the fact that they are withholding the tax upon them; whereupon the debtor shall not again withhold the tax on said coupons, but in lieu thereof shall deliver to the government the certificate of such bank, trust company, etc., which is withholding such tax money.

Any corporation, collecting agency, or person first receiving from the owner any interest coupons or orders for the collection of registered interest, and to whom the certificates above provided for are delivered, should require the persons tendering such coupons or orders for registered interest to satisfactorily establish their identity.

A debtor whose bonds may be registered both as to principal and interest, shall deduct the normal tax of 1 per cent. from the accruing interest on all bonds before sending out checks for said interest to registered owners or before paying such interest upon interest orders signed by the registered holders of said bonds until there shall be filed with said debtor or its fiscal agent (and not later than 30 days prior to Mar. 1) through whom said interest is customarily paid, the proper certificates claiming exemption from liability for said tax.

The debtor may appoint paying or fiscal agents to act for it in matters pertaining to the collection of this tax upon filing with the collector of internal revenue of its district a proper notice of the appointment of such agent or agents.

HARRISBURG, PENN.

The Philadelphia & Reading Ry. Co., the Philadelphia & Reading Coal & Iron Co., the Reading Co. and the Wilmington & Northern R.R. Co., principal defendants in the Governments' suit to dissolve the so called "Anthracite Coal Trust," filed separate answers in the United States District Court, recently at Philadelphia, making general denial to the charge of having formed an illegal combination to stifle competition in the sale and transportation of anthracite coal in Pennsylvania.

It is understood these answers will form the defense of all the defendants in the suit. Each answer gives a detailed denial in so far as the Government's allegations affect the individual company.

Each denies "that it is a party directly or indirectly, to any agreement, contract, combination or conspiracy, by virtue of which it, either alone or in combination with the other defendants or any of them or otherwise, has acquired the power now or hereafter to control, regulate, restrain or monopolize, or by virtue of which it, either alone or in such combination does control, regulate, restrain or monopolize, either the production of anthracite, or its transportation from the mines of Pennsylvania to market points in other states, or its price of sale, in or throughout other states."

The Reading Co. admits that it is the holding company of the Philadelphia & Reading Coal & Iron Co., and the Philadelphia & Reading Railway Co., also that it owns nearly all the capital stock of the Wilmington & Northern R.R., the Schuylkill Navigation Co., and the Central Railroad of New Jersey. It denies specifically, however, that the company was made an instrument to accomplish an unlawful purpose.

It is further averred that the plan for the reorganization in 1896 of the Railway Co. and the Coal & Iron Co., was for the purpose of saving large investments of the public and was done under the law of Pennsylvania. It is denied that the Reading Co., the Railway Co. and the Coal & Iron Co., are one and the same association of persons engaged in mining, selling and transporting coal.

The Reading Co. denies that the purchase of the majority of stock of the railroads was made to effect a monopoly, but says it was done in the natural course of business, the railroads being connecting lines.

The Philadelphia & Reading Ry. points out that substantially all the anthracite not consumed near the mines moves to market over ten railroads, that New York Harbor and Philadelphia are important markets, that Philadelphia is reached over the lines of the defendant and those of the Pennsylvania R.R.; and that a substantial tonnage is distributed by water from Philadelphia to New England.

Attention is called to the fact that during the fiscal year ending June 30, 1912, the company transported 11,224,945 gross tons of anthracite, it transported 14,806,220 tons of bituminous coal and 22,711,791 net tons of general merchandise.

The Philadelphia & Reading Coal & Iron Co. admits holding the major portion of stock of six coal companies, which own 9000 acres of coal lands in the Schuylkill Region. All was purchased in the lawful course of business, it is averred. It is admitted that, since 1896 the Reading Co. has, from time to time, made to the Coal & Iron Co. temporary commercial loans, but that these are usually repaid within a few months.

The Wilmington and Northern R.R. Co. admits that a majority of its stock is owned by the Reading Co. It denies that anthracite constitutes its principal freight, and that the acquisition of its stock by the Reading Co. had any tendency to accomplish an anthracite monopoly.

Valuation Decision Is Upheld

The Supreme Court of Pennsylvania has handed down a decision that the County Commissioners of Westmoreland County could not appeal from the ruling of the Court of Common Pleas in fixing the valuations of coal lands for taxation purposes.

The Common Pleas Court of Westmoreland County sat as a board of revision and appeals June 11, and heard the complaint of the Pittsburgh Coal Co., Henderson Coal Co., Monongahela River Consolidated Coal & Coke Co., Elizabeth Stauffer Moore, Laura A. Hasson, Monessen Coal Co., Shenango Furnace Co., Pittsburgh-Westmoreland Coal Co., and the Naomi Coal Co. The Court ruled that the county commissioners had exceeded their authority in fixing the value of coal lands for taxation purposes and ordered relief for the coal-land owners.

The county commissioners then carried the case to the Supreme Court of the state, which held that the commissioners' appeal would not lie, dismissed the case and directed that Westmoreland County pay the costs.

PENNSYLVANIA

Anthracite

Hazleton—The Lehigh Valley Coal Co. has made arrangements for opening a new coal stripping between Drifton and Freeland, extending toward Highland.

Wilkes-Barre—The various United Mine Workers locals have received notice that the levy of 50 cents per month on all members will be continued for the time being for the benefit of the striking Colorado miners and their families. District No. 9, has also made a loan of $25,000 to the striking miners in the Colorado District.

Shamokin—Coal companies who maintain alleged blacklists whereby a number of employees are discriminated against and which prevents them from getting positions at the mines of such corporations, were scored by a number of delegates at the annual convention of the Ninth District United Mine Workers. A resolution was offered to have the convention go on record condemning the practice.

Scranton—Pending a report from the special commission which is to make an examination of the conditions underlying West Scranton and also to check up the work of the city mine cave commission, the members of the West Scranton Surface Protective Association have deferred action on the propositions submitted by the People's Coal Co. to serve as a solution of the mine-cave menace in that section. The latest offer of the People's Coal Co. was submitted in a report from a committee of twelve. Briefly, the offer is that, commencing in November, the company will set aside ten cents on every ton of coal mined, this amount to be used as a fund for assisting in the repairing of frame buildings, etc., damaged by caves

Bituminous

Washington—In the suit of the Pittsburgh Coal Co. of Penn. against W. H. Brunt, executor of Francis L. Robbins' will et al., exceptions to the adjudication of the court, an opinion has been handed down, overruling all exceptions and directs the adjudication to stand as heretofore filed. This is the action involving the deed to 97 acres of coal, underlying the Washington fair grounds. The amount of the claim against the estate is about $300,000, Francis L. Robbins, who formerly owned the land, was at one time president of the Pittsburgh Coal Co.

Johnstown—Judge Stephens scored mine officials who violate the state mining laws in no meek terms, when William Roberts, a mine foreman, plead guilty to violating the mining laws. Some time ago Superintendent Andrews of the mine in which Roberts is employed plead guilty to making false air returns to the mine inspectors and blamed his trouble on Roberts, stating the foreman had made false returns to him in the air tests. Roberts placed the blame on the gage which he used in testing the air, stating that it was defective, and that as a result no return of the air pressure was made by him.

Waynesburg—The W. Harry Brown Coke Co. is making extensive preparations previous to the operation of the new mine which is being opened in the Dunkard Creek region. Several months ago the Brown Co. purchased a tract of 1500 acres and immediately let contracts for the development of the underlying coal. The Brown Co. has purchased the steamer "G. W. Thomas" from the Peoples Coal Co., which has been idle for the past three years. In addition to purchasing the steamer it is authentically reported that several other important steps had been taken toward the immediate development of the mine on the Gray Landing. No coke will be made except at the Alicia plant. It being the plan to transport the coal down the river.

Charleroi—Negotiations have been completed and the work of title investigation and deed transferring is now underway for the sale of a 5000-acre block of coal in Cumberland township, Greene County. A large steel corporation operating extensively in the Pittsburgh district is reported be the purchasing company. Western Pennsylvania financie and coal dealers, among whom is said to be J. V. Thompso the Uniontown coal king, are rumored to be the sellers the tract. Approximately $5,000,000 will be paid for t coal, at the rate of $1000 an acre.

WEST VIRGINIA

Elkins—The Jenkins Coal Co., which has been operati a small mine near Mabie for some time, has commenced t construction of extensive mining operations near the san place. Within the next few weeks a considerable plant modern electrical mining machinery will be in operatio which will vastly increase the output of the mines.

Fairmont—The car supply in this region is anything b ideal. On Oct. 22 the Consolidation Coal Co. had no less tha 42 mines shut down on account of lack of cars. It is claim by the railroad authorities that these conditions will be in proved when the Monongah Cutoff is constructed.

Williamson—A combination of capital represented b Patrick Grady has leased several hundred acres of coal lar owned by the Lawson Land Co. surrounding this city. large coal operation will be started in the immediate futu with the tipple in the Norfolk & Western yards. The pla will be operated by elevator conveyors, and the Norfolk Western Ry. will consume the entire output.

TENNESSEE

Briceville—Citizens of Briceville are contributing ge erously for the purpose of building a monument to the mer ory of the 84 men and boys who lost their lives in the Cro Mountain mine explosion of Dec. 9, 1911, near that plac Employees of the Coal Creek Coal Co., the Tennessee Co Co., the Minersville Coal Co., the Westborne Coal Co., th Caryville Coal Co., the Sun Coal Co., the Egan Coal Co., th Peabody Coal Co., the Rich Mountain Coal Co., and the Kim berly Coal Co. among others in that section, and many othe citizens, have made substantial contribution to the fund, ar indications are that a sufficient sum will be collected to ere a handsome memorial.

Jellico—Plans are under way, supported by a number o the coal companies in and around Jellico, Tenn., for the es tablishment of a permanent mine rescue school at that plac for the purpose of facilitating the thorough instruction o miners in first-aid work. E. B. Sutton, who is connecte with the mine-rescue station at Knoxville, Tenn., will hav charge of the school, if sufficient interest is taken by th operators to warrant its establishment, and modern equip ment will be secured and used in order to get the best re sults. Examinations will be conducted following the demon strations of various phases of rescue work, and first-ai certificates awarded to the men who show a proper under standing of the methods used.

KENTUCKY

Lexington—The next examinations for the purpose of de termining the qualifications of applicants for mine fore men's certificates will be held at the office of the Inspector o Mines at Lexington, Ky., on Monday, Nov. 24. The examina tions will continue for several days.

Whitesburg—It is reported that arrangements are unde way for another big development project in the Lowe Boone's Fork section, J. L. McCormick, of Big Stone Gap Va., D. C. Anderson and J. B. Altemus, of Philadelphia, bein among those interested. These men arrived at Whitesbur recently and left for the section referred to, for the purpose of laying out plans for the beginning of active developmen work. It is said that several million dollars will be expended on mining operations and the building of two new industrial towns.

Harlan—Negotiations are under way by the Harlan Coa Mining Co. for the purchase of mechanical equipment for its Coxton No. 2 mine, which it will operate. The equipment wil be of the most modern character, and as good as anythin now installed in Kentucky.

OHIO

Columbus—The past week was taken up by the Ohio min commission in taking testimony from both the operators and miners on the question of paying for coal mined on the mine-run basis. The miners produced testimony in an effort to rebutt the evidence of the operators. The following week will be given over to arguments and after that the report will be prepared.

Logan—Over 100 men have been employed at the Peabody Coal Co.'s mine at Job, Hocking County, and it is believed that 200 more will be taken on soon. In the future it is expected to operate the mine 12 months out of the year. The mine had been closed since last February.

Massillon—What is said to be the last existing undeveloped acreage of genuine Massillon coal has just been opened by the Pocock Coal Co., of Massillon, near Newman. The coal once made the Massillon district famous. The mine was opened after several companies had drilled the 40-acre tract and decided that no coal was to be found. At one time thousands of miners were employed in that district, but as the coal became exhausted the industry died out. The new mine will employ several hundred men.

INDIANA

Evansville—Judgment was rendered recently in the Federal Court at Evansville, in favor of Henry B. Walker, trustee in bankruptcy of the Kimberly Mining Co., for a 3½ per cent. assessment against the stockholders for the purpose of paying the debts of the company. The assessment will aggregate about $2500.

Fort Branch—After burning two days in a room of a mine of the Fort Branch Mining Co., a fire was got under control. It was caused by shots fired after the miners quit work and slate falling from the roof bottled up the flames. The mine rescue car was called from Clinton.

Sullivan—The suit of the county treasurer versus the Shirley Hill Coal Co., in which the latter sought to enjoin the treasurer from collecting alleged omitted taxes of $2000 has been compromised by the payment of $281.

ILLINOIS

Marion—The strike on the Coal Belt Electric Line, which tied up transportation facilities to the various mines between Marion, Herrin, and Carterville, has been settled, the company granting a slight increase to its employees.

Duquoin—The Paradise mine, the top works of which were destroyed by fire early in the summer, has resumed operations. This is supposed to be one of the best-equipped surface plants in southern Illinois, and it is anticipated that 2000 tons per day will be produced in the course of the next six weeks. This is considered a model mine in the way of conveniences for its help.

Sparta—The Moffatt Coal Co. has removed its general offices from here to the Wright Building in St. Louis, with the purpose of handling the future tonnage through the St. Louis gateway. Mr. W. J. Rich is in charge of the St. Louis office. The Illinois Fuel Co. has likewise made arrangements for selling its tonnage through St. Louis, with the Dealers' Fuel Co. as distributors.

Oakland—While drilling for oil wells on the Nolan and Temple farms near here, a vein of coal was struck 10 ft. thick with a good slate roof, it is reported.

MISSOURI

Kirksville—The Star Coal Co., operating the mine of that name at Kirksville, has completed the installation of electrical equipment in a second vein which is now being worked. A road recently built from Kirksville to the mine has been put into commission, facilitating the company's operations.

IOWA

Cleveland—The old No. 2 shaft of the Whitebreast Fuel Co., abandoned some years ago, has been recently reopened, for the purpose of working the top vein, for the supply of the local coal trade. The shaft was found in a remarkable state of preservation, the walls being in perfect alignment. This shaft was sunk about 1880, and, for 12 years, was one of the largest coal producers in the state. After that time, the output declined and operation was finally abandoned by the Whitebreast company. Lately it has been operated spasmodically to supply local trade.

NORTH DAKOTA

Minot—The machinery for Minot's briquetting plant has all arrived, and it is expected that the plant will be in operation in a short time. This is the first plant of its kind to be built in the state. The methods of operation have, however, been worked out, and it is confidently expected that briquetting will, with the starting of the plant, be placed upon a satisfactory commercial basis.

COLORADO

Denver—Petitions, designed to determine whether public sentiment would support a proposal for the state to seize and operate the coal mines until the settlement of the strike, were put into circulation Oct. 20 by various labor organizations.

Crested Butte—Two hundred and fifty employees of the coal mines in the vicinity of Crested Butte walked out Oct. 20 in sympathy with the striking coal miners in the Trinidad district. They declare they have no grievance except that they wish to have the union recognized.

FOREIGN NEWS

There is an insistent rumor seriously accepted in Europe that China has granted to Japan the exclusive privilege of developing the coal fields of China. If this be true, the concession gives Japan the most valuable monopoly that was ever granted by any nation. China has possibly more coal than is known in all the rest of the world, there being in that country 30,000 square miles known to be rich coal deposits.

Edmonton, Alberta—The coal output of Alberta for 1912 is placed at 3,500,000 tons, out of a total of 13,000,000 tons for all Canada, taking in seven provinces, the Yukon and Northwest territories and the Arctic Islands. Alberta is credited with 14½ per cent. of the total coal resources of the world, the reserves of the province being estimated to contain 1,075,039,000,000 tons as compared with 160,841,910,000 tons for the rest of Canada.

PERSONALS

Samuel W. Eldred, manager of the Wabash Coal Co., was recently elected a member of the executive board of the third district by the Illinois Coal Operators' Association.

All Officials and Directors of the Colorado Fuel & Iron Co., and those of its twelve subsidiary concerns, were reelected at annual meetings of stockholders and directors, Oct. 20.

James Matthews, of Shenandoah, Penn., has been reelected president of the ninth district of the United Mine Workers by a vote of 10,564 against 4338 for Thomas Butler, of Jirardville.

Arthur Mitchell, who has been inspector of mines for the state mining department of West Virginia for the last five years, has resigned to become superintendent of the Marvin Colliery at Matewan. He will enter upon his new duties on Nov. 1.

Myron G. Doll, for several years local manager of the Sullivan Machinery Co.'s office at Salt Lake City, has resigned, and H. E. Moon, heretofore associated with the Denver office of the same company, has been appointed as his successor.

Frank E. Getts, on Oct. 20, took charge as district sales manager of the Chicago office of the Alberger Pump & Condenser Co., of New York. Mr. Getts is well known throughout the United States in connection with important steam turbine installations.

James Abercrombie, mine superintendent at Browder, Ky., for the Muhlenberg Coal Co., suffered an accident at the mine recently which may result fatally. A fall of earth upon a timber in the shaft, upon which he was standing, caused him to fall to the bottom of the shaft, which is about 75 ft. deep. He is believed to be injured internally.

OBITUARY

Edwin M. Crickmer, an extensive coal operator of West Virginia, died Oct. 22 as the result of an injury received in the mine ten years ago. He had been an invalid for a number of years, but his condition was not thought serious until shortly before his death.

H. D. Dennis, president of the Morgan Run Coal Co., of Coshocton, Ohio, died at his home in Cleveland recently at the age of 62 years. For more than 30 years he was connected with the Morgan Run Coal Co. and was one of the best-known coal men in the state.

Gordon C. Wilson, a well known operator of Pittsburg, Kan., fell dead recently at Joplin, Mo. Mr. Wilson was visiting a friend when the attack came, and death was instantaneous. The operator was 38 years old and was interested in several mines in Pittsburg.

Thomas Longstaff, who has been connected with the St. Bernard Mining Co., at Earlington, Ky., for nearly 40 years, died recently at that place at the age of sixty-six. He was buried with Masonic honors. He is survived by his widow and a number of children and grandchildren.

CONSTRUCTION NEWS

Pana, Ill.—The Peabody Coal Co. has started the work of building at Kincaid, about the middle of Christian County, a large power house to furnish electricity to many central Illinois industries.

Butler, Penn.—The Blackstone Coal Co., now holding options on 20,000 acres in Forward and adjoining townships, will soon begin work on a large colliery near Buhl Station on the Baltimore & Ohio R.R., and a new town will be established there. Two additional collieries will be located near McBride.

Sterling, Ill.—The Chicago & Northwestern Ry. is building roads into every coal district which may be easily reached from the main line. The officers and directors have been authorized to extend the line from Girard and Benld 10 miles into Madison County, Ill., also a line into the coal territory west of Miami, Iowa.

Minneapolis, Minn.—The Pittsburgh Coal Co. has plans for the construction of one of the largest, if not the largest, coal-storage plants in the United States. The capacity will be between 20,000 and 25,000 tons. A concrete wall will be put along the sides of the yard, and a "clamshell" handling plant will be installed. It is expected that work upon this plant will be begun early next year.

St. Charles, Va.—The Electric Transmission Co. has been purchased by Samuel Insull, of Chicago, who controlls a large number of public utilities all over the country. The plant will be enlarged at once for the purpose of providing for a much larger production of current. Mr. Insull proposes to utilize the large coal fields in the vicinity of St. Charles for the cheap production of electricity for long-distance transmission, as well as for use in mining operations in southwestern Virginia.

Uniontown, Penn.—Improvements aggregating $90,000 are under way by the Brownsfield-Connellsville Coke Co. at its Martha and Marie mines at Tarr Station, Westmoreland County. Among these improvements are new tipples which are being built at an approximate cost of $12,000 to $15,000. Also 72 new ovens are being erected by the company at the Myers plant. The Wineland-Gilmore Coal & Coke Co. is installing a new plant at Smithton, Westmoreland County. This firm owns approximately 100 acres in its Smithton tract, and is putting in a plant of 60 bank ovens with facilities for shipping both coal and coke. The Luzerne Coke Co. is erecting 36 bank-type ovens at its plant on the Monongahela River between Brownsville and the LaBelle Coal & Coke Co.'s plant.

Cabin Creek Junction, W. Va.—The Virginian Power Co. through its secretary, Wilbur Tusch, is offering an issue of $1,250,000 of its notes, for the purpose of securing funds to complete its steam-power plant and transmission lines by which to handle the electric current which it will develop. The company is said to be constructing its steam plant with a view to developing 26,000 hp., which will be sold to mines in that section, of which there are 222 within transmission distance of the plant, producing more than 19,000,000 tons of coal annually. The company states that it has numerous contracts to furnish electricity to these mines. A future project to be developed by the company is a hydro-electric plant on the New River, which will require a 1400-ft. dam, 125 ft. in height, in order to develop 100,000 kw. Other power sites are controlled by the company on New River, and it contemplates ultimately to transmit electric current to several of the larger cities within a radius of several hundred miles of its plants.

NEW INCORPORATIONS

Williams, Okla.—W. T. Henry, G. T. Williams and S. H. Abbott have incorporated the Williams Coal Co. here, capital $1000.

Dallas, Tex.—An amendment has been filed by the Belknap Coal Co., of Wichita Falls, decreasing its capital stock from $200,000 to $150,000.

McAlester, Okla—The McAlester Coal Co. was recently incorporated here with J. G. Puterbaugh, C. H. Hightower and James T. O'Leary as incorporators.

Coalton, Okla.—The Herron Coal Mining Co., capital $20,000, has been incorporated with W. F. Herron, W. P. Russe and George Arbaugh as incorporators.

Seattle, Wash.—The McKay Coal Co. has been organize with a capital stock of $1,500,000. The incorporators ar Jos. J. Henry, Elmer C. Johnson and A. Welch.

Chicago, Ill.—The Scioto Collieries Co., with a capital o $50,000, has been organized to mine coal and manufactur coke. The incorporators are E. S. Cummings, T. J. Tarne an E. Colgan.

Richmond, Ind.—The Alley Monarch Mining Co. has bee incorporated here, with $50,000 capital stock, to do coal min ing. The directors are J. W. Alley, H. L. Monarch and Fre Hackman.

Charleston, W. Va.—The Laurel Hill Coal Co. has bee organized with a capital stock of $40,000, $5000 subscribe and $500 paid in, to do a coal-mining business in Lincol County. The incorporators are W. C. Walburn, J. H. Ma cum, M. L. Duncan, T. R. Walburn and J. A. Wood, all o Huntington.

INDUSTRIAL NEWS

Martinsburg, W. Va.—Several Martinsburg gentlemen headed by H. H. Emmert and W. A. Roush, have completed a deal for 1000 acres of land in Shelby and Fayette Counties Ill. An 8-ft. bed of coal runs through the property.

Johnson City, Ill.—The Link Belt Co., of Chicago, was re cently awarded the contract to put in the screens at the Lak Creek mine of the Consolidated Coal Co., of St. Louis. Thi mine has a tonnage now of 500 tons, getting out of the de velopment stage.

Wheeling, W. Va.—There will be a special meeting of th stockholders of the Wellsburg, Bethany & Washington R.R Co. on Nov. 12 in this city. This meeting is called for th purpose of considering the sale of valuable coal lands owne by the company.

Clarksburg, W. Va.—The Hutchinson Coal Co. has take over the holdings of the Short Line Coal Co., consisting of mine and 200 acres of coal at Dola, on the Short Line R.R between Clarksburg and New Martinsville. The new owner will put in a first-class mining plant.

Charleston, W. Va.—Awaiting a rise in the Ohio River 390 barges carrying 5,000,000 bu. of coal were assembled Oct 24 at the mouth of the Kanawha River ready to go through Lock 2 as soon as the stage should be sufficiently high to float them down to Cincinnati and Southern points.

Dubois, Penn.—The opening of traffic on the Pittsburgh & Shawnut R.R., between Kittanning and Brookville, was accomplished on Oct. 20, when the first train was run. This new road traverses a territory which has hitherto been dif ficult of access, but which is, nevertheless, thickly populated

Ebensburg, Penn.—Acting for others, A. W. Buck, of this place, purchased all the coal land, machinery, buildings and equipment of the Auld Run Coal Co. at forced sale. The coal lands lie in the Brushvalley district, in Indiana and Cambria Counties. It is understood that the mines will be reopened and operated on an extensive scale.

Connellsville, Penn.—John A. Bell and associates have purchased the property formerly owned by the Washington County Coal Co. lying in Jefferson Township, Washington County. This consists of about 800 acres of Pittsburgh coal and surface upon which the Cedar Grove mine was opened about five years ago. It is understood that necessary repairs will be made and the mine reopened shortly.

Reynoldsville, Penn.—A coal deal, which is regarded as one of the largest ever put through in Indiana County was practically consummated when the Manor Real Estate & Trust Co., of Philadelphia, secured the holdings of the Greenwich Coal & Coke Co., a tract of something over 27,000 acres in Green and Buffington Townships. The consideration is not known, but it is said that the figures will run well up into the hundreds of thousands of dollars.

Pittsburgh, Penn.—In September the Pennsylvania lines east of Pittsburgh and Erie carried 6,319,382 tons of coal and coke, an increase of 404,055 tons. Bituminous tonnage increased 471,873 tons, coke increased 54,338 tons, and anthracite decreased 122,156 tons. Coal and coke tonnage for nine months totaled 56,208,756 tons an increase of 5,125,517 tons. Bituminous tonnage increased 3,660,264 tons, coke increased 1,188,070 tons, and anthracite increased 277,183 tons.

COAL TRADE REVIEWS

GENERAL REVIEW

Market fails to show a further expansion. October busiess in anthracite below the average. Confusing cross curents and uncertainties in the bituminous situation. Market howing a softening tendency which is compensated for by ecreased shipments due to restricted car supply.

Despite important restraining influences, such as a reapse into unseasonable weather conditions, increasing conervatism in general business, and a continuation of the ecord-breaking movement of coal, there has been nothing more serious developed than a mild lull. Even this is rearded as more or less temporary, and is the inevitable acompaniment of a protracted between season's market; no urther expansion is anticipated until the trade definitely urns the corner and enters upon the winter's activity. On he other hand, uncompromising adherence to regular schedles is the rule with the leading producers and no element f infallation is perceptible at any of the large distributing enters.

In anthracite the mild weather is tending to hold down the emand, but a cold snap will soon create an active situation. Stove coal is in short supply, and is the feature of the market; aside from this there are quite a number of complaints about the poor business during October, which is ordinarily a big month in the hard-coal trade. Production has been curailed by an inadequate supply of cars, a rather unusual eature in anthracite at this period of the year.

The bituminous market is subject to confusing cross-curents and uncertainties. The situation at New York has firmed up to such a degree that an advance in quotations is necessary. On the other hand, New England reports a general ack of interest on the part of buyers with orders confined chiefly to extensions of previous sales. In spite of an inadequate car supply and a poor movement, there is plenty of coal at tide. In view of the fact that production is well covered by contracts it is thought that there is not sufficient free coal on the market to seriously effect the situation.

Decreased requirements in the iron and steel industry in he Pittsburgh district has curtailed the industrial consumpion, but retail demand has, on the other hand, been stimuated by the recent fall in temperature; while the general market is strong at the moment, it is generally felt that a certain weakness cannot be avoided when the lake shipping closes. Ohio continues reporting a consistently strong market, due probably to the acute situation in transportation. The new advanced price level is being firmly maintained with the tendency, if anything, toward a further increase.

The car shortage is also a controlling factor in the Midile Western situation, and there is a general feeling of uncertainty pending further developments. There is a brisk demand, while the lack of equipment is having a steadying nfluence, but the volume of business is not so large, and two or three weeks of mild weather will cause many cancellations.

BOSTON, MASS.

No material change in Pocahontas and New River. Transportation beginning to reach Hampton Roads with something like regularity. Georges Creek in light demand but the better Pennsylvania grades continue fairly firm. Stove size increasingly short and anthracite generally in firm position.

Bituminous—The mild situation of a week ago continues without material change. There is a general lack of interest here in Pocahontas and New River not only for spot shipment but for a month ahead and what orders come in are chiefly extensions of previous sales; $2.85 is frequently heard now as a price at which surplus tonnages are being moved at Hampton Roads and while some of the operating interests are able to command 5@10c. more the amount of the business is small and hardly significant. Transportation is just beginning to arrive with something like regularity.

New England, is taking things easily and nothing short of pinch conditions would stir up any active interest in Southern coals. Some large consumers are even seeking to have contract shipments postponed. The inland trade is well supplied and there is little inquiry; 130,000 tons arrived in Boston in one day last week.

From being the scarcest grade in the market, Georges Creek has lately come to tide in good supply and consumers are being urged to accept deliveries on contracts. So many consumers, however, had arranged for Pennsylvania when Georges Creek was not to be had that the outlets are now rather narrower than would have been supposed.

The Pennsylvania grades, especially, the quality coals, continue to show a firm undertone, with prices little changed. Most of the Cambrias and Somersets find a ready sale and the better coals from Clearfield may be included in the same list.

Anthracite—An increasing number of shippers are curtailing the proportion of stove size in any one cargo and notwithstanding frequent warnings many of the Eastern dealers have calmly taken on liberal supplies of egg and nut hoping for better shipments on stove as the season advanced. They now find themselves in a hard place, with stove almost as scarce as a year ago. The mild weather is holding down the demand at retail but given a cold snap there will be something of a strained situation. Stove is already commanding a premium f.o.b. with some of the individual shippers and there is likely to be more of the same talk as November comes along.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.65	$1.30@1.75	$1.67@1.77	
Philadelphia*	2.30@2.90	2.55@3.00	2.92@3.02	
New York*	2.60@3.20	2.85@3.30	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.95
Providence†				3.73@3.88
Boston†				3.83@3.93

*F.o.b. †On cars.

NEW YORK

Cold snap of last week stimulated retail anthracite; wholesale continues moderately quiet, but with an excellent undertone. Bituminous improved and quotations advanced. Supplies at tide relatively low.

Anthracite—The warm weather continues to have a restraining influence upon the hard-coal situation, but the cold snap of last week had a stimulating effect on the retail businees, which is still in evidence. The market continues to be a weather proposition. But even as it is, the mines are working up to full capacity and the production is so heavy that there are reports of a car shortage at some points. An active situation is anticipated when the cold weather does appear.

Stove coal continues the leader in the market, and is in short supply at all points. Chestnut is improving and is moving much better, while egg is heavy. The steam sizes are being well taken care of. The better grades of No. 1 Buckwheat are in short supply and active with the poorer grades quiet. The good grades of No. 2 Buckwheat are still short, while No. 3 is easy on all kinds with the poorer qualities notably heavy.

We quote the local hard-coal market slightly higher as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.50	5.20	5.20@5.45
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.40@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.75@2.20
Barley	1.75	1.75	1.70	1.50@1.70

Bituminous—A slightly stronger tone is noticeable in the local soft-coal market due probably to both interruptions of work in the mining regions and to transportation. Water shipments were seriously restricted for a time due to inclement weather, but the situation in this respect is much relieved at the moment. The stocks at tide are reported relatively small and there is the feeling that better prices are inevitable when the turn in the weather conditions is finally realized.

On the other hand, it is believed that the consuming interests are much better stocked than ordinarily; in fact, it is pointed out that the liberal stocking on the part of the railroads has been the cause of the market being so well maintained throughout the summer. The car supply continues moderately short, but it has not become any worse so far as can be seen.

In view of the improved condition in the market, we quote all grades somewhat higher this week as follows: West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

PHILADELPHIA, PENN.

Complaints of slow business in anthracite, as compared with previous years. Trade as a rule apathetic, but production heavy and the movement good. Broken coal out of the market.. Car shortage developing.

The weather is still the determining factor in the situation in this vicinity. The retail-market orders are coming in very slowly outside of the demand for stove coal. As a matter of fact, many dealers are complaining about the lack of business, and compared with previous years, October does not look as favorable. As a rule, this month usually sees a heavy business both with the wholesale and retail dealers; the apparent apathetic condition of the trade can be traced entirely to the unusual weather conditions, and no activity is looked for until there is a change in this respect.

Egg and chestnut coal still seem to be in easy supply; pea coal is picking up, but broken and stove are the only sizes for which there is an active demand. It is almost impossible to secure any tonnage of broken coal unless at the full circular price; this size is contracted for at the beginning of the season and many of the companies report that they are behind on deliveries, so that it is manifestly impossible for them to consider any additional business, even at the full circular prices.

One still hears of discontent due to the imposition of the state tax, but up to the present, no concentrated effort on the part of the retailers has been made to saddle it on the consumers; most of the dealers are still absorbing it.

Operations at the collieries has been much handicapped during the past week, with an unusual car shortage. This has been growing more acute weekly, and nearly reached a point during the past week, when it would prove more than serious.

Bituminous trade is about on a parity with the week previous. There were no unusual advances in prices and no reports except that all grades were holding their own, with the demand excellent, and production about equal to the call.

BALTIMORE, MD.

Weakening tendencies exhibited by the market. The Western demand showed a decline for the first time. Warmer weather conditions take away the prop of the previous week. Cars in rather poor supply.

The past week showed indications that the market would soon take a drop. Demand was the lightest for many weeks past, and despite a rather poor movement, due to restricted car supply, there was plenty of fuel at tide to meet all calls.

Concerns here with West Virginia connections reported that the rush of three-quarter gas coals toward the Great Lakes had slowed up to a considerable degree. Congestion at the shipping centers was given as a reason, and it is said that about all the fuel is now on hand that can be conveniently handled. A vast amount of coal is reported on cars at the lake ports. Fuels that had been bringing from $1.15@1.20 f.o.b. mines are now offering about 10c. off: Run-of-mine coal in West Virginia was offered down to the dollar mark, although most sales were above that figure.

Pennsylania steam coals are reported in poor demand, with railroad orders generally scarce. Sales are made around $1.20@1.25 that several weeks ago were bringing $1.35@1.40. It must be said, however, that there is not any great quantity of the coal not under contract, and the lull is probably more or less temporary.

As a whole the market is expected to pick up rapidly soon, unless there is a decided change for the worse in general industrial conditions. Warmer weather the past week undoubtedly took away the prop that had kept the market from a slump a week earlier.

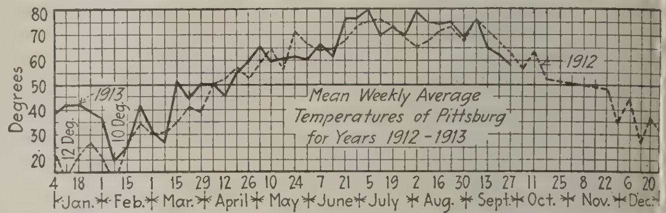
Anthracite conditions are normal, a fair call being noted for steam sizes, and the prospects being good for domestic coals when the first real winter weather appears.

PITTSBURGH, PENN.

Somewhat decreased industrial demand for coal, with increased demand for domestic, and occasional price advances in the latter. Car supply poor. Shipping stage in Ohio River permits dispatch of large fleets to down-river points. Connellsville coke market stagnant, with prices nominally unchanged.

Bituminous—There has been a considerable decrease in the fuel requirements of the iron and steel industry; in the past week or two there has been a decided slowing down and the prospect is clear for further curtailment of iron and steel output in the future. At present the mills are running at about 80% of capacity, but they are curtailing their supplies of all sorts in greater ratio, in view of the prospects.

Retail demand for coal, on the other hand, has increased, and some operators have made a further advance in 1¼-in. domestic, so that occasionally there are quotations above $1.75. A few have also marked up slack. Car supply continues poor. At the moment the coal market is fairly strong, but some decrease in strength can hardly be avoided when the Lake shipping season closes. We quote for prompt and near-forward delivery: Slack, $1@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in. domestic, $1.65@1.75, per ton at mine, Pittsburgh district.



A rise in the rivers permitted shipments down the Ohio to begin Sunday, Oct. 26. On that day the Monongahela River Consolidated Coal & Coke Co. sent out six fleets of 22 barges each and three with 17 boats each, while the Diamond Coal & Coke Co. sent two fleets of 10 barges each, the total shipments amounting to about 33,866,000 bushels, or about 150,000 net tons, and additional shipments are being made as steamboats become available.

Connellsville Coke—The market continues altogether stagnant. There is no disposition to increase pig-iron production but rather to curtail somewhat. The operating furnaces are all covered by contracts and the disposition of operators is to overship, so that practically no demand comes into the market for prompt coke. No one is disposed to consider seriously the question of contracts for the new year. The market remains quotable: Prompt furnace, $2@2.15; contract furnace (nominal), $2.25@2.50; prompt foundry, $2.75@3; contract foundry, $2.75@3.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 17 at 379,605 tons, a decrease of 7285 tons, and shipments at 384,01[illegible] tons, a decrease of 5932 tons.

Later—The group of Connellsville coke operators who have been holding out for the $2.50 price on furnace coke have abandoned their efforts and will now meet the market. They have just sold 10,000 tons to an Eastern steel interest at $1.90 for November shipment, and the furnace coke market is now quotable on the basis of $2@2.15 for prompt or contract, with possibilities of a still further shading.

BUFFALO, N. Y.

Bituminous not so firm, but prices holding. Light demand due chiefly to warm weather. Coke continues weak. Anthracite affected by the lack of seasonable weather.

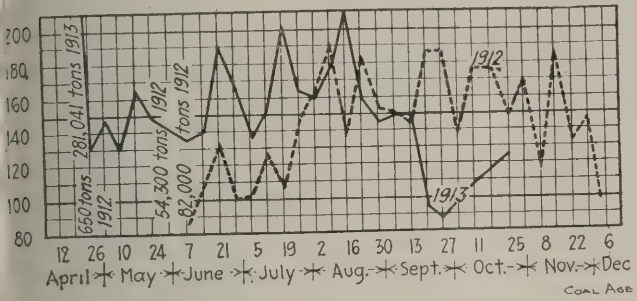
Bituminous—Soft coal is still on its former footing, but as a rule there is a report of general weakness everywhere, with prospects of a decline in prices if the weather continues mild. So far as can be learned the weakness is entirely on account of the weather. The reports of slackness now are not by any means general, but are more common than they were and must be accepted as not without meaning.

The car situation is without any change. The supply is smaller than ever before, not being more than 60 per cent of the demand on some of the leading coal roads. On the other hand, certain more local lines are providing cars promptly. The reports of strikes and lockouts increase, which, of course, offsets, in a measure, the alleged dullness in general business. There are said to be 800 miners on strike at Rossiter in the Clearfield district over the preparation of the coal and strikes and lockouts are reported in the Bessemer district, caused by the operators opposing the efforts of the men to unionize the mines. These difficulties are local, but they reduce the coal output while they last. The mine owner without coal enough to meet his contracts is not finding it easy to pick up extra tonnage.

Quotations on bituminous remain at $2.90 for Pittsburg lump, $2.80 for three-quarter, $2.65 for mine-run and $2.2[illegible] for slack, the latter being very firm; some jobbers say it will sell on a par with mine-run before long.

Coke—The coke market is weak, especially for low grades. While Connellsville 72-hr. foundry is fairly steady at $4.8[illegible], it is not easy to obtain $4.35 for 48-hr. furnace; stock coke is a drug, though it is not very plentiful.

Anthracite—The weather has been unfavorable in the an- acite trade also, but the movement is fair. Shippers are adily short of stove, while they have a surplus of egg. If stomers order straight stove or stove and chestnut they 1 the risk of being refused till they include about an even ount of egg. It is likely that the price of stove will event- tly be advanced to a par with chestnut.



ANTHRACITE SHIPMENTS FROM BUFFALO

The effort to accelerate the anthracite movement by lake only partially successful, as the mines are not producing fficient. The shipment from Buffalo by lake for the week as 125,400 tons, which is some hundreds of tons short of idsummer shipments. Still, with six weeks more before e lakes close, the supply at upper-lake ports ought to be least fairly satisfactory. The fleet has been held up con- derably of late by storms.

TOLEDO, OHIO

Cool weather stimulated domestic buying. Prices showing 1 upward tendency. Car shortage seriously interfering with roduction.

Coal is strengthening on this market, and the past week as noted some changes in the list, all with an upward trend. is generally believed that prices will be still higher. The cent cool weather has brought about a better domestic emand and the call for steam coal has been good all along. he car situation is tight with little prospect of an improve- ent for some time at least. There is a decided hold-up om southern Ohio coal fields, and this, of course, affects the ke shipping. Cargoes are not as heavy as is usual at this eason of the year for the reason that there is little or no oal on the docks which can be moved. The railroads are ading fully 50% hopper cars which are extremely objectionble to most of the trade, and whenever possible dealers are efusing to place orders in the hope that a little later flat- ottom cars can be obtained.

COLUMBUS, OHIO

New higher prices have been well maintained. Demand or all grades continues good and the production is limited nly by the car supply. Colder weather stimulates domestic rade.

The past week has been one of advancing prices and con- inued good demand in all the mining districts. The new evels announced a week ago have been well maintained and o price cutting of consequence is reported. In fact the tend- ncy is toward premiums rather than discounts and all in- erested in the trade believe that prices have not yet reached heir high point. Demand for domestic, steam and lake onnage continues strong.

Pressure in the retail trade has been largely responsible or advancing prices, as jobbers in every section are placing rders requesting immediate delivery. Stocks are generally ight and every effort is being made to increase them to ortify against a shortage when the severe weather comes. Dealers are getting higher prices than usual for the time f the year and the demand is running more and more oward the fancy grades such as Pocahontas and re-screened arieties.

The car supply is growing less and less and as a result the utput is being decreased. According to reports received rom all mining districts, Eastern Ohio only produced. 50 er cent. of the average and the Pomeroy Bend district howed up about the same. The Hocking Valley reports bout 55 per cent. of normal and the domestic fields are no etter.

Lake trade is active and will probably continue so as long s navigation is open. The tonnage is falling off but this is natural result of the increased domestic demand and the rowing car shortage. The larger operators which engage in he lake trade will probably ship a greater tonnage than last year. Congestion on the upper lake docks is not great and the interior movement is good.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$2.00 @ 1.90	....	$2.00 @ 1.90	$1.75 @ 1.70
3-4 inch............	1.85 @ 1.75	$1.50 @ 1.40	1.85 @ 1.75	1.55 @ 1.50
Nut...............	1.30 @ 1.20	....	1.60 @ 1.55	1.25 @ 1.20
Mine-run...........	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.25 @ 1.20
Nut, pea and slack..	0.90 @ 0.85	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack........	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.70 @ 0.65

DETROIT, MICH.

Bituminous steady after a slight reaction. End of month develops some business. Conditions not materially changed.

Bituminous—There has been little change in the local situation, and prices are being well maintained all along the line. There are unconfirmed reports of some producers seeking extra business who have made concessions in one way or another, but such business cannot be considered as the real market.

In the domestic market, smokeless coal is quiet. There seems to be a slight over-supply of this grade, and diversion and reconsignment of shipments to other points have ceased. This slowing down in business is giving the operators a welcome opportunity to increase shipments in the Lake trade from which there is a heavy demand. The semi-smokeless coals are bringing nearly Pocahontas prices; large stocks of these grades have been bought for domestic purposes, and now that Pocahontas is easier in the market, it is rather difficult to dispose of.

The market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	....	....	....	$2.50	$2.50
Egg...........	1.65	....	....	....	....	2.50	2.50
Nut..........	1.50	....	....	....	....	....	....
Steam lump....	1.50	....	....	....	....	....	....
¾-in. lump......	1.15	$1.20	$1.15	1.10	1.10	....	....
Mine-run.......	1.10	1.10	1.10	1.10	1.10	....	....
Slack..........	0.85	0.85	0.75	0.75	0.75	....	0.85

Anthracite—Hard coal shows some briskness, due to a fall in temperature and the anxiety of dealers to accumulate an adequate supply before the winter's demand opens up. Jobbers, however, are not anticipating a very large business before the middle of the current month.

LOUISVILLE, KY.

Fall in temperature stimulated activity in the domestic grades. Steam coals also strong. Eastern Kentucky companies handicapped by poor car supply. Screenings weak.

Some rather snappy weather during the week past resulted in the usual flood of small orders which was reflected immediately to the mines and made business good on the prepared grades everywhere. The earliest snow in years fell through Kentucky on Oct. 21, and the number of small consumers who were caught unawares made things active for several days.

The steam market is also much stronger than a week or so ago, especially on eastern Kentucky coal. Prices are not especially high, considering the season, but the relatively limited supply of the better grades keeps the demand well balanced. About 80c. a ton f.o.b. mines is the average price, with second grades, including eastern and western Kentucky, from 15c. to 20c. lower.

A number of eastern Kentucky operators have lost about one-third time lately on account of the poor car supply, and it is extremely unlikely that this condition will improve as the season advances. Experience has proved to the contrary, and operators are, therefore, doing their best to prepare for a material shortage in transportation facilities.

As indicated, prices are improving all along the line. The November basis for eastern Kentucky coal is about $2.35 a ton for block, with isolated sales as high as $2.50 a ton, the second grades ranging from $2.10@2.25 a ton. The demand for western Kentucky domestic is also improving, block being strong at $1.25@1.40 a ton f.o.b. mines. There is little mine-run coal moving in any portion of the state.

HAMPTON ROADS, VA.

October will be a big month at the Hampton Roads piers. Shortage much easier than for some time. Domestic business beginning to open up. Rumors of a new big coal consolidation.

Shipments of coal over the piers at Hampton Roads continue brisk; large cargoes have moved coastwise and foreign, and the call for bunker coal has also been heavy. Present indications are that all piers will show up with a large tonnage dumped during the entire month, and unless the unforeseen happens the piers at Sewalls Point will again break their record. In addition to the movement of Pocahontas and

New River there has also been some shipping of high volatile and nut and slack coals to the New England market. Prices on all grades remain practically the same as they have been for the past two or three weeks.

There is a fair accumulation of coal at tidewater, and while some suppliers are short others have sufficient to take care of tonnage now due with some little free coal. Several large cargoes have been sold during the week and Government colliers have taken in the neighborhood of 30,000 tons in addition to the coastwise and foreign shipments. Vessels taking foreign cargoes have cleared for Havana, Santiago, Dakar, Trinidad, Cavite, St. Lucia, Canal Zone and Curacoa.

Reports are current here that negotiations have been closed by an English syndicate for the purchase of extensive coal properties in the New River fields of West Virginia. It is impossible, however, to get the report confirmed here. One of the largest companies mentioned as having been purchased have given out the statement that so far as they are concerned the report is without foundation.

Owing to the fall in temperature during the last few days retail business has picked up considerably although there is yet some complaint among the dealers as to poor sales. There has been no advance in prices for domestic grades, summer rates still prevailing.

BIRMINGHAM, ALA.

Demand for steam coal quiet, but domestic improving, due to the recent cool weather. Practically no furnace coke moving. Foundry coke quiet with sales limited to small shipments. Some improvement in blacksmith coal. Pig iron dull, though price is holding up well. Car shortage still evident.

The past week has brought no relief to the stagnant steam-coal market, the production being in excess of the demand, though none of the operators are making concessions in prices, believing this condition to be only temporary. Due to the recent cool weather, the domestic lump has taken on a more cheerful aspect, though the market is far from being satisfactory. Inquiries on blacksmith coal are increasing, and business on that grade is the most satisfactory of any.

There is practically no furnace coke moving out of this district, and foundry coke only in small quantities. Pig iron is very quiet, few sales being made during the past week, though at a better price than formerly, the basis being strictly $11.50 per ton on 2 Foundry for the balance of this year. Very little tonnage was booked for next year. While it would seem that the car supply would improve, with the quiet business, there is little change over last week. Some of the railroads are taking care of their mines fairly well, but those on the Southern Railway are suffering greatly for the lack of cars.

NEW ORLEANS

New coal transportation company announces big cut in prices. Completion of government work on Warrior River opens all water route for Alabama coal into this port.

While it has not been proved that coal can be brought to New Orleans from the Alabama fields by water at a cheaper rate than by rail, there is no question that the up-river Mississippi interests are worried. The formal announcement this week, by the president of the transportation company, which expects to handle this business through the Warrior, Tombigbee and Alabama Rivers, that coal would be sold in New Orleans 50c. under the present price, has caused something of a flurry.

The working out of the experiment is being watched with the greatest interest. It is suggested that this is the reason for the delay in the preparation for export business that could be brought to this port after the opening of the Panama Canal. There are seventeen locks to be passed in the Warrior River and whether the big self-propelled brages will be able to handle this business as cheaply as is expected remains to be seen.

INDIANAPOLIS

Notwithstanding mild weather, domestic trade continues good. The call for screenings not yet back to normal. Complaint about the car situation continues. Mine operations are cut down. There is little heavy demand, however, among consumers, on account of this situation.

The little spurt of cold weather was helpful to the coal trade, especially the retail department, but it has been succeeded by another mild spell. The short car supply is a large factor in the trade, yet the situation does not seem to differ much from that existing any year at this time. It is true, however, that it is affecting mine operations to the extent of about 30% in this state.

The screening situation does not improve much, and operators are puzzled as to why it does not get back to normal. Industrial conditions in the state seem to be about as active as usual and the mild weather is not regarded as a weighty factor. It is believed by some that the large Chicago agencies are buying at outside points to give the Indiana mines the impression that they are not in the market. The domestic situation is strong. Supplies of Eastern coal are slow to arrive, but this is not causing distress yet as yard stocks seem to be of good size. In fact, if the mild weather keeps up two or three weeks, there will be many cancellations of orders. The following range reflects Indiana prices f.o.b. mines:

Mine run No. 4	$1.10@$1.35	Domestic lump No. 5 & 6	$1.50@ 1.75
Mine-run No. 5 and 6	1.05@ 1.10	Screenings No. 4	0.60@ 0.90
Nut	1.25@ 1.35	Screenings No. 5 & 6	0.50@ 0.60
Egg	1.40@ 1.60	Brazil block	2.00@ 2.25
Domestic lump, No. 4	1.75@ 2.00	Washed coal at premium of 25c. a ton	

The chief trouble now is in the car shortage due, apparently, to the lack of motive power. A committee of operators sent a communication to the commission stating that in more than 200 instances, coal equipment had been held for weeks in Indianapolis yards while the mines were suffering for cars, also that 350 carloads of coal are on track in this city almost every day and there is no power to move them. The commission learned that the New York Central and Pennsylvania companies are contemplating a belt line around the city, which would eliminate the congestion of freight traffic.

CHICAGO

Demand continues brisk, but sales are somewhat less than customary for this time of the year. Shrinkage in the car supply has tightened the market on Eastern coals. Demand for gas-house and byproduct coke materially increased. Carterville operators report heavy buying of all sizes. Heavier sales of anthracite.

While the demand for coal in the Chicago market continues brisk, the general volume of business is somewhat under the records for October in previous years. A shrinkage in the car supply is the chief factor in the Eastern coals in this market. The position of the smokeless grades, especially, has been strengthened on this account. There has been a distinct revival in the buying of this coal and a previous wavering tendency in the market has disappeared.

A greater demand in the Western market and a lessening in the supply of freight equipment has caused the additional strength noted in the anthracite trade. Chestnut continues to be short of the demand. It is estimated that Eastern operators are obtaining about one-half the cars they need and that the supply for Western producers ranges between 60 and 75%.

Small shipments of Hocking coal has created an unsatisfactory condition in this section, and the supply falls short of demand by a substantial margin. Additional firmness is reported in the coke market. There has been a marked increase in orders for gas-house coke and the byproduct variety is in greater demand. The latter now sells at from $4.90@5.10. Similar strength is lacking so far as furnace and foundry coke are concerned. The recent announcement of E. H. Gary, chairman of the board of directors of the United States Steel Corporation, that there will be no shutdown of the mills at Gary, Ind., however, has given operators increased confidence in the future.

A strong demand for all sizes of Carterville coal has been reported by operators in that district. Domestic lump and No. 1 washed sell, as a rule, at $2 a ton, the mines. A considerable amount of egg is being sold at high figures for retail consumption. In the territory surrounding Franklin County, domestic lump is selling at from $2@2.25, the mines, while in districts farther distant prices are somewhat under these figures. Springfield operators have failed in their effort to boost the price of domestic lump to $2, and it is now firm at $1.75.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.12@1.22	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byproduct, egg and stove, $4.90@5; byproduct, nut, $4.95@5.10; gas house, $4.65@4.75.

ST. LOUIS, MO.

Market uncertain pending further developments. Car shortage having a steadying effect. Anthracite moderately active. Steam coals heavy.

An unsteady market for the past week has kept the trade in a somewhat uncertain channel, expecting that every day would bring something to base future prospects on. The weather has been mild and the anticipated demand and advance in price did not come.

Che only thing that stimulated the market at all was the shortage, which became more pronounced the past week, has a somewhat serious aspect now. On the Illinois Cen- the mines are now getting about two or two and a half s per week, the C. & E. I. about three days a week, and Iron Mountain about the same. The roads from the inner ls are in somewhat the same trouble, the Southern giving mines about two days a week, the L. & N. about three, the & O. four, and the Vandalia five. The Wabash is in pers the worst condition of all, for what little equipment they e is usually in bad order.

There has been a fair demand the last week or so for anacite, especially in the larger sizes. Gas-house coke is in some demand but byproduct is a drug. Smokeless is ving better than was anticipated. The local steam market still dragging and Standard coal when averaged up is ely bringing the cost of production.

The prevailing prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
. lump	....	....	....	$1.10@1.20
. lump	....	....	$1.50	....
. lump	$1.75 @ 2.00	....	1.60	1.40@1.50
np and egg	1.50 @ 1.60	$2.25	....	....
. 1 nut	1.50 @ 1.75	....	....	1.10
eenings	0.50 @ 0.60	....	....	0.20@0.25
ne-run	1.10 @ 1.20	....	....	0.90
. 1 washed nut	1.80 @ 1.90	....	1.40	....
. 2 washed nut	1.30 @ 1.40	....	1.60	....
. 3 washed nut	1.10 @ 1.15	....	....	....
. 4 washed nut	1.05 @ 1.15	....	....	....
. 5 washed nut	0.35 @ 0.40	....	....	....

KANSAS CITY, MO.

Weather conditions favorable. Gas supply still limited. ll-time operations general.

A sudden drop of the thermometer was responsible for a sh during the past week. Though the cold weather was ort lived, people who had about made up their minds to get ong with gas during the coming winter promptly decided at a change of attitude was necessary. Practically all dered coal and indications are that demand will continue rong during the next few months.

Many plans have been advanced to increase the available pply of natural gas here, but none is regarded as practicle. Officers of the piping company assert that the supply is stricted, and the coal situation is being benefited to a arked extent. All mines are working full time with the ception of a few which close down occasionally because the shortage of transportation facilities.

OGDEN, UTAH

Warmer weather throughout territory has affected shipents. Shortage of coal in Colorado has absorbed surplus at ock Springs. Car shortage in Wyoming continues, but sitution in Utah has improved. Quotations advanced in southern alifornia, Nebraska and Colorado.

The entire intermountain territory has been enjoying ideal ll weather and the demand for coal has slacked off somehat. However, the mines still have plenty of lump orders to eep running at capacity. The sugar factories and other eam plants are consuming all the slack and steam coal prouced at the mines. At the first of this week there were inications of a surplus of nut coal at the Wyoming operations, ut the unusual demand in Nebraska and Colorado allowed e operators to move a larger percentage of this grade into e Eastern market.

A partial car shortage continues in Wyoming, and most the mines are losing some time on this account. It seems ere are plenty of box cars, but open cars for loading slack re very scarce. The conditions in Colorado has assisted the tah mines, which at present are working full time.

Quotations for southern California have advanced to: ump, $3; nut, $2.50; mine-run, $1.85; slack, $1. Shipments to ebraska and Colorado are above normal and quotations are ow: Lump, $3; nut, $2.25; mine-run, $1.85; slack, $1. The alance of the territory remains at: Lump, $2.75; nut, $2.25; ine-run, $1.85; slack, $1.

PRODUCTION AND TRANSPORTATION STATISTICS

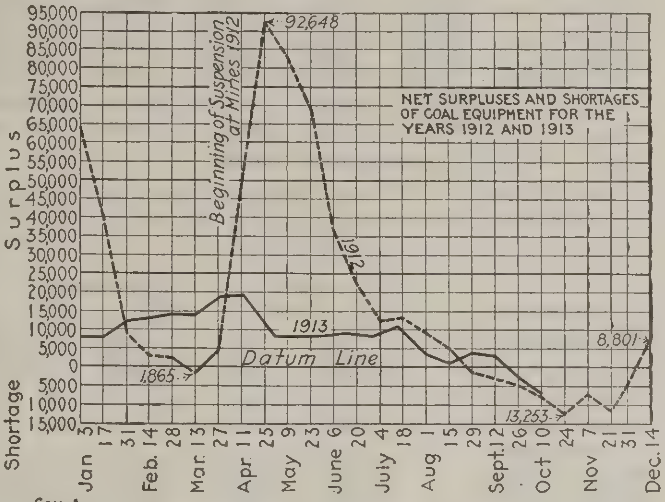
THE CAR SITUATION

American Ry. Association reports surpluses and shortages f coal equipment for two weeks ended Oct. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	86	0	**86**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	719	2,301	1,582
Ohio; Indiana; Michigan; Western Pennsylvania	200	2,612	2,412
West Virginia, Virginia, North & South Carolina	705	5,028	4,323
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	125	1,048	923
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,072	350	**722**
Montana, Wyoming, Nebraska	15	51	36
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,163	227	**936**
Texas, Louisiana, New Mexico	424	27	**397**
Oregon, Idaho, California, Arizona	1,485	166	**1,319**
Canadian Lines	20	692	672
Total	6,014	12,502	6,488

	June 14	June 30	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1
Surplus	11,098	11,055	13,203	8,810	8,293	8,689	8,714	7,953
Shortage	2,033	2,821	1,826	4,029	7,038	5,209	7,731	10,393
Net*	**9,065**	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**	**983**	2,440

*__Bold face__ type indicates a surplus.



Coal Age

NORFOLK & WESTERN R.R.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of September, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas	1,216,933	17,144	1,234,077	1,261,363	89,380
Tug River	231,318	3,688	255,045	192,449	42,557
Thacker	225,733	11,054	233,756	165,524	71,242
Kenova	73,090	9,589	82,679	64,860	17,819
Clinch Valley	....	....	....	146,306	15,200
Other N. & W.	....	....	....	4,698	....
Total N. & W. Fields				1,835,200	236,198
Williamson and Pond Crk. RR.	....	....	....	37,609	5,167
All Other Railroads	....	....	....	200,704	....
Grand Total	1,747,073	41,455	1,788,523	2,073,513	241,365

Shipments of coke entirely from the Pocahontas field amounted to 99,256 tons.

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for September and the first eight months of this year and last year:

	September		Nine Months	
	1913	1912	1913	1912
Coal	3,001,733	2,784,230	25,901,547	23,372,470
Coke	387,704	386,335	3,619,076	3,449,574
Total	3,389,437	3,170,565	29,520,623	26,822,044

VIRGINIAN RAILWAY

Total shipments of coal over this road for September of the current year were 393,199 tons as compared with 276,851 tons for the same month last year. For the nine months to Sept. 30 of the current year, the shipments were 3,291,941 tons as compared with 2,522,221 tons for the same period last year, showing a substantial increase.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for September and first nine months of this year and last year in short tons:

	September		Nine Months	
	1913	1912	1913	1912
Anthracite	813,394	935,550	7,665,020	7,387,837
Bituminous	4,378,037	3,906,164	37,774,323	34,114,059
Coke	1,127,951	1,073,613	10,859,413	9,671,343
Total	6,319,382	55,915,3 7	26'298,756	51,173,239

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for August, 1912-13, and for the eight months ending August, 1911-12-13, in long tons:

	8 Months			August	
Imports from:	1911	1912	1913	1912	1913
United Kingdom	5,881	5,881	3,693	1,143	229
Canada	686,984	916,453	746,029	150,472	67,418
Japan	9,271	18,616	70,229	400	6,564
Australia and Tasmania	142,684	84,554	96,651	3,969	19,017
Other countries	139	1,925	2,816	1	6
Total	844,959	1,025,388	919,418	155,985	93,234
Exports:					
Anthracite	2,294,005	2,186,330	2,847,443	540,438	398,530
Bituminous,					
Canada	6,428,135	6,696,010	8,652,472	1,328,189	1,532,227
Panama	344,912	312,227	351,850	22,402	30,343
Mexico	378,740	224,561	377,098	13,775	26,137
Cuba	671,219	757,635	868,114	111,173	95,748
West Indies	364,704	480,410	419,496	32,641	42,032
Other countries	455,149	1,197,509	1,165,481	82,995	100,012
Total	8,642,859	9,668,352	11,834,511	1,591,175	1,826,499
Bunker coal	4,406,35	4,943,257	5,079,189	623,743	669,819

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during August and the first eight months of this year in comparison to last year, in short tons:

	August		Eight Months	
Anthracite	1912	1913	1912	1913
Baltimore & Ohio[1]	125,357	94,702	950,993	933,805
Chesapeake & Ohio[1]	808	1,642	18,076	11,988
Erie[3]	739,121	769,423	4,747,796	5,739,611
Pennsylvania[1] [3]	927,277	713,451	6,452,287	6,851,626
Virginia[2] [1]	....	....	20	809
Total 5 roads	1,792,563	1,579,218	12,169,172	13,537,839
Bituminous				
Baltimore & Ohio[1]	3,068,785	3,456,089	22,464,879	24,101,535
Buffalo, Roch. & P.[1] [2]	749,941	833,388	5,326,258	6,201,264
Buffalo & Susq.[1] [2]	138,974	155,375	956,133	1,206,526
Chesapeake & Ohio[1]	1,552,892	1,665,525	11,870,710	11,036,996
Erie[3]	7,783	9,872	184,335	293,740
Hunt. & Br'd T. Mt[1] [2]	65,063	108,975	759,244	894,913
New York Central	667,262	763,112	5,080,151	5,953,578
Norfolk & Western[1] [2]	2,114,942	2,250,079	15,180,555	15,829,781
Pennsylvania[1] [3]	4,032,727	4,562,339	30,207,895	33,396,286
Pitts. & Lake Erie[1] [2]	1,155,951	1,154,219	7,312,284	8,585,935
Pitts. Shaw. & North[1] [2]	155,994	239,808	1,230,202	1,798,320
Virginia[1] [2]	337,366	376,083	2,334,731	2,898,724
Western Maryland	220,168	283,805	1,882,587	1,972,893
Total 13 roads	14,267,848	15,848,669	104,789,964	114,170,509
Coke				
Baltimore & Ohio[1]	409,627	391,999	3,112,642	2,891,814
Buffalo, Roch. & P[1] [2]	51,607	36,220	334,959	376,107
Buffalo & Susq.[1] [2]	27,004	20,006	173,715	200,032
Chesapeake & Ohio[1]	22,682	26,723	167,969	237,206
New York Central	7,634	....	57,992	36,207
Norfolk & Western[1] [2]	114,462	108,158	953,901	1,055,151
Pennsylvania[1] [3]	1,146,390	1,161,484	8,597,730	9,731,462
Pitts. & Lake Erie[1] [2]	551,943	537,557	4,082,161	4,656,960
Pitts. Shaw & North[1] [2]	....	....	5,155	9,383
Western Maryland	5,087	8,822	45,618	53,232
Total 10 roads	2,335,836	2,290,969	17,531,842	19,247,554
Coal and Coke, 13 Roads				
January			16,421,839	18,936,646
February			17,787,331	17,546,496
March			19,483,025	17,631,345
April			13,429,367	16,850,690
May			15,635,568	18,986,796
June			16,702,153	18,580,363
July			16,635,448	18,704,710
August			18,396,247	19,718,856
September			17,432,358	....
October			18,712,657	....
November			17,815,767	....
December			17,929,632	....
Total, 12 months			206,381,392	

[1] Includes coal from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note.—Southern Railway handled 338,648 short tons of coal during July and 2,409,598 short tons during the 7 months ending July.

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for July and the first seven months of the years 1912 and 1913:

State	July		Seven Months	
	1912	1913	1912	1913
Missouri	176,125	198,723	1,666,270	1,620,257
Kansas	337,367	465,761	2,794,914	3,134,125
Arkansas	126,224	163,185	1,033,059	1,026,101
Oklahoma	201,959	272,124	1,582,189	1,935,973
Totals	841,675	1,099,793	7,076,432	7,716,456

FOREIGN MARKETS

GREAT BRITAIN

Oct. 17—There is practically no change in the conditio the coal market. Admiralty list descriptions continue good request for prompt shipment, but inferior classes large are plentiful. Best small coals are steady. Forw business is slow, buyers generally adopting a waiting po Quotations are approximately as follows:

Best Welsh steam	$4.68@4.80	Best Monmouthshires	$3.96@
Best seconds	4.44@4.56	Seconds	3.72@
Seconds	4.20@4.32	Best Cardiff smalls	2.46@
Best dry coals	4.32@4.56	Seconds	2.28@

The prices for Cardiff coals are f.o.b. Cardiff, Penarth Barry, while those for Monmouthshire descriptions are f Newport; both net, exclusive of wharfage, and for cash 30 days.

NOTES IN THE FOREIGN TRADE

The following excerpts are taken from the "D Consular and Trade Reports:"

Coal in the Klondike—The Northern Light, Power & Co., of Dawson, shipped 10 tons of coal to Fairbanks, Ala in mid-August from its mines at Coal Creek, which is the Alaska-Canadian line on the Canadian side. The Fingers Coal Co., whose mines are about midway betw Dawson and Whitehorse, on the Yukon River, in Yu Territory, is selling coal in Dawson at $14 per ton. though a higher grade of coal than that of the other c pany, it contains a lower per cent. of pitch and forms m or less clinkers in burning.

The Elbe River Markets (Germany)—The lignite indu enjoyed a good business in 1912. Sales were greater t in 1910 and 1911, and were encouraged by the early wi general activity in oil-consuming industries, and the mal sugar campaign. Labor conditions were satisfact Bohemian lignite importation was furthered by the g shipping facilities on the Elbe.

Guadeloupe (French West Indies)—Total coal imp into this country for 1912 amounted to 29,124 tons as c pared with 39,459 tons in 1911; of this amount the Un States furnished 25,881 tons in 1912, and 13,049 tons 1911.

COAL SECURITIES

The following table gives the range of various active securities and dividends paid during the week ending Oct.

Stocks	Week's Range			Year's R
	High	Low	Last	High
American Coal Products	85	85	85	87
American Coal Products Pref	102	102	102	109¼
Colorado Fuel & Iron	29⅜	27¼	28	41½
Colorado Fuel & Iron Pref	....	....	155	155
Consolidation Coal of Maryland	....	....	102¼	102¼
Lehigh Valley Coal Sales	210	200	210	....
Island Creek Coal Com	47¾	47	47	53½
Island Creek Coal Pref	84¾	84	84	85
Pittsburgh Coal	21½	19⅞	20	21⅜
Pittsburgh Coal Pref	91	88⅛	89	95
Pond Creek	20	18⅝	19	23¾
Reading	163⅜	158⅞	162⅜	171
Reading 1st Pref	83⅞	83	83	92½
Reading 2nd Pref	..	..	91	95
Virginia Iron, Coal & Coke	42	40	42	54

Bonds	Closing		Week's Range or Last Sale		Year' Rang
	Bid	Asked			
Colo. F. & I. gen. s.f.g. 5s	95	98	98	Sept. '13	93½
Colo. F. & I. gen. 6s	104	106½	107¼	June '12	..
Col. Ind. 1st & coll. 5s. gu	80¼	81	80½	80½	77½
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98
Pocah. Con. Coll. 1st s f 5s	..	86	85½	Oct. '13	85
St. L. Rky. Mt. & Pac. 1st 5s	78	Sale	78	78	73
Tenn. Coal gen. 5s	..	99	98⅛	99	98⅛
Birm. Div. 1st consol. 6s	100½	101⅞	101⅜	Sept. '13	100⅝
Tenn. Div. 1st g 6s	100⅝	Sale	100⅝	100⅝	99
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103
Utah Fuel 1st g 5s	..	..	..	.....	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾
Va. I. Coal & Coke 1st g 5s	92½	93	93	93	92

DIVIDENDS

New Central Coal Co.—Dividend of 2%, payable Nov. holders of record, Oct. 29.

Geo. B. Newton Coal Co.—Dividend of 3½% on the preferred, payable Nov. 1 to holders of record, Oct. 25.

INDEX OF COAL LITERATURE

We will furnish copy of any article (if in print)) for the price quoted. Where no price is quoted, the cost is unknown. Inasmuch as the papers must be ordered from the publishers, there will be some delay for foreign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

A Suggested Method of Preventing Rock Slides. Geo. S. Rice. Jl. West. Soc. Engrs., September, 1913; 17 pp., illus.

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Preventing Accidents from Machinery. Frank H. Kneeland. Coal Age, Oct. 4, 1913; 3½ pp., illus. 10c.

BLASTING EXPLOSIVES

Shotfiring and Watering Systems in Utah Mines. John E. Ambrose. Coal Age, Oct. 11, 1913; 2 pp., illus. 10c.

BORING AND TUNNELING

A New Gasoline Rock Drill. Coal Age, Oct. 11, 1913; ½ p., illus. 10c.

Ten Deep Borings in East Kent, England. Malcolm Burr. Coll. Guard., Oct. 10, 1913; 3¼ pp., illus. 40c.

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A Laboratory Study of the Inflammability of Coal Dust. J. C. W. Frazer, E. J. Hoffman and L. A. Scholl, Jr. Bureau of Mines, Bull. 50; 55 pp., illus.

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How Best to Handle the Dry or Dusty Mine. David Victor. Black Diamond, Sept. 27, 1913; 1 p. 20c.

The Influence of the Presence of Gas Upon the Inflammability of Coal Dust in Air. (Proc. A. M. E. E., Vol. 3). Prof. W. M. Thornton. Coll. Guard., Sept. 19, 1913; 1½ pp. illus. 40c.

COKE

Apparatus for the Testing of Firebricks for Use in Coke Ovens. Iron Coal Tr. Rev., Sept. 26, 1913; ½ p., illus. 40c.

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The Manufacture of Coke in Belgium. (Paper by Baron Evance Coppee read before the Iron and Steel Inst., Sept., 1913.) Iron Coal Tr. Rev., Sept. 5, 1913; 5½ pp., illus. 40c.

DRAINAGE, PUMPING, ETC.

A New Acid-Proof Mine Pump. Coal Age, Oct. 18, 1913; ½ p., illus. 10c.

Large Colliery Pump. Iron Coal Tr. Rev., Sept. 26, 1913; 1 p., illus. 40c.

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Electrically Propelled Inclined Railway for Unloading Coal. Elec. Wld., Sept. 20, 1913; 1 p., illus. 20c.

EXPLOSIONS

Experimental Explosion at Bruceton Mine. Coal Age, Oct. 11, 1913; 1½ pp., illus. 10c.

Inquiry into the Cadder Pit Disaster. Coll. Guard., Sept. 26, 1913; 1½ pp. 40c.

Mill for the Production of Stone Dust. Iron Coal Tr. Rev., Sept. 12, 1913; ¼ p., illus. 40c.

Spontaneous Ignition of Coal. T. A. Peebles. Power, Sept. 30, 1913; ¾ p. 15c.

FUEL TESTING

Analyses of Coals in the United States. N. W. Lord, with chapters by J. A. Holmes, F. M. Stanton, A. C. Fieldner and S. Sanford. Bureau of Mines, Bull. 22, Part I; 316 pp., illus.

Analyses of Coals in the United States. N. W. Lord, with chapters by J. A. Holmes, F. M. Stanton, A. C. Fieldner and S. Sanford. Bureau of Mines, Bull. 22, Part II; 834 pp.

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Further Researches in the Microscopical Examination of Coal, Especially in Relation to Spontaneous Combustion. (Paper by James Lomax read before the I. M. E., Manchester, September, 1913.) Coll. Guard., Sept. 26, 1913; 1¼ pp. 40c.

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GENERAL

Burning Anthracite Culm. J. E. Parrish. Coal Age, Oct. 11, 1913; 3¾ pp., illus. 10c.

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A New Coal-Hoisting System. Coal Age, Sept. 6, 1913; ¾ p., illus. 10c.

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A New Resuscitation Apparatus. Coal Age, Oct. 4, 1913; ¾ p., illus. 10c.

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COAL AGE

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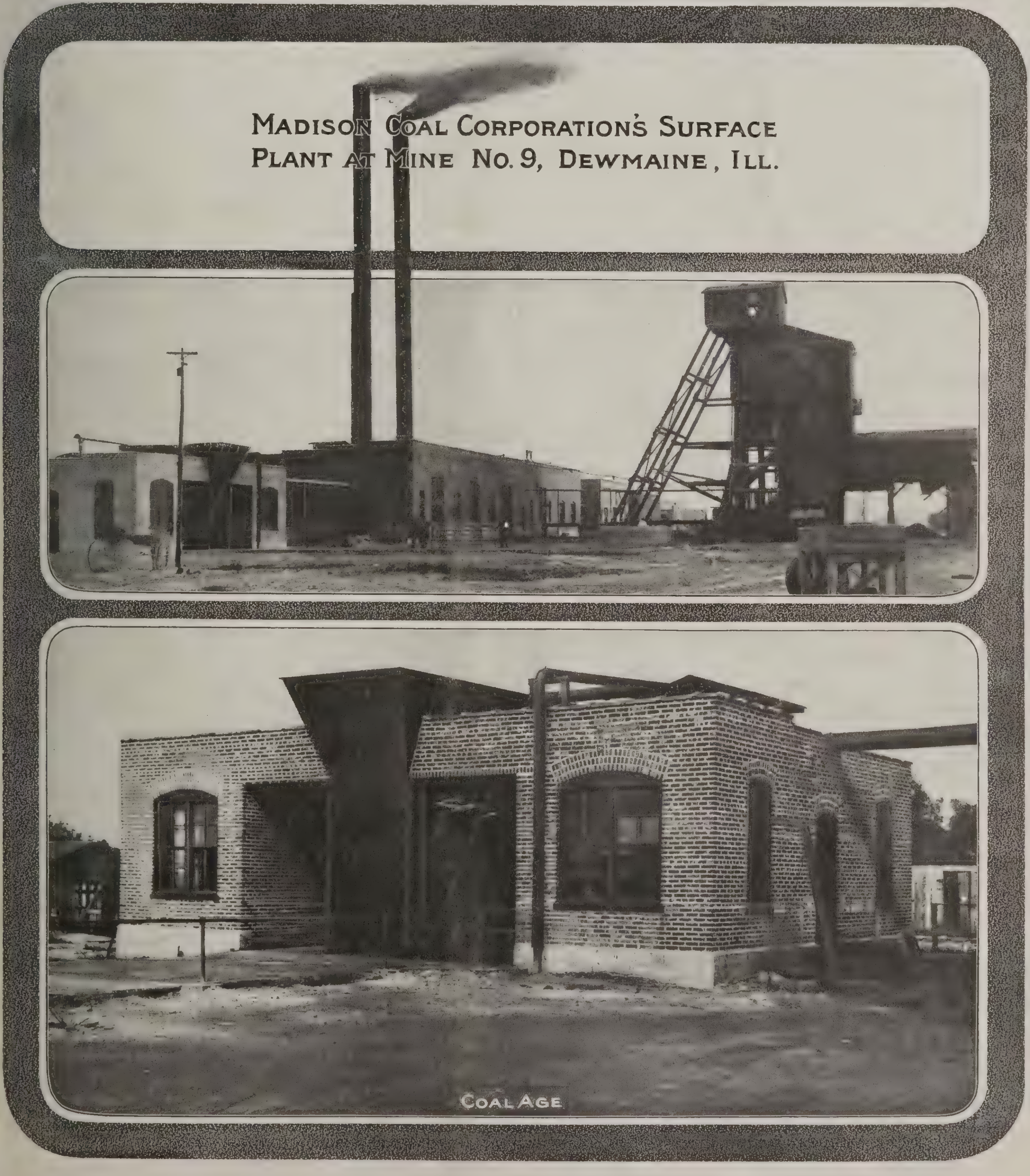
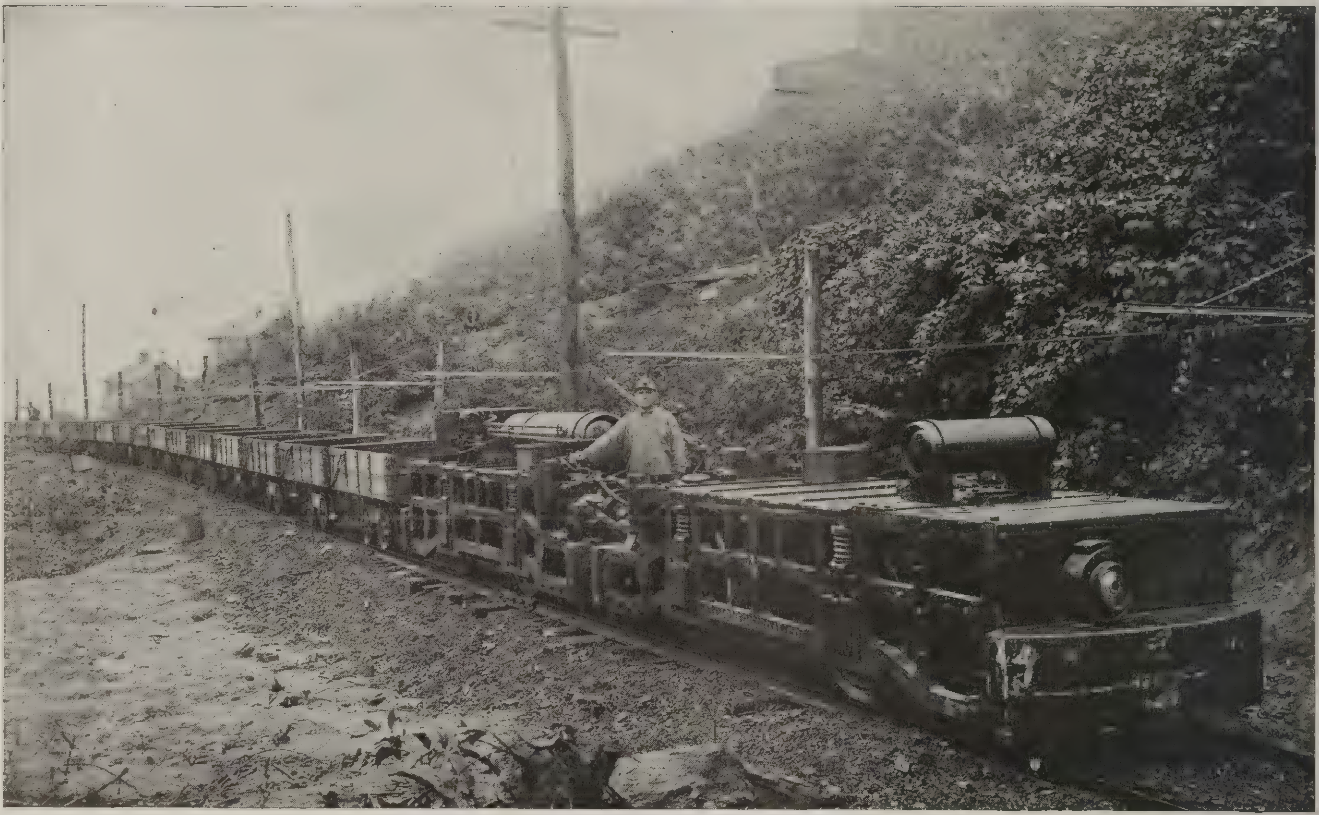


MADISON COAL CORPORATION'S SURFACE PLANT AT MINE No. 9, DEWMAINE, ILL.



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The use of two units in tandem distributes the weight over 8 wheels instead of 4, and hence the locomotive has great tractive power and also is easier on the track than if the weight were more concentrated.

The **Barsteel** frame construction gives ready access for inspecting, oiling, replacing brake shoes, adjusting brake rigging, etc., and also allows excellent ventilation to the electrical apparatus.

If you want to get out maximum tonnage at the least expense and in the shortest time ask for the advice of our mining experts.

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COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

The Weekly Ad-Talk Page

There was a book published not long ago that made such an impression on an advertising man of Chicago that he decided to advertise it at his own expense. He said that it was a book he had waited for so long and so ardently that he felt he must tell other people about it—induce other people to read it.

The book is called "CROWDS." Its author is Gerald Stanley Lee. And the book might be called a philosophy of modern business. It claims the world is waking up to the fact that the Golden Rule is practical, every day common sense.

Here is an interesting extract from "Crowds" which will give you an idea of its quality:

"In the United States some forty years ago, being a new country, and being a country where everything a man did was, in the nature of things, felt to be a first experiment, everybody felt democratic and independent, and as if he were making the laws of the universe just for himself as he went along.

There was a period of ten years or so in which every spool of thread and bit of dress goods—everything that people wore on their bodies or put in their mouths, and everything that they read, came up and had to be considered as an original first proposition, as if there never had been a spool of thread before, as if each bit of dress goods was, or was capable of being, a new fresh experiment, with an adventurous price on it; and before we knew it a moral nagging and edging and hitching had set in, and was fast becoming in America an American trait, and fixing itself by daily repetition upon the imagination of the people.

The shopping of a country is, on the whole, from a psychologist's point of view, the most spiritual energy, the most irrevocable, most implacable meter there can ever be of the religion a country really has.

There was no clergyman in America who could have made the slightest impression on this great national list or trend of always getting things for less than they were worth—this rut of never doing as one would be done by. What was there that could be done with an obstinate, pervasive, unceasing habit of the people like this?

What was there that could be done to touch the imagination of the crowd?

Six thousand women a day were going in and out of A. T. Stewart's great store on Broadway at that time. A. T. Stewart announced to New York suddenly in huge letters one day, that from that day forward there would be one price for everything sold in his store, and that that price would be paid for it by everybody.

A. T. Stewart's store was the largest, most successful, original, and most closely watched store in America.

The six thousand women became one thousand.

Then two thousand. Some of them had found that they finished their shopping sooner; the better class of women, those whose time was worth the most, and whose custom was the largest, gradually found they did not want to shop anywhere else. The two thousand became three thousand, four thousand, six thousand, ten thousand, twelve thousand.

Other department stores wanted the twelve thousand to come to them. They announced the one price.

Hardware stores did it. Groceries announced one price. Then everybody.

Not all the clergymen in America, preaching every Sunday for months, could have done very much in the way of seriously touching the imagination of the crowd on the moral unworthiness, the intellectual degradation, the national danger of picking out the one thing that nearly all the people all do, and had to do, all day, every day, and making that thing mean, incompetent and small. No one had thought out what it would lead to, and how monstrous and absurd it was and would always be to have a nation have all its people taking every little thing all day, every day, all they were buying, or that they were selling—taking a spool of thread, for instance—and packing it, or packing their action with it, as full of adulterated motives and of fresh and original ways of not doing as they would be done by as they could think up—a little innocent spool of thread—wrecking all their sins and kinds of sins on it, breaking every one of the ten commandments on it as an offering. * * *

It was A. T. Stewart, a very ordinary-looking, practical man in a plain, every-day business, who arrested the attention of a nation and changed the habit of thought and trend of mind of a great people, and made a candid, direct people, a people that went with great sunny prairies and high mountains, a yea and nay people, straightforward, and free from palavering forever. A. T. Stewart was accustomed in his own personal dealings from day to day to cut people short when they tried to heckle with him. He liked to take things for granted, drive through to the point, and go on to the next one. This might have ended, of course, in a kind of cul de sac of being a merely personal trait in a clean-cut, manful, straightforward American gentleman; and if Stewart had been a snob or a Puritan, or had felt superior, or if he had thought other people—the great crowds of them who flocked through his store—could never expect to be as good as he was, nothing would ever have come of it.

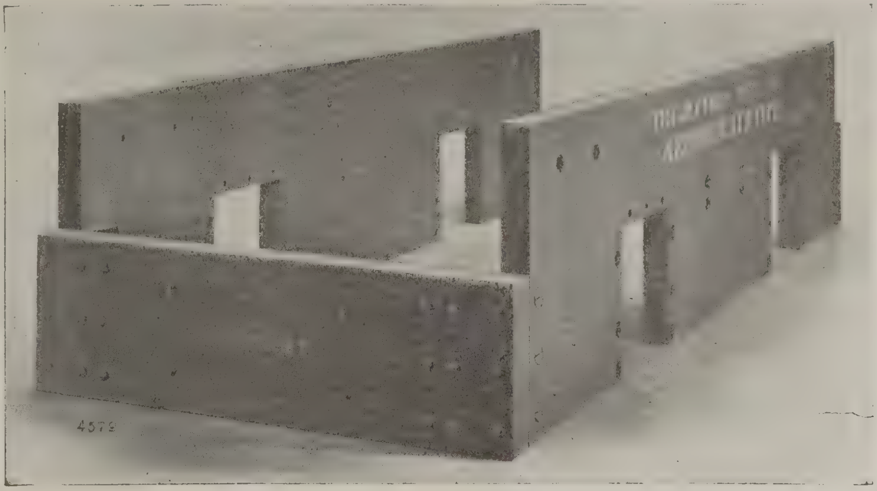
It is not likely that he was conscious of the long train of spiritual results he had set in motion; of the way he had taken the habit of mind, the daily, hourly psychology of a great people, and had wrought it through with his own spirit; or of the way he saved up, and set where it could be used, everyday religion in America, and had freed the business genius of a nation for its most characteristic and most effective self-expression.

He merely was conscious that he could not endure palavering in doing business himself, and that he would not submit to being obliged to endure it, and he believed millions of people in American were as clean-cut and straightforward as he was.

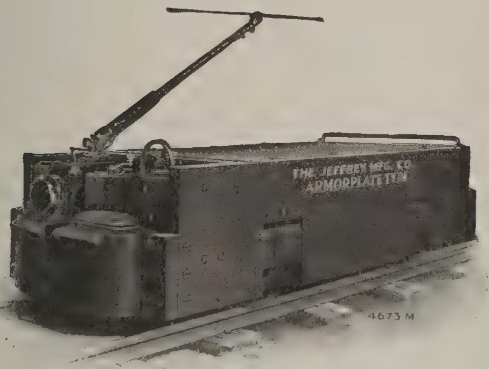
And the millions of people stood by him."

You Realize the Advantages of the

Jeffrey *ARMORPLATE* Type Locomotive



The *ARMORPLATE* Frame allows the greatest per cent. of weight to be used for motor equipment for a given weight of locomotive.



The *ARMORPLATE* Type of Frame is used on Locomotives from 7 tons up to and including 15 tons weight.

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The cost of upkeep for this construction is a minimum.

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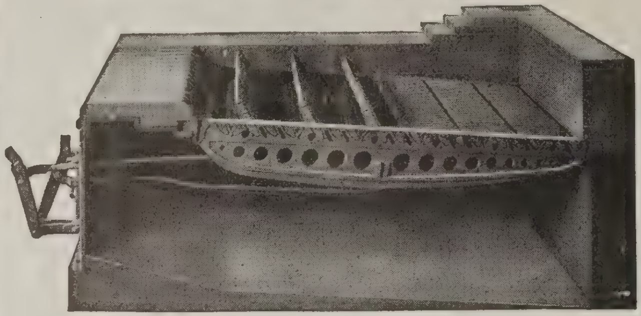
But you **can** burn that so-called "waste" stuff—and get out of it all the steam necessary for your power plant, if you will use



McClave Grate No. 4-A installed complete. Illustration shows divided cut-off position

McClave Grates

McClave Grates, used in combination with **Argand blowers**, get out of low grade fuels such as buckwheat, rice, slack, bird's eye, etc., results practically the same as with first class coal. They're built for that purpose. And for YOU, think what a saving that means. You can sell **all** the high grade coal you mine. Why not do it?

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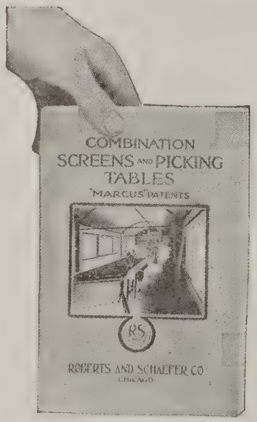

Send For This Book

It tells how you can successfully screen and "pick" your coal *in one operation.*

It describes in detail

The "MARCUS Patent Picking Table Screen"

Tells where and how it is being used both abroad and in this country.

Why it requires hardly 50 per cent. of the power formerly required to do the same work.

Why it results in a better sized and cleaner coal.

It is, in short, a booklet genuinely worth sending for—if you are interested in any way in the economical screening and cleaning of coal.

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Engineers and Contractors **CHICAGO, U. S. A.**

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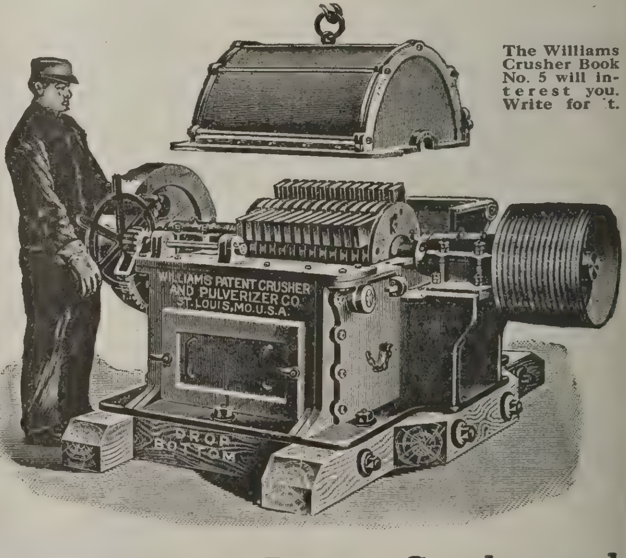
Easy to get at—

Note the accessibility of the **Williams Patent Crusher.** Consider also that *adjustable hammers* give you *five times* the ordinary amount of wear.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Old Colony Building, **Chicago**

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COAL AGE

Vol. 4 NEW YORK, NOVEMBER 8, 1913 No. 19

The Boys of the Rescue Crew

BY BERTON BRALEY

Written expressly for Coal Age

When the damp explodes in a distant room
Or the roof of an entry falls,
Sealing the men in a living tomb
With thick and soundless walls;
When the women crowd at the open shaft
And wail as the women do,
It's then we call for the nerve and craft
Of the boys of the Rescue Crew!

They take the smoke
As a sort of joke,
They dare the fire damp, too:
For it's all their trade
And they're not afraid,
The boys of the Rescue Crew!

They look like divers who tempt the sea,
But they battle with fire instead,
To bring out the living—if such there be—
And search for the huddled dead;
And many's the seething hell they've braved
For the sake of their comrades there,
And many a dying man they've saved
And brought to the light and air!

By day or night
It's theirs to fight
With death itself in view,
And they face their fate,
With hearts elate,
The boys of the Rescue Crew!

There's blame few medals they ever get
And never a hint of fame,
But the miners know their style, you bet
And the way they play the game;
The words of the miners are few and rough
But their thanks and their faith are true,
And the prayers of the women are fame enough
For the boys of the Rescue Crew!

In the heat and murk
They do their work
And they stick till the work is through,
So I boost again
For those dauntless men,
The boys of the Rescue Crew!

Mining Natural Coke and Coal in Virginia

By John E. Ambrose*

SYNOPSIS—Description of mining a seam of natural coke in conjunction with three other contiguous seams of coal, at Richmond, Va. These seams have a dip varying from 18 to 45 deg.; the two middle ones are worked together, being separated by only 5 or 6 ft. of parting. Most of the chutes are worked on the battery system, but a few light pitches require sheet iron, to make the coal slide down to the gangway.

⁂

One of the most interesting studies from a geological standpoint is the formation of the natural coke of the Richmond Basin, Va. Some years ago, before the civil war, the mines at Gayton, Henrico County, Va., were operated by slaves, worked by their masters. Slopes were sunk to great depths, and headings or gangways, as we call them in pitching seams, were driven long distances without any aircourses. The mines made fair outputs. The rooms (breasts) were turned directly off the gangways or levels, which were driven at right angles to the slope and about 100 ft. apart. The coal and coke were trammed to the slope turnout or sidetrack where they were hoisted to the surface.

For some reason, the mines were shut down, later, and allowed to fill with water. A few years ago a company was formed, the water pumped out of the shafts on the upper end of the property and operations commenced on a large scale. This company continued to develop the property until their tipple burned down, when they ceased operations and allowed the slopes and shafts to again fill with water. Recently the Old Dominion Development Co., of Richmond, Va., pumped the water out of the slope opening, which is about 1580 ft. deep, retimbered the slope, relaid the incline with heavy steel rails and, for the third time, active mining operations were resumed in this mine.

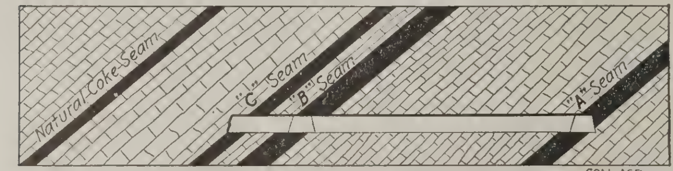


Fig. 1. Cross-Section of Coal Measures, Showing the Cross-Tunnel to Reach Other Seams

The system recently adopted for the operation of the mine may be described as follows: The main hoisting slope is a single-track incline, pitching about 40 deg. at the entrance, and is driven through the overlying strata to intersect the seam, a distance of about 150 ft. Below this point, the slope is driven in the seam on a dip of about 18 deg., until the 1000-ft. level is reached. From that level the seam pitches from 35 to 45 deg., until it reaches the foot of the slope or the 1580-ft. level.

There are three seams of coal besides a natural coke seam. As shown in Fig. 1, the foot of the slope is located in the "A" seam, and from this point a double-track tunnel, Fig. 2, is driven across the measures to intersect the "B" and "C" seams, and will be extended later to tap the coke seam beyond. At the point where the tunnel intersects the "B" seam, gangways are turned north and south, in that seam. These gangways are timbered with heavy double timbers, the collars being 7 ft. between notches and 7 ft. in the clear above the rail, while the legs have a 10-ft. spread.

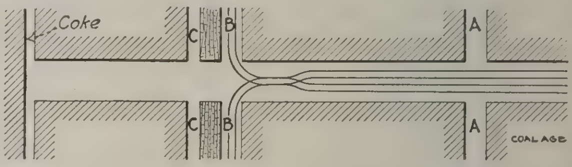


Fig. 2. Plan of Slope Bottom, Showing Arrangement of Tracks

The strata between the "A" seam and the "B" seam vary from 96 to 110 ft. in thickness, while the parting between the "B" and "C" seams is only 5 to 8 ft. thick. From the "C" seam to the natural coke seam, the thickness of the strata varies from a few feet on the south end of the property to 150 and 200 ft. on the north end; although some claim that the "C" seam and the coke seam come together on the north end of the property where the "C" seam is cut out entirely.

The gangways were driven in the "B" seam, because of the fact that only a few feet of slate separated it from the "C" seam. It was found that by working these two seams, room over room and pillar over pillar, the coal could be successfully taken out; but it was necessary to keep the workings in the "C" seam ahead of those in the lower or "B" seam. No gangways or levels were driven in the "C" seam; but, instead, rock chutes were driven up from the "B" seam and the coal in "C" seam was mined through these chutes, as shown in Fig. 3.

Later, however, the gangways were turned from the "B" seam into the "C" seam, as the coal in the latter was found to be of an excellent grade, more or less resembling anthracite. The thickness of this seam varied from 5 to 6 ft. An aircourse was driven in the upper "C" seam and the rooms in that seam turned off the aircourse. Where the pitch was light, it was necessary to lay sheet iron in the chutes to enable the coal to slide down to the level or gangway; but where the pitch was heavier, the battery method was used, the chutes being kept full of coal and the miners standing on the coal at the face while at work.

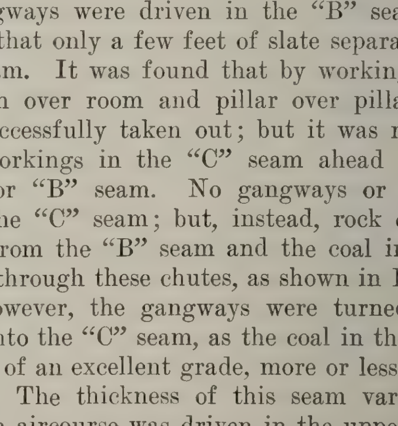


Fig. 3. Cross-Section Showing Workings in "B" and "C" Seams

The development work, as far as it has progressed, shows that the coke seam is thicker at the north end of the property than at the south end. The writer is informed by old miners that this coke seam attains a thickness of 6 to 10 ft. in places. The coal has a ready market, the mine being close to Richmond, and the natural coke being a fuel for which there is a popular local demand. Some consumers claim that it is even better than anthracite coal. The present development work is being pushed with a view to securing a large output in the early future. Much credit is due the management of the company for the energy and push they have displayed in opening up this property. The work has been made harder by reason of the fact that it is difficult to secure competent miners who understand the system of mining employed in working these seams. The coal is all shot from the solid, permissible powders, carbonite or monobel being used.

---

*Mining engineer, New Durham, N. J.

Where the pitch is sufficiently light, the natural coke seam is mined (undercut). The bottom bench or layer in the coke seam resembles coal and is termed by the miners "coaly." This lower bench, which is from 6 to 9 in. thick, is soft like bituminous coking coal. The floor of the seam is slate. The mining is all done in the "coaly" bench; but it is necessary to "snub off" the front of the coke in order to mine the seam to the required depth. When the mining is complete, holes are drilled in the coke by compressed-air rotary augers. The coke is blasted down and thrown into the sheet-iron chute, which runs to the gangway below where it is loaded into the mine cars.

Mules are used to haul the output to the sidings at the slope, from which point they are hoisted to the surface. The loads are hoisted from the slope in two-car trips and then run by gravity to the foot of the car-haul, by which they are carried up the incline onto the tipple, where they are dumped. The empty cars are run down the incline to a side track, where they are allowed to gravitate to the head of the slope. This arrangement has proven very satisfactory.

⁂

The Brush Creek Coal Field in Kentucky

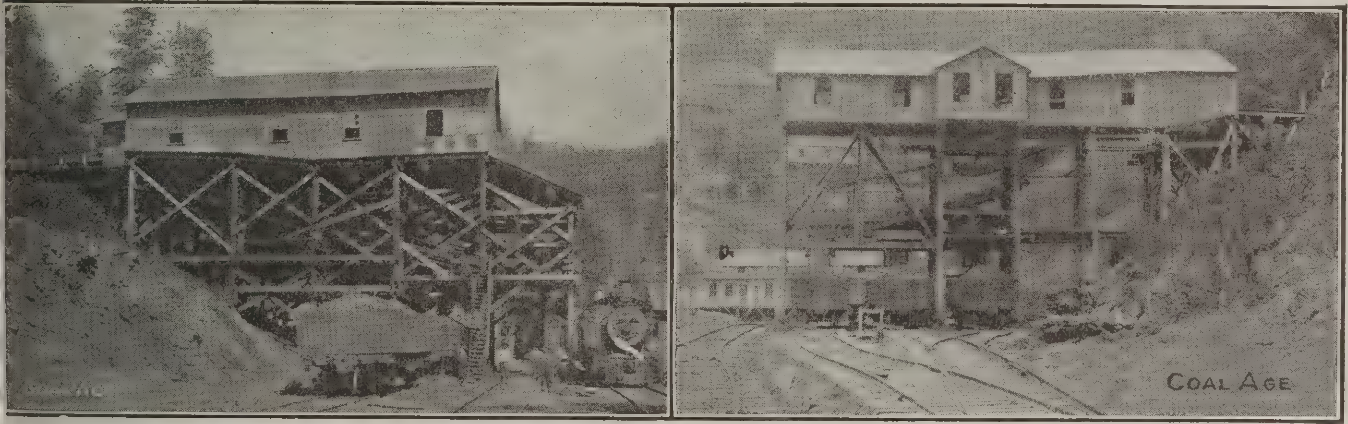
By Jno. C. McNeil*

SYNOPSIS—A brief sketch of the development of the Brush Creek field in Kentucky. Production is relatively small as yet but the coal is a popular grade and the indications point to a rapid increase.

⁂

The Brush Creek coal fields are situate in Knox County, Ky. and are wholly on the Cumberland Railroad, a short line in operation from Artemus to Wheeler, Ky. nd projected to Jellico, Tenn. to a connection with the . & N. and Southern Railroads.

This field was opened up by a syndicate from Warren, enn., who organized the Cumberland Coal Co. and ought up several thousand acres of lands on Brush reek. The same people organized the Cumberland R.R. o. to build a railroad line into the field and market the utput.



The Carter Coal Co.'s Warren Plant on the Left and the Anchor Mine on the Right

History of the Development

After installing a large plant at Warren, the company eased their mines to Col. John G. Matthews, of Barbourville, a coal operator of much experience in Southeastern Kentucky. Other plants were opened on the line by Dr. Samuel Bennett, at Bennettsville and Trosper. These operations were known as the Bennett Jellico Coal Co. and the Bennett Coal Co., respectively.

In the early part of 1908, the Geo. L. Carter interests purchased the lease of the Matthews Coal Co., in the Cumberland Coal Co. property and the lease of the Evans Jellico Coal Co. on the Bennett Coal Co. property. In the fall of 1907, the Bennett Jellico property was leased to the Trosper Coal Company.

In 1911, the Cumberland Railroad was extended up Tye Fork to Anchor and to Wheeler in the direction of Jellico. The Brush Creek Mining & Manufacturing Co. opened a mine at Wheeler and two operations were installed on the Tye Fork Spur by the Anchor Mining Co. and the Dean Jellico Coal Company.

The Carter interest, known in Kentucky as the Interstate Coal Co., later bought the properties of the Cumberland Coal Co. and the Bennett Coal Co. and also acquired large holdings of undeveloped lands. These interests, now known as the Carter Coal Co., control several thousand acres of coal lands in the Brush Creek field and have also purchased the property of the Anchor Mining Company.

---

*Chief clerk to general manager of the Cumberland R.R. o., Artemus, Ky.

A modern electric plant has been erected at Warren by the Carter interests which supplies the mines at Warren and Trosper, and will later supply the Anchor mine, with power. Coal washers have been installed at Warren and Trosper and loading booms and box-car loaders put in at Warren.

The Trosper Coal Co. have also installed box-car loaders at their plant.

The coal mined on the Cumberland Railroad is known as the Dean seam, which ranges from 5 to 7 ft. in thickness. An analysis of this coal from one of the mines in the Brush Creek field, made by the Kentucky Geological Survey, shows the following:

	Per Cent.
Moisture	2.63
Volatile matter	38.77
Fixed carbon	53.70
Ash	4.90
	100.00
Sulphur	0.76
Coke	68.60
B.t.u. per lb.	14487

The coal is sold throughout the Northwest by larg shipping concerns in Louisville, Cincinnati and Chicago and gives universal satisfaction because it stand stocking so well. It has a firm texture and does no disintegrate under severe weather conditions.

A troublesome feature in the Kentucky coal fields i the recent introduction of the big hopper-bottom "battleships." This is in some cases necessitating the reconstruction of the tipples.

The mines now being operated are:

The Dean Coal Co., owned by Knoxville interests; th Trosper Coal Co., owned by Jellico, Tenn. interests; th Carter Coal Co., at Warren and Trosper, owned by Johnson City, Tenn. interests; the R. C. Tway Mining Co. owned by Louisville interests and the Brush Creek Minin & Manufacturing Co., owned by Jellico, Tenn. interest

The present output of the various mines is about 200 tons daily. This is being gradually increased and because of the large undeveloped areas connected to th mines and owned by the operators, the Brush Creek fiel presents large possibilities of becoming a heavy produce in the near future.

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A Chinese Coal Cableway

By A. Gradenwitz*

SYNOPSIS—A modern aerial tramway supplanting a continuous caravan of camels and pack mules. Mining is, however, still carried on by the peasants in the most primitive manner, each man or family working independently and employing antiquated hand methods.

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The coal from the mountains to the west of Toli was in former times, the only one marketed in Peking, and was conveyed to the capital in a rather primitive fashion, b an endless file of camels and mules reaching the whol way back from Peking to the coal mountains. Rive passages were duplicated, those on one side being reserve for caravans coming from the mountains and those o the other for caravans going in an opposite direction These passages consisted of dams, comprising interme iate fagot layers, through which the water was allowe to pass.

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*Berlin, Germany.

General View of Line in Rear of Toli with Mountains in Background

An Endless Caravan of Camels and Mules Has Been Supplanted by the Cableway

The construction of railways, however, resulted in the anthracite coal from some mines in the neighborhood of Peking being conveyed to the capital and there sold. In order therefore to cheapen the transport and to render its own coal marketable again, the Salt Corporation of the city of Tientsin, province of Petchili, some years ago decided to install a mechanical transporting plant and entrusted Messrs. Adolf Bleichert & Co., of Leipzig, with the construction of a cableway.

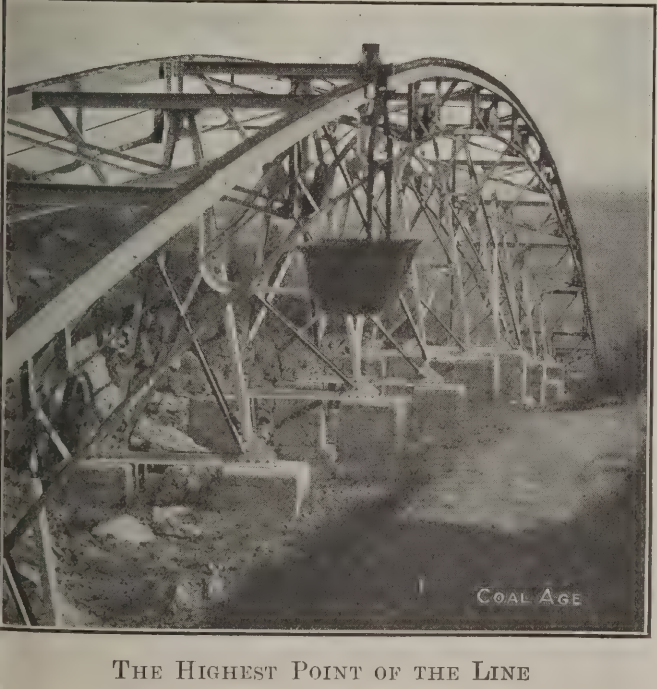
Surveying was commenced in the summer of 1908 and the construction of the plant was completed in July, 1911, though some sections had been inaugurated beforehand. Building materials were supplied by rail as far as the railway station of Toli, being thence taken by camels to the building grounds.

The Extent of the Cableway

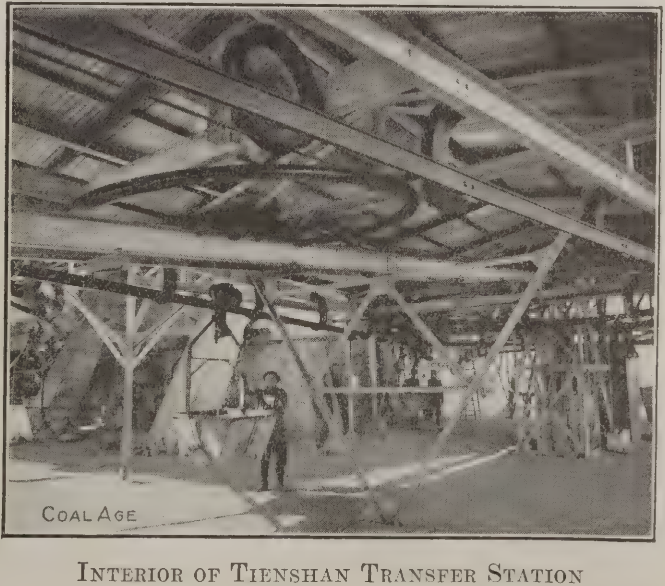
The cableway comprises a first section (Toli I) from the railway station of Toli to the Tienshan transfer station, with an angle station near Natcheing, which at the same time serves as a driving station. Near Chiantshanggu, there has been provided a loading station and near Wangfutang there is an intermediate and driving station. From the Tienshan transit station the line branches out into a section (Toli II), leading across the loading stations of Hoshan, Shinanhing, Pedian (driving station), Fungdia, and Nantze to the terminal and loading station of Chin Chiankon, on one hand, and into a section (Toli III), leading from the driving station of Forzshwang to the terminal and loading station of Hung Mechan, on the other.

The first section (Toli I) is 9.15 km., (about 5.7 miles), the second (Toli II), 7.89 km., (about 4.9 miles) and the third section (Toli III), 7.2 km., (about 4.5 miles) in length, the total length thus being 24.24 km., (15.1 miles). In the first section there is a fall of 142 m., (465ft., 9 in.); the two portions of the second section have a fall of 177.28m. (581ft., 6in.) and 155m. (508 ft., 5 in.) respectively, and the third section at first a rise of 65m., (213ft., 2in.), followed by a fall of 31m., (101 ft., 7 in.). The output of the first (common) section is 50 tons per hour, or about 1000 tons during a 22-hour day and night service, the output on the two other lines being 20-23 tons and 17 tons per hour respectively. These figures are, however, only preliminary.

A total of 439 buckets is operated on the cableway for the transport of anthracite coal, the speed on the first section being 2.5m., (8.2 ft.), on the second section 2.5 m., (in the lower portion) and 1.5m. or about 5 ft. (in the upper portion), and on the third section 2.5 m. per second. For the first section, there has been provided an 80 hp. driving motor, for the second section, three motors of 15, 13 and 6-7 hp. respectively, and for the third section, two driving motors of 25 and 15 hp. re-



The Highest Point of the Line



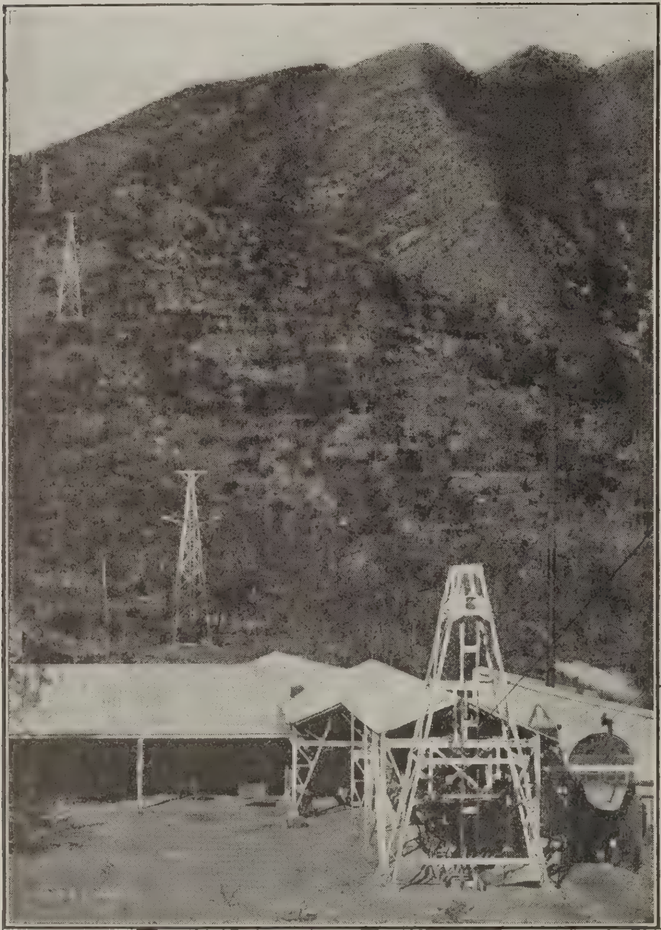
Interior of Tienshan Transfer Station

spectively. Semi-transportable steam engines (locomobiles) are used in all cases.

The Mines and Mining Methods

There are in all about 600 coal mines, many of which are temporarily shut down, the men being unable to deal with the water, while many are only worked with a few hands. The coal is conveyed by camels or mules from the mines to the loading stations of the cableway, in order there to be dumped into storage hoppers and transferred into buckets. It is afterwards taken to Toli by cableway and to Peking by rail, where about 12 Chinese dollars is netted for each ton (1 Chinese dollar=45 cents in American money).

Some words might be added to show the primitive way these mines are worked by the natives:—The coal seams come to the surface in the Western mountains at an angle of 0-35°, the upper stratum of the mountain slopes is a carbonate of lime formation containing some lime caves. All peasants in this district are on their own ground engaged in coal mining of the most rudimentary description, by hewing with primitive iron picks on the coal, in which work they are assisted by their sons and other male relatives.



Natshoing Angle and Loading Station

The men make their way into the seam up to 3 m. (about 10 ft.) thick through several tunnels, between which the seam is left intact, so that only the volume of the tunnels and cross-cuts is extracted. Timbering is only provided in a few of the tunnels. The tunnels only penetrate a distance of 100 to 120 m. (330 to 400 ft.) into the mountain, and after a seam has thus been worked or stripped, the mine is allowed to decay and another tunnel is dug at some other place, e.g. 20m. (65 ft.) higher.

The coal hewn is dragged up a primitive ladder to the surface in baskets and poured out on a waste heap. On arriving at the top of the heap, the miner sits down in the basket and thus slides back into the tunnel. Above the mouth of the latter, a rude house is erected, which accommodates the whole family.

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A Pledge to Safety First

The *Railway Age Gazette* prints a description of a new departure in the "Safety-first" movement which is as follows:

The Grand Trunk Railway of Canada, on which George Bradshaw has been promulgating "safety-first" ideas, has issued a placard 10x6½ in. the substance of which is reprinted below. The lettering is blue and red on white carboard—a red, white and blue effect. At each corner, in the border, is a print of the safety-first button.

Grand Trunk Railway System
The Pledge

I will Railroad (mine) according to the (Book of) Rules. I will do all in my power to guard against unsafe acts on my part. If I see a fellow employee doing his work in an unsafe manner, I will speak to him, as a friend, and use my moral influence to have him perform his duties in the Safest Possible Manner. I will remember and practice at all times SAFETY-FIRST.

EIGHTY-THREE PER CENT. of all persons injured on railroads are YOU MEN WHO WORK FOR THE ROADS. SIXTY-SIX PER CENT. of all preventable injuries sustained by you are DUE TO UNSAFE PRACTICES which you could avoid.

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Coal Mining in China, 1912

The present coal production of China is estimated at 9,000,000 to 13,000,000 tons a year. The most important event in the Chinese coal-mining world in 1912 was the amalgamation of the Chinese Engineering & Mining Co. and its rival organization, the Lanchow Collieries, under the title of the Kailan Mining Administration.

The consul general at Tientsin reports the total output of the coal mines in the Kaiping Basin for 1912 as 1,706,658 tons, as compared with 1,433,546 tons in 1911. The anthracite mines of the Peking Syndicate (Ltd.) in the province of Honan are credited with an output of 549,877 tons, an increase of 32 per cent. over 1911.

The Chinghsing collieries, in southern Chihli, are reported to be preparing for larger development. Their present output is given as 1000 tons per day. The output of the Fangtze and Hungshan collieries, belonging to the Shantung Mining Co., is reported as 469,157 tons in 1911, and 573,677 tons in 1912. The Fushun collieries, near Mukden, operated by the South Manchurian Ry. Co., produced 1,470,150 tons in 1912, and the mines at Yen Tai, operated by the same company, had a total output of 43,104 tons. The Pinghsiang mines, owned by the Hanyang Iron & Coal Co., produced but 232,373 tons in 1912, as compared with 648,476 tons in 1912.—*Daily Consular and Trade Reports.*

Relation of Big Business to Mining

By Charles Richard Van Hise*

YNOPSIS—It is suggested that there be an interstate rade commission and state trade commissions, which hall have substantially the same powers to regulate coperation in industry that the Interstate Commerce Comission and the State Commerce Commission have in reard to the public utilities.

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It is generally agreed, that concentration of industry up o a certain point is necessary in order to give efficiency. t would not be held by anyone, I imagine, that we should eturn to the situation of 50 or 60 years ago, in which inustry was minutely subdivided, in which there were few rganizations of large size, but many minor organizations cattered all over the country. Do you believe—do any f you believe that we shall ever return from the great our mill to the cross-roads grist mill? It is impossible. This illustration and many others which could be menioned show that some degree of concentration is allowble. The practical question is: What degree of conentration is permissible and advantageous, not only for conomy in production, but for the advantage of the eople at large? It is therefore clear that it does not neet the question which confronts us in regard to the o called trusts to assume that all of the concentrations f industry are monopolies.

The Laws Relating to Big Business

Monopoly has never been recognized in this country by ommon laws, nor by statute law; neither has it ever been o recognized in England. Coöperation in industry both y combination and by contracts has been recognized by e laws of both countries. The distinction is fundaental. In England in the middle ages both common nd statute laws were stringent against combinations and ontracts in restraint of trade. But Parliament more than 0 years ago wiped out all the statutes against such ombinations and contracts, provided they were not onopolies, contrary to public policy, or immoral.

Also, in this country, in colonial days, the laws were rict against combinations and contracts in restraint of ade. But here, also, there was a gradual amelioration the laws until coöperation was permitted, along many nes, including division of territory, limitation of output, d even fixing of prices; provided, always, that as a relt of the coöperation the combination or contracts did t result in monopoly or were not general, were not imoral and were not contrary to public policy.

Thus we see that the laws in regard to combinations d contracts in restraint of trade went through a similar olution both in this country and in England, and that e laws finally became liberal. In other countries than ngland and America, the laws in regard to coöperation e also liberal. By gradual development the principle s been reached for most civilized nations that freedom trade means freedom to combine as well as freedom compete. This was the situation in this country also hen in 1890 the Sherman law was enacted, and imediately the wheels, so far as coöperation was concerned, ere turned back to the conditions of the middle ages. All combinations and contracts in restraint of trade were prohibited, and this applied to the latter even if limited in extent or confined in time. This national legislation led to an influenza of similar legislation in the states and, within a few years, more than 30 states had passed statutes against combinations and contracts in restraint of trade, many of them even more drastic than the Sherman law.

The question now arises: What were the results of these statutes? The Sherman act contained two separate provisions, one of which prohibits every contract and combination in the form of trust or otherwise in restraint of trade as illegal; another section provides that monopoly or attempt to monopolize is also illegal.

New Attitude of the Supreme Court

By the public it was supposed that every contract and combination in restraint of trade meant what the words said, and that Congress in using these words meant to pass a new and drastic law replacing the common law; indeed the earlier decisions of the Supreme Court took this point of view and held that the reasonableness or unreasonableness of a contract or combination was immaterial. However, in the Standard Oil and Tobacco cases the court took an entirely new attitude and stated that only restraint of trade which was undue was meant to be covered by the law (although the word "undue" is nowhere in the act), that the restraint meant was that which was not permitted under the common law; and, therefore, that only contracts or combinations were prohibited by the law which were unreasonably in restraint of trade.

The Existing Situation

What is the situation with which we are confronted? The Sherman law and the state anti-trust laws are upon the statute books. We have gone through one stage of development, have made the first step in the second stage. In is now proposed to neutralize the decisions of the court by defining "reasonable" so that it shall mean prohibitive of all contracts and combinations in restraint of trade, and thus succeed in getting statute law back to where Senator Sherman and the people thought they had gotten it 30 years ago through the enactment by Congress of the Sherman act. This would compel the beginning of another third cycle of development.

This solution of the problem of combination makes me think of the philosopher, Harold Udgardin, by name, an Esquimau who lives up on Hudson Bay. "Harold has one trap now set in the same place where it has been for 20 years; he has not yet caught a fox in it, but he will not consider changing its location, as it is a good place, he reasons, and ought to catch a fox. "It preys on his mind if he doesn't visit and trim this fox trap regularly, and he has been known to get up and go out in the night to bait it when he was especially negligent."

Notwithstanding that the trap of the Sherman Act has never caught a fox for 20 years, and only smells in one or two places of a tail or a leg, it is proposed to strengthen its "springs" and sharpen its "teeth" with the expectation that it will then catch a sufficient number of foxes to become the solution of the great fundamental problem of concentration of industry.

Note—Abstract of address to the 16th annual convention of e American Mining Congress, Philadelphia, Oct. 20-24, 1913.

*President of University of Wisconsin.

Sherman Law Should Apply to Small Dealer as Well as the Greatest Trust

In regard to the Sherman Act, it has been assumed that its only violators are the great combinations. This assumption is made in practically all discussion of the question. The Steel Trust, the Tobacco Trust, and a few other large combinations are mentioned; and it is supposed that the small business men and the small producers are not acting in violation of the law. But the principle of coöperation which the Sherman Act tries to suppress extends from the great industrial centers, like Philadelphia, to the country cross-roads. Does it make any difference here in Philadelphia, the home of anthracite, whether one buys anthracite of one retail dealer or another? It doesn't make any difference in the country cross-roads either. The price is just the same from all the dealers in the same locality. The same is true ot ice, the antithesis of anthracite, and is also true of all standard articles.

The principle of coöperation has extended from the great manufacturers and the great dealers of the large cities to the small manufacturers and small dealers of the small cities and even villages. All are coöperating in exactly the same way; the principle is the same for the large and small men, one is violating the law just as certainly as is the other. I am willing to stand for enforcement of law when the law is enforced alike for all; but when somebody is picked out because he is in the front seat, or because it is good politics to attack him and ninety-nine or nine hundred and ninety-nine are allowed to escape, I say that it is a profoundly immoral situation. And that is exactly the existing situation in this country. The politician who says "Break up these trusts; destroy them," says with the very same breath, "We must have coöperation among the farmers."

Why, gentlemen, the cranberry growers of Cape Cod, New Jersey, and Wisconsin, sell about 90 per cent. of their products through an agency down in Hudson St., New York. Similarly, many products of the farmers, illustrated by cotton, citrous fruits, etc., are marketed through coöperative selling agencies. Have we heard ot the Attorney-General prosecuting these farmers? Congress understands the situation and at its two recent sessions it attached to the sundry civil bill a clause containing an appropriation of $300,000 for the enforcement of the antitrust laws, which included the provision that none of this money should be spent in prosecuting combinations or agreements of labor, nor spent "for the prosecution of producers of farm products and associations of farmers who coöperate and organize in an effort to and for the purpose to obtain and maintain a fair and reasonable price for their products."

The purpose of this provision is clearly to make the Sherman law class legislation by indirection and, in effect, to prevent equality before the law of the manufacturer as compared with the farmer. Also, some of the smarter state legislations have seen the situation, and in order to prevent the farmers from being hit by their antitrust bills exempted the products of the lands so long as in the hands of the producers. This was true for Texas, Louisiana, Illinois and South Dakota. You see the state legislature, like Congress, saw tnat the farmers have so many votes that they have to be dealt with gently when they form a trust.

The Farmers Will Not Be So Enthusiastic About "Trust Busting"

But some of the state laws got into the United States courts, and these courts promptly declared these exemption unconstitutional as being special legislation, and not giving equal protection under the laws. I venture to predict that it will not be so popular a political game to shout, "Bust the trusts" when the farmers understand that their trusts are also to be "busted."

No more pernicious or immoral legislation was ever passed by Congress or by the states. Fortunately Ex-President Taft and President Wilson have both protested against the pernicious action of Congress. The principles of justice in regard to trusts and combinations are alike for the manufacturers, the farmers and the laborers.

There is just as close-riveted an arrangement between the three icemen in the country town as there is in steel; and any solution of the problem of combination, if it be a just solution, must be applied not only to steel tobacco, etc., but to the small tradesmen and the farmer Just as certainly as the great combinations are violating the Sherman Act, as I have no doubt many of them are so are the small aggregations of wealth violating state antitrust statutes. This general violation of the trust laws, national and state, is the problem that we have before us.

The Breakdown of Competition

The late Attorney-General of the United States, Mr Wickersham, said: "If we can only break up each of the great combinations into six, or eight, or ten parts, these different parts will compete; the tendency to competition under such circumstances is irresistible." But I tel you, gentlemen, the tendency for coöperation in this Twentieth Century is so much stronger than the tendency for competition, that you will never restore the latter in the old sense.

There will be competition between different classes of goods; there will be competition between the great mail-order house and the village grocer; there will be competition in service; and I am just as anxious as anyone to have trade regulated by competition as far as possible but, as a matter of fact, competition has broken down hopelessly in this country to adequately control prices to adequately control quality; and we all know it.

We have recognized the failure of competition to secure quality by the establishment of the pure-food laws. Why should we have pure-food laws if competition will give us good quality? If articles were fraudulently sold, so important to the general welfare as foods, there was a remedy in the courts. If I were sold a thing as pure strained honey, that was wholly innocent of having any relation whatever with a bee, I had a remedy in law; I had been fraudulently dealt with. Why didn't I take my case to the courts? You know why. The loss was so small that it was impracticable for the individual to thus obtain redress.

Finally, recognizing the fact that competition was wholly inadequate to secure pure food, national and state pure-food laws were enacted and special officers were designated upon whom was imposed the duty of protecting the public. When we confessed that competition did not regulate quality, and imposed the duty of protecting the public upon administrative officers, we succeeded in get ng pure food, or a reasonable proportion of pure food, least, and never until then.

Magnitude and Efficiency

Now, why is it that competition to regulate prices has oken down? Because of the simply enormous advan- ges which come with coöperation. One of these has en mentioned—the economic gains of magnitude. In is matter there are no differences of opinion up to a rtain magnitude. We all agree that the nation will not turn to the country grist mill; but this does not settle e question regarding the magnitude that is permissi- e.

I have looked through the books, and I have had perts examine the literature of concentration, to find investigations had been made which would give facts pon which to base a judgment regarding the relation efficiency and magnitude. The only such investigation which I find record is that of Herbert Knox in regard the steel industry. The late Commissioner of Corpora- ons, as the result of an elaborate inquiry, reached the nclusion that the large concentrations in the manufac- re of steel are very much more efficient than the small es, and for certain products he gave the amount per n. He stated that the five great combines—United tates Steel, Lackawanna, Cambria, Jones-Laughlin, Re- iblic—have an advantage for pig iron and steel billets om $2.50 to $5 per ton, as compared with the smaller ganizations. Similar investigations should be made r other lines of industry than steel, so that we may have scientific foundation upon which to decide how far we all permit magnitude.

The Forces Which Produced Combination

This brings us to the next point of the discussion—the rces which have led to combination in this country. ne of these is directly related to what has just been id. Each step from the loose association to complete erger was taken to escape the last decision of the court cause of the irresistible tendency for coöperation. Ger- any and England are vastly more fortunate than we are this respect, in that, permitting reasonable coöpera- on, they have allowed firms to coöperate wthout driving em to consolidation. The units of the various cartels id combinations in these countries have therefore sur- ndered their autonomy to a less extent than the ele- ents of the combinations in this country.

Other forces which have led to combination are the sire to eliminate or at least restrict competition, the de- re to limit output and divide territory—and in con- ction with these the maintenance of prices. These rces may be legitimate or illegitimate, depending upon e extent to which they are carried.

he Relations of Coöperation and Conservation

There can be no question that the competitive system, ien unrestrained, is positively opposed to the policy ot nservation. This is true alike for minerals and timber, it tonight I can only consider the first aspect of the bject.

The minerals of the earth, and here are included not ly the metallic minerals but the carbon compounds, quired the building of the earth for their making. Min- al deposits are doubtless in the process of manufacture the present time; but even if so, this is at so slow a te as to be negligible. From the point of view of mankind, the stores of minerals in the earth are deposits of definite magnitude upon which we may draw but once and which by no possibility can be increased. To illustrate, with regard to the banks of coal, the situation in regard to this subsurface produce of first importance for the human race is similar to that of a man who has a deposit in a bank upon which he may draw, but cannot by any possibility increase by a single dollar. He is obliged to make his existing bank account last throughout his life. Similarly the mineral resources of the earth must last throughout the life of humanity.

In this connection it should be recognized that modern civilization would not be possible without the mineral resources of the earth—no iron ships, no metal agricultural implements, no tools except those of stone, no fuel but wood. Without the subsurface products of the earth, we would at once return to the material conditions of the stone age.

It is therefore incontrovertible that, from the point of view of the human race, economic systems or laws which result in unnecessarily rapid use of the mineral stores of the earth are indefensible; but such are the economic theories and laws now dominant in the United States. The wastefulness of the competitive system may be proved with regard to every product which is taken from the earth.

Coal

The most disastrous losses in the mining industry, so far as the future of the human race is concerned, are in connection with coal. Dr. Holmes, in a paper upon mineral wastes, presents the facts in regard to the ruinous wastes of the unrestrained competitive system in connection with coal. He says that in the early days of mining, when there was much subdivision of ownership, that not more than 30 to 40 per cent. of the anthracite coal in the veins mined was brought to the surface, leaving from 60 to 70 per cent. in the ground. He states that even at the present time not more than 50 per cent. of the anthracite reaches the surface. The situation is similar for bituminous coal, but until recently the losses for such coal were substantially half. This loss has been somewhat reduced, but it continues to be appalling.

Dr. Holmes estimates that since the beginning of mining in the United States, "two billion tons of anthracite and three billion tons of bituminous coal have been left underground in such condition as to make its future recovery doubtful or impossible." The principles which, from the point of view of conservation, should apply to mining of coal are well known. So far as practicable the mines should be so worked as to make one superimposed vein after the other available. Coal slack should be reduced in amount and should be utilized. No considerable percentage of coal should be left in the ground as pillars. If these reforms were introduced, the losses could be reduced to half the present amounts and possibly to one-fourth.

Under the Sherman law there is no opportunity to limit output, divide territory, or regulate prices. If the operators could agree upon limtation of output, and division of market so as to reduce freights, and could arrange for reasonable prices which would give them no more than their present profits, they would then be able to follow these principles in mining their coal; for they themselves would be gainers in prolonging the life of their mines, and, far more important, many future generations would be the immeasurable gainers in that they would have an adequate coal supply.

It is doubtless true that the plan proposed would result in somewhat higher prices for bituminous coal; but, even so, coal would be cheaper in this country than in others. This slight additional increment, however, would be but a small social burden for this generation to bear in order to leave an adequate heritage to future generations. Under the competitive system, we are recklessly skimming the cream of the natural resources of a virgin continent with no regard for the rights of our children.

Corrective Measures

My proposal, gentlemen, is neither regulated competition, nor regulated monopoly, but retention of competition, prohibition of monopoly, permission for coöperation and regulation of the latter.

It has been proposed that combinations should be so divided that no one corporation shall have more than 50 per cent. of any business. That is Mr. Byan's suggestion. In the case of the Stanley bill, the presumption of the violation of the Sherman law is against a corporation having more than 30 per cent.

Now, it makes no difference whether you break the great combinations up so that no one combination has more than 50 per cent. or 30 per cent. of a line of business, or so that there are 10 with 10 per cent., or 20 with 5 per cent. The demonstration of this lies in the fact already mentioned that thousands of farmers may and do coöperate in marketing their products just as perfectly as do the five great manufacturers of steel. This they do in various parts of the United States for numerous products.

At the present time there are state and national movements to still further extend the advantages of coöperation to the farmers. Since it is unquestionable that the sense of justice of the citizens of the United States will support the courts in prohibiting class legislation, we shall, therefore, I believe, ultimately permit coöperation in all lines of business alike. If we, however, retain freedom of competition, permit concentration sufficient to give efficiency, allow reasonable coöperation, and prevent monopoly, this will require regulation just as it has been necessary to regulate the railroads. This done, the Sherman law will be forgotten.

Has there been any prosecution of the railroads for violations of the Sherman law because of collusion in fixing rates? And yet, every one of us here knows that they are just as flagrant violators of the Sherman Act as any other class of corporations in the United States. Are the freight rates the same for different roads between any two points? Are the passenger rates between Philadelphia and Chicago identical on all roads? Can you do better in price by traveling over the Pennsylvania than over any other road? The rate is the same, providing the speed is the same. How does it happen that the roads all got together? Just by Providence, I suppose. It was doubtless by a Providential act that these rates were fixed identically upon all roads, under the same conditions, all over the country.

Why is it that nobody proposes to indict the railroads for collusion? Simply for the reason that the rates which they can charge are controlled by commissions, national and state. Nobody any longer wishes to make them further trouble, because the public is protected by its commissions. That is the sum of the whole matter. The railroads are just as much amenable to attack under the Sherman Act as any other combination in the United States; but when the railroads are giving reasonable rates and are competing in giving reasonable service, even if the law is on the statute books and is the hallowed thing that has been described, the sense of official justice is such that they are not attacked in the courts. Will the Attorney-General of the United States or the Attorney General of this or any other state bring suit against the railroads for conspiracy in fixing rates when the public is properly protected? I have not heard the proposal made anywhere.

However, it is a wrong condition when we have on the statute books a law of a kind which requires the officials of justice to close one eye whenever they pass by the men in control of one great group of industries, and a the same moment see other men not one whit more guilty We ought to remedy this condition so that honorable business men shall not be in the position, the unfortunate position, of being technically violators of statutes which are not advantageous from the public point of view to enforce

Trade Commissions Should Be Created

I have not time to more than touch upon necessary modifications of the law; but the substance of my remedied proposal is that there be an interstate trade commisson and state trade commissions, which shall have substantially the same powers to regulate coöperation in industry that the Interstate Commerce Commission and th State Commerce Commissions have in regard to the public utilities. It seems to me that the Interstate and Stat Commerce Commissions and the administrative bodies fo the pure-food laws point the way for the next constructive step in the development of the laws.

The Sherman Act can be left to apply, as defined by the Supreme Court, to monopoly. Unreasonable restrain of trade may be defined as monopolistic restraint of trade and it is rather generally agreed that monopoly should be prohibited. To make the matter perfectly clear anothe amendment should allow reasonable coöperation, but such coöperation should be under the watchful eyes of administrative commissions in order to protect the public.

Powers of Commissions

The coal operators at a conference held in Chicago in May, 1912, agreed upon a bill for the establishment of an interstate trade commission. The important power proposed for such commission was the authority to decid whether any proposed arrangement is in opposition to th Sherman Act as it now exists under the interpretation o the courts. If any arrangement is approved by the commission as in accordance with law, then the organization which enters into such an arrangement is to be free from prosecution under the Sherman Act. Also the commission is empowered to require the discontinuance of any existing trade arrangement, practice or combination, which i found to be in violation of the national trust law.

From the foregoing discussion it is apparent that while the above proposal is a move in the right direction an is an improvement upon the present situation, it is no adequate. The frightful wastes of unrestrained competition as applied to mineral products, and especially as applied to coal, can only cease when operators are permitted to coöperate in limiting and dividing the market. However, if they are permitted to thus coöperate, there i nger that the public may be required to pay unreason-ble prices; and therefore any such coöperation should be nder the watchful eyes of commissions that should have ower to require the discontinuance of any trade arrange-ent found inimical to the public welfare.

Ultimately also it will probably be found necessary to ve the commissions the same authority in regulating ices that the State and Interstate Commerce Commis-ons have in regulating rates for the public utilities. The irden of fixing prices should rest with the operators; it whenever any man feels that a price is unreasonable, e should have the right to have his case brought before commission for adjustification. If, after investigation, ny price is found to be unreasonable, the commission ould have authority to issue an order that it be made asonable.

All Unfair Practices Should Be Prohibited

The proposed trade commissions should have a number other powers which I have not time fully to discuss. is clear that all unfair practices should be prohibited; d by unfair practices is meant to include everything vered by the term immoral practices under the com-on law. If I were to define unfair practices, it would that they should include all those practices of every nd which are inimical to the welfare of the people.

Another, and perhaps the most vital, point of the law eating the state and interstate road commissions should that when an individual is wronged through unrea-nable rates, or rebates or other discrimination, it should the duty of a public commission to handle his case.

Powers to Be Given Gradually

I should not expect that these trade commissions, if eated, would at once be granted all the powers which ey would finally exercise. In this matter I should expect e same slow development to take place that has occurred garding the commissions which control the public utili-es.

More than 40 years have elapsed since the creation of e Interstate Commerce Commission. These early com-issions had the powers of recommendation of requiring iblicity, etc. Finally the commissions of Illinois and wa were given the power to control rates, but compara-vely little came of this authority. It was not until 05 that in Wisconsin a comprehensive law was enacted control the railroads. The passage of the law was rongly resisted by the companies, because of the fear at the proposed commission would treat them unfairly, t the act was passed despite their opposition.

Under the law, there were appointed in that state by nator R. M. La Follette, then Governor, a scientific mmission composed of three men, one a well known wyer, the other a keen statistician and the third an inent professor of transportation. I have heard from ny of the railroad men, including a railroad president d some of the ablest railroad lawers, that the Wiscon-n commission has been fair and reasonable both to the ilroads and to the public. Neither side would go back the previous situation—upon one side hold-up bills to defeated by questionable methods at each session of the gislative; upon the other side numerous rebates and scriminations. Before we had a railroad commission Wisconsin there was continuous war between the peo- and the railroads. Since that commission has been created, and especially since its authority has been extended over all the public utilities of the state, including the adjustment of rates, we have had peace.

Interstate Commerce Commission

Similarly, the Interstate Commerce Commission had small powers at first, merely powers of recommendation; and it was only six years ago that this commission finally gained the power to fix maximum rates; and at the present time the commission has not the power to initiate rates. The initiative rests with the railroads. It is only two years ago that the Interstate Commerce Commssion gained the power to suspend advances of rates pending investigations regarding their reasonableness. Thus, stage by stage, conservatively, the development of the control of public utilities by administrative commission was worked out.

Substantially the same history applies to the pure-food laws. Doubtless the extension of laws of this class will go on until fabrics are included; until fraud will be practically eliminated through the use of false names for any commodity.

I would have the proposed trade commissions pass through a similar history. Thus, precisely as with the Commerce Commissions, by slow development, industry where coöperation has so extended as to become affected with a public interest would be controlled by trade commissions under the same lawful methods that have been applied to the public utilities. Concentration, coöperation, and control are presented as the keyboard to the solution of our great industrial problems.

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Natural-Gas Consumption in Pennsylvania

From almost every point of view, the consumption of natural gas in Pennsylvania surpassed in 1912 that of any previous year. According to B. Hill, of the U. S. Geological Survey, the consumption in 1912 reached a total of 173,656,300 cu.ft. This gas was used largely for manufacturing and other industrial purposes, the quantity thus consumed reaching 124,324,911 cu.ft. valued at $14,333,048, the average price being 11.53c. per thousand cubic feet. It is needless to say that Pennsylvania leads all other states in the quantity of gas consumed.

Gas is the ideal fuel for the manufacture of iron, steel and glass, for which the state of Pennsylvania is noted. The presence of natural gas in this state has helped to make it the leading manufacturing commonwealth in the country. Since the introduction of natural gas into the industrial establishments of Pittsburgh, in 1883, this district has continued to grow until it has become the greatest industrial center in the United States. It is estimated that more fuel is consumed in the city of Pittsburgh and its immediate vicinity, and more coal and coke is shipped into and through the Pittsburgh dstrict than any other district in the world.

⁂

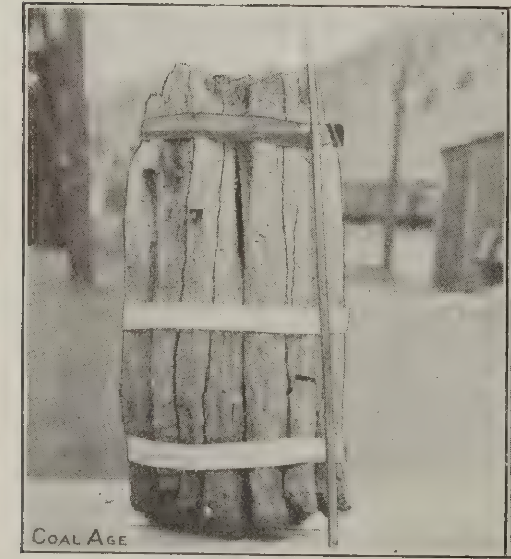
When it is necessary to use doors in mines, these should be given a sufficient fall to close readily, or be made self-closing by the use of weights or other means. It is generally necessary to have an attendant or trapper at most doors on main haulageways and because these trappers often neglect their duties, trouble results. If the doors are made to close automatically, much of this trouble will be avoided, as the doors will close when released.

SNAP SHOTS IN COAL MINING

A Tornado Recently Destroyed the Mine Buildings and Houses of Western Mining Company at Bush, Ill.

The Coal Tipple at Kirkwood Mine of Hutchinson Coal Co., in Ohio, Was Demolished by Railroad Wreck

A Closer View of the Kirkwood Tipple at Bridgeport, Ohio, after Railroad Wreck, July 7, 1913



Sample of Coke Made at Sunnyside, Utah

Tipple and Washer of Donald No. 2 Mine, Connellsville Coal & Coke Co., Gray's Landing, Penn.

LEGAL DEPARTMENT

Place for Delivery of Coal

By A. L. H. Street*

SYNOPSIS—Silence in contracts to sell coal as to where delivery shall be made frequently leads to litigation. Trade custom or surrounding circumstances sometimes supply omission. Judicial construction placed upon particular words and phrases which have been used in coal sales contracts. Review of cases passed upon by the appellate courts.

⁂

Contracts to sell coal have often been involved in litigation on account of their failure to clearly specify where the parties intended delivery to be made. As pointed out in a recent article in Coal Age, treating another phase of the subject (that involving the question when delivery to a carrier operates as delivery to the buyer), the question as to what place is fixed for delivery becomes important in instances where the ownership of the coal or other subject of sale at a particular time is in dispute, as affecting, among other things, questions whether the buyer or the seller is the proper person to make claim against the carrier for any loss or delay of the shipment during transportation, or whether the seller is entitled to recover the contract price, notwithstanding the loss or injury. Avoiding the phases which were treated in the article mentioned, I present the following observations, which are based upon the appellate court decisions cited:

When a Contract Is Silent as to Point of Delivery

It is usually held by the courts that when a contract is silent as to where delivery is to be made, it will be presumed that the parties intended that delivery should be made at the place where the subject of sale was situated when the bargain was concluded. The legal principle will be controlled, however, by any contrary trade custom, in view of which the parties may fairly be presumed to have contracted; or the intention of the parties as to where delivery shall be made may be inferred from the surrounding circumstances (45 Nebraska Supreme Court Reports 655). Accordingly it has been held that, under an agreement to sell coal at a specified price at the mines, for shipment to the buyer at Chicago, with draft attached to the bill of lading, payable on arrival of the coal, delivery was required at Chicago, though the buyer agreed to pay the freight (80 Illinois Appellate Court Reports 144.)

When a contract requires delivery in a certain city, but it and the surrounding circumstances fail to disclose the intention of the parties as to the exact place where delivery was intended to be made, the buyer is entitled to fix the particular point at which he desires delivery (36 Missouri Supreme Court Reports 310). Prepayment of freight charges by the seller tends to show an understanding that delivery is to be made at the destination, but does not, of itself, conclusively establish such intention (Pennsylvania Supreme Court, 50 Atlantic Reporter 928.)

A Case in Arkansas

It would seem that a contract to sell coke "f.o.b., Van Buren, Ark.," too plainly requires delivery at that point to render it necessary to invoke judicial interpretation, but the Arkansas Supreme Court has been called upon to affirm that point (122 Southwestern Reporter 239). On the other hand, however, a contract by a Philadelphia coal company to furnish a Rhode Island concern with its coal requirements at "$2.40 per ton of 2240 lb.. f.o.b., Philadelphia" was held to merely fix the price up to that point and to require delivery at the buyer's yard, where the agreement further specified that a third party or any other mutually satisfactory concern should freight, insure, unload and haul the coal to the buyer's works for $1.35 per long ton; that the total payments to both parties should be $3.75 per long ton, delivered at the buyer's yard; that the coal should be delivered at such times and in such quantities as the buyer should direct; and that the seller should have at least one thousand tons of coal constantly in the buyer's yard, which amount should not be stored during continuance of the contract without being drawn upon by the buyer; but that the coal should remain at the seller's risk and not be paid for until expiration of the contract, etc. (United States Circuit Court of Appeals, First Circuit; 162 Federal Reporter 848.)

How an Ohio Coal Company Lost Out

A contract by an Ohio coal company to furnish fuel for the use of "The Edison Illuminating Company, of Detroit, f.o.b. Michigan Central R.R.," was held by the Michigan Supreme Court to require delivery on the tracks of that railroad at Detroit. It was further held that postal cards sent by the coal company to the buyer, reading: "In our office. We ship this day on your account," followed by a schedule showing car numbers, quantity shipped in each car, etc., were not inconsistent with a mutual understanding that delivery should be made at Detroit (107 Northwestern Reporter 915.)

Where a coal dealer wrote a customer at Aurora, Ill.: "Until otherwise advised, the price of coal for future orders will be $4 for lump and nut, and $2.50 for pea coal, f.o.b. E., J. & E. tracks, your station," and in accepting a subsequent order wrote: "We cannot make the pea coal any lower than $2.75 per ton, f.o.b. E., J. & E. tracks, Aurora," it was decided that the contract required delivery to the customer at his home town; rendering it unnecessary for him to look to the carrier for delay in delivery (126 Illinois Appellate Court Reports 253.)

Agreement to "furnish" coal on board cars at a certain place constitutes a contract to deliver there, although, under the agreement, the coal is to be weighed at another point to which it is to be shipped (Iowa Supreme Court, 33 Northwestern Reporter 622.)

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*Attorney at law, St. Paul, Minn.

POWER DEPARTMENT

A Central Station in West Kentucky

By Newell G. Alford*

SYNOPSIS—The utilization of the exhaust steam from three air compressors for the generation of 500 kw. of alternating current. A considerable proportion of the power required for three mines is thus made from a waste product formerly thrown away.

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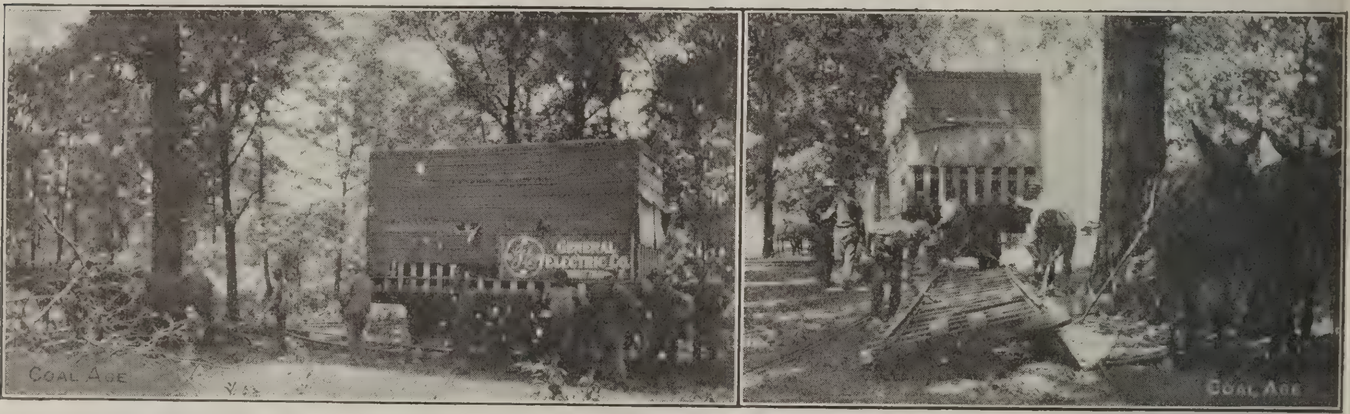
With the advent of a central-power plant at Earlington, Ky., the St. Bernard Mining Co. has set the power efficiency pace for its fellow operators in the western Kentucky coal field, simultaneously inaugurating a new era for its vicinity and joining the quest popular in other districts for increased operating economy.



Two Views of the 500-Kw. Turbine Being Taken through the Woods to the Power Plant

During its continuous operation in the last 43 years this company has thrived under cautious management. Its high production mark was reached last year with an output of 1,750,000 tons of coal from its nine individual developments, the relative locations of which are shown upon the accompanying map.

The operation of these nine mines prior to the new installation required 4500 boiler horsepower, necessitating the consumption of 250 tons of run-of-mine coal per 24 hours. At each of the mines which the company operates electricity is used for either cutting coal, haulage or lighting. With the exception of mines No. 9, No. 11, and the Hecla shaft, each operation had its own isolated power-generating unit. From the No. 9 power house now abandoned direct current was transmitted to the three operations above named, but due to heavy line losses the potential varied considerably at the points of application.

Several Machines Were Discarded

The abandoned power house built in 1903 contained an accumulation of generating machinery which had been purchased from time to time as requirements demanded. The original installation consisted of four simple slide-valve engines direct connected to generators. The prime movers drew their supply of steam from five Erie City boilers of 150 hp. each on which steam pressure was carried at 70 lb. during operation.

In consequence of the relatively high operating cost of this plant a possible means of reducing its expense was sought, and attention was turned to the possibilities of the compressor plant located in the hills about one and one-half miles to the northeast of the old power house. This plant distributes compressed air within a radius of two and one-half miles to the working faces of No. 9 and No. 11 mines. The boiler room at this plant is 72 ft. long and 54 ft. wide. It is a wooden frame covered with corrugated iron sheeting. This structure contained a battery of four Erie City boilers, each rated at 150 hp., and upon which steam was carried at 95 lb. Occasionally for short periods these boilers were overloaded prior to the first operation of the new turbine installation. A fifth boiler has since been added.

Adjoining the boiler room is the air-compressor room 60 ft. long and 45 ft. wide, of the same type of construction as the former, with the exception that it has a concrete floor. Here two Norwalk and one Ingersoll-Rand straight line air compressors supply air under a pressure of 85 lb. These three machines compress 3538 cu.ft. of free air per minute during the day, and 3224 cu.ft. at night. Allowing for friction losses, the power required to compress this amount of air is 590 hp. during the day, and 538 hp. at night.

Assuming a steam consumption of 40 lb. per horsepower-hour, which is conservative in this class of apparatus, the steam consumed during the day is found to be 23,600 lb. per hour, while a corresponding consumption at night is 21,500 lb.

As a check upon these computations upon the available amount of steam, it may be stated that there is 600 hp. of installed boiler capacity, which, under normal rating, evaporates 30 lb. of steam per horsepower-hour, or a total of 18,000 lb. per hour. Since, however, the boilers were overloaded periodically it is safe to assume that there is at all times 20,000 lb. of exhaust steam per hour available for use in a mixed or low-pressure steam turbine. With this conclusion substantiated a course of action was mapped out which had as its culmination the generation of current from the exhaust steam from the air compressors.

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*Earlington, Ky.

As Much Current Generated as Before

The installation of such a low pressure generating unit made possible the production of the same amount of current as was formerly generated in the old power plant without the fuel charges and expense of upkeep on the boilers and numerous machines. In other words, the steam consumed by the turbine at the new plant is merely a waste product from the air compressors. The only charges against such an installation are interest depreciation and the maintenance of the turbine and condensing apparatus.

The load on the former direct-current power house consisted of five mine locomotives ranging from 12 to 15 tons, five motors, four coal-cutting machines, and the mine lights at Hecla, No. 9 and No. 11 mines. This made a total connected horsepower of approximately 985, which is equivalent to about 740 kw. Readings taken at the old power house showed that the average load was about 240 kw., with a maximum peak of 550 kw. The latter never lasting over two or three minutes. This gave a load factor based upon a nine-hour day of 33⅓ per cent.

As this plant was a 250-volt direct-current installation, located at Earlington, some distance from the point where power was used, heavy line losses were incurred. These are for the most part eliminated in high-tension alternating-current transmission. Consequently it is perfectly safe to assume that the load factor on the new alternating plant does not exceed 35 per cent., including losses in the transformers, motor generators, and transmission lines.

Since the installation of the new units the following motor load has been added to the original amount. Two 25-hp. fan motors, one 5-hp. shop motor, and a 30-hp. motor for propelling the cooling tower fan. With these additions there is a total load of approximately 820 kw., which at a 35 per cent. load factor gives an average day load of 285 kw., with a maximum peak of approximately 625 kw. The plant above mentioned, however, was considered as the first step in the centralization of power, with still further developments to follow. Six of the company's mines still use isolated power generation. With this in mind, further expansion was constantly considered in all designs and specifications.

The type of alternating current to be adopted was the first problem to be dealt with. In the first place, there are two standard frequencies from which to choose, namely, 25- and 60-cycle. Each of these has its advantages, the former being perhaps better adapted to power transmission, and the latter to lighting. The line losses decrease as the voltage increases, but since the farthest point of application in this case was only three miles distant, and the element of adnger is to a large extent reduced by lower voltage, the current finally decided upon was three-phase, 60-cycle, at 2300 volts.

Provision Made for Using Live Steam

Although the exhaust steam supply from the air compressors is constant under normal conditions, there are times when one or more of these machines are shut down. With a mixed-pressure turbine any stoppage of supply from the compressor may be made up efficiently by live steam from the boilers. This is done by means of special expanding nozzles, which receive the steam at boiler pressure and deliver it against the turbine rotor. These nozzles, of course, occupy but a small section of the wheels' periphery. With this construction the normal power of the turbine can be secured from high- and low-pressure steam at the same time, the two pressures being utilized in whatever proportion the conditions demand.

There were two principal reasons for selecting the 500 kw. turbine of General Electric Co.'s manufacture: (1) The mixed-pressure machine offered by this company had a higher efficiency guarantee than the low-pressure turbines of other makes. (2) The mixed-pressure machine is available as a high-pressure turbine at reduced efficiency. This would be a highly desirable feature should the management at any time adopt a complete new installation, in which a low pressure turbine could not be advantageously employed.

A View of the Transmission Line

The street lighting for the town of Earlington is provided for in the Wood arc machine, which was moved to the new plant from the old power house.

Piping Details

Live steam is supplied to the compressor room by a 10-in. header on which is placed a horizontal cast-iron steam separator draining to two heaters of the open type. Immediately beyond this is a group of valves through which steam is delivered to the three air compressors, a 200-kw. Curtis turbo-generator unit held for case of emergency and the expansion nozzles of the larger turbine mentioned above.

The exhaust system consists of a 14-in. pipe extending from the heaters to the exhaust turbine. A tee in this line supplies the exhaust steam to the heaters, another provides an outlet to the atmosphere, while the exhaust from the compressors is teed in at convenient points.

Between the exhaust feeders from the compressor and the feed-water heaters is a 12-in. back-pressure valve located beside a 12-in. gate valve. The function of this back-pressure valve is to relieve the exhaust system when the supply from the air compressors exceeds the demand of the mixed-pressure turbine. Between the 12-in. gate valve and the feed-water heaters, the exhaust line from the condenser circulating pump enters the exhaust header. The circulating pump is, therefore, relied upon as the chief source of exhaust steam for feed-water heating purposes.

Since the exhaust from the air compressors contained about 10 per cent. of water in suspension and a considerable amount of oil, it was deemed wise to equip this line with a horizontal oil and water separator, which admits only dry steam to the low-pressure connection on the 500-kw. turbine. A similar piece of apparatus, but built for high pressure, protects the 200-kw. machine.

Between the oil and water separator and the 500-kw. turbine is a Davis flow-regulating valve. This tends to close when the exhaust steam demanded for the turbine exceeds that furnished by the air compressor. It also tends at all times to maintain atmospheric pressure between this valve and the compressors and prevents their speeding up. In other words, it prevents the vacuum from coming back through the turbine to the air compresors and their piping system. At such times, the deficiency of steam is made up by the high-pressure steam connection.

Placing the Turbine on Foundation

The condenser, which is common to both the 500-kw. and 200-kw. units, is located between their respective foundations. In arranging the piping to this machine, a 36-in. corrugated copper expansion joint was attached directly to the exhaust flange of the 500-kw. turbine; and a similar device 16 in. in diameter is placed upon the 200-kw. machine. This relieves the turbine structures from strains which would otherwise result from the expansion and contraction of the piping in the condensing system. Atmospheric exhaust release valves are inserted in this piping also.

Selecting the Condenser

The selection of the condensing equipment was an item which received careful attention in view of the fact that the water conditions were somewhat unusual. About a mile from the power house there is a lake 125 acres in area. It was first thought that by placing a pump upon its shore and laying an intake and discharge line from this point to the power house, enough water could be supplied for condensing purposes.

This, however, had its bad features, in view of the fact that it would have been an expensive arrangement, and, furthermore, that during the summer months the entire contents of the lake might have been heated up to a considerable degree.

Another alternative was as follows: To the north of the compressor plant is a steep ascent, on the top of which is an ideal spot for a pond of about 5 acres in area. This could have been secured with slight excavation and damming on one side. Water could then have been fed to the condenser under a gravity head and returned to the far end of the pond to prevent short-circuiting. This would allow a considerable area to act as a natural cooling surface. This idea was, however, abandoned in favor of a forced draft type of cooling tower with which apparatus an operator is, to a large extent, independent of atmospheric conditions.

The cooling tower chosen for the condenser is of the Barnard forced draft type manufactured by the Wheeler Condenser & Engineering Co. The tower is of steel-plate construction, the filling consisting of galvanized wire mats hung vertically edgewise to the air current, thus reducing the load on the fan. Two fans are employed upon a single shaft, which is driven by a General Electric 30-hp. motor.

This tower is guaranteed to cool 1450 gal. of water per min. (which is the amount necessary for circulating purposes) from 100 deg. to 83 deg. F., with air at 70 deg. F. and a relative humidity of 70 per cent.

A Jet Condenser Is Employed

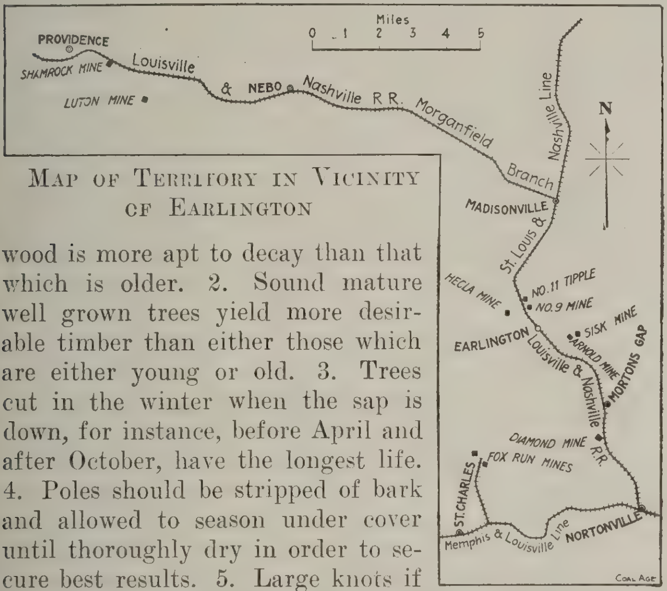
The condenser is a Wheeler rectangular jet of the low level counter-current or rain type, and is designed to serve both the 200-kw. high pressure and the 500-kw. mixed pressure turbine, maintaining a vacuum of 27 in. referred to a 30-in. barometer when operating with the cooling tower under the conditions above named. Steam enters at the end of the shell which is amply proportioned to prevent any loss due to the pressure drop. The cooling water, which is siphoned from the tower tank, enters at the top and is broken up by a series of baffles and spray-plates into a fine rain, condensing the exhaust and becoming heated to a point very close to the theoretical temperature of the vacuum. The more intimate the mixture of the steam and water which can be obtained in a condenser, the smaller the quantity of injection water required. In this instance, the small amount of injection water necessary reduces not only the power demands upon the withdrawal pump, but also the size of the cooling tower. In practice, the temperature of the circulating water and condensate leaving the condenser is within 5 deg. of the theoretical temperature of the vacuum.

To remove the air and circulating water from the condenser and force it to the top of the cooling tower, a Christie patent high vacuum combined air and tail pump is mounted directly below the condenser. This is a horizontal double-acting brass fitted machine, in which air is admitted through a central port and is compressed up to atmospheric tension between the cone-shaped piston and the cover. The pump is unique in that the piston pushes the cover off its seating at each stroke, clearance being entirely eliminated. Make-up water for the condensing system is supplied through 5000 ft. of pipeline from a reservoir suppying house water to the town of Earlington.

High-tension transmission lines varying in length from 1¼ to 3 miles are carried on wooden poles placed 125 ft. apart. Ordinarily, these vary in length from 25 to 35 ft., and were cut from carefully selected and seasoned chesnut. Over rights of way, however, 45-ft. poles are used. The tops of these poles are cut wedge shape at an angle of 45 deg., the bottom being sawed off square. In order to prevent, as far as possible, undue decay caused from the collection of moisture, the gains, the tops of the poles and the bottoms as far up as the ground line, are given two coats of creosote.

The Specifications for Poles

In making the specifications for the line poles, the following points were taken into consideration: 1. Young wood is more apt to decay than that which is older. 2. Sound mature well grown trees yield more desirable timber than either those which are either young or old. 3. Trees cut in the winter when the sap is down, for instance, before April and after October, have the longest life. 4. Poles should be stripped of bark and allowed to season under cover until thoroughly dry in order to secure best results. 5. Large knots if sound and trimmed smooth are not objectionable. 6. A perfectly sound dead or dry streak which does not impair the strength of the pole is not a defect.



Map of Territory in Vicinity of Earlington

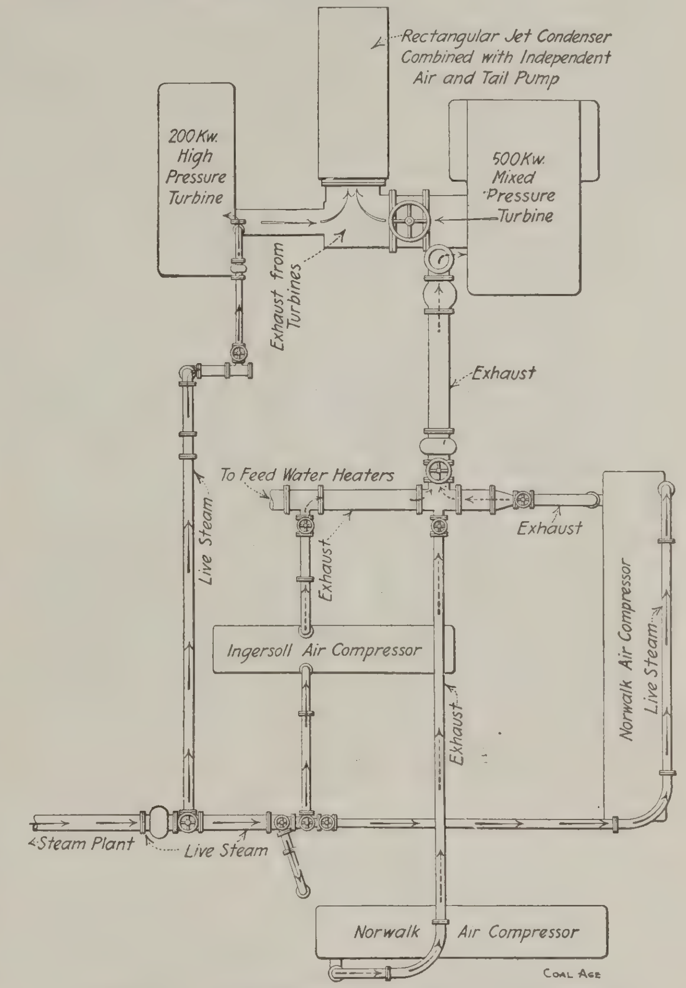
A continuous lightning-protection system traverses the entire length of the transmission line. This consists of No. 4 galvanized wire running continuously from pole top to pole top. The top of every second pole is equipped with a metal point, projecting vertically into the air on which in turn is fastened a short piece of wire. This projecting wire and metallic rod are then connected with the earth by a ground wire down the side of the pole.

The transmission right of way running for the most part through thick forest was cleared 20 ft. upon each side of the line. In addition to this, trees which were long enough to fall across the wires, were felled. The average height of the tree determined this factor and, since forest fires of magnitude rarely occur in this territory, 40 ft. was considered sufficiently wide.

The switchboard which was furnished by the General Electric Co. is of natural black slate, and was designed along lines of standard up-to-date practice. It is located so as to face the generators, thus avoiding unnecessary steps on the part of the operator. It consists of eight panels arranged as follows: One double exciter panel; two three-phase generator panels, one regulator and exciter motor panel, one double circuit, three-phase outgoing feeder panel, one three-phase motor and exciter panel, one D.C. generator panel, and one D.C. feeder panel.

These panels are arranged in a row with synchronism indicator and ground detector on brackets.

Instrument transformers are installed in the busses at such points as to operate a power factor indicator and curve drawing polyphase wattmeter, showing total load on station and the power factor. In addition, a vibrating reed type of frequency indicator is installed on the busses. Each outgoing feeder is protected by an aluminum cell lightning arrester of the latest design including charging resistances for arresters of all voltages. The oil switches are installed on the panel pipe supports, 5 in. behind the board. They are non-automatic for the generators, and automatic with secondary transformer trip coils for the feeders and motors.



Principal Features of the Piping Layout

The alternating current instruments are of the horizontal edgewist type, wattmeters and power factor indicators, operating on the well known direct-reading dynamometer principle. The ammeters and voltmeters are on the inclined coil magnetic vein principle. The direct current instruments are of the D'Arsonval type.

Aside from the main switchboard at No. 9 shaft, there are auxiliary boards at both Hecla and No. 11 mines, each of three panels, and controlling the motor generator sets and the direct feeders supplying power to each of the two operations.

All the direct current equipment is of a single polarity controlling a negative grounded system. Circuit breakers are installed on the negative side of the generators, and the positive side of the feeders, thus providing complete protection from short circuits, wherever they may occur.

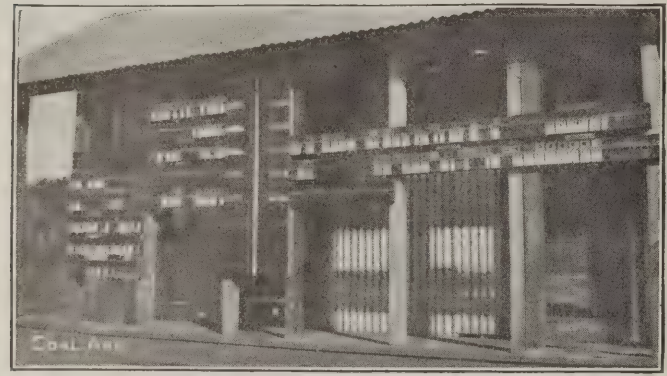
Since in the installation of this plant, conditions were encountered which were new to this field, Mr. T. M. Means, of the Randolph-Means Co., of Pittsburgh, Penn., was retained as consulting electrical engineer.

Identification Check Board

The Northwestern Improvement Co. has just installed at its Mine No. 7, Cle Elum, Washington, a new check board which is particularly suitable as a system of identification. It is in reality a representation of the mine. The central position of the board shows the main slope, manways and return airways. Travelingways are painted yellow, and return airways, red.

The levels are marked, on either side of the slope, and arms are projected therefrom, on which the miners' check numbers are hung. These arms are marked in subdivisions to correspond with the several batteries and blocks by which the level is being worked, and these subdivisions are further marked to designate the rooms which are being worked.

A blue enamel check with the miner's number thereon is left on the board at all times, and a brass check which the miner takes with him into the mine, hangs over it. No miner or company man can enter the mine without his check. By this system it is easy to tell how many men are working in the mine, and where they are distributed. If a miner changes his working place, the blue check corresponding to his check is transferred to the proper place on the board.



Showing Check Board at a Washington Mine

No part of the mine is designated upon the check board except those parts where men are working, and no numbers are hung upon the board except those numbers under which men are working.

Several short arms to one side of the main board are used for company men's checks. In case any of the checks are not hung upon the board when the miners come out from work, the foreman is supposed to ascertain whether the men are still in the mine, and if so, institute a search for them immediately.

Considerable confusion could arise in case the men do not coöperate with the management and obey instructions regarding the taking out and returning of their checks, but when they come to realize that it is to their interest to have such a method of knowing they are safe, they will not fail to do their part, just as they expect the management to do when things go wrong.

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The Evans Mining Class

The mining class, in charge of Evan W. Evans, mine superintendent, D. L. & W. Coal Co., Scranton, Penn., has opened its fall term under auspicious circumstances. The class has a present enrollment of 25 members, representing all classes of mining work, among which are numbered the following: Mine machinist, pipeman, timberman, pumpman, footman or cager, driver-bosses, drivers, barn-boss, oiler, car-runners, surveyors, firebosses, miners and laborers.

The class has been growing in popularity each year, and much credit is due Supt. Evans for the disinterested effort he has put forth to teach the principles of mining to men anxious to learn. Mr. Evans has the hearty congratulations of Coal Age in this work.

OUTCROPPINGS

To some men every day is a holiday.

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He who knows but little tells it quickly.

⁂

Laziness has no advocate, but many friends.

⁂

Have money in your head, but not in your heart.

⁂

The successful man generally has more ballast than sail.

⁂

Knowing a thing is nothing unless another knows you know it.

⁂

Some men go to work like a balky mule and quit like a high-speed hoist.

⁂

The man who starts out with the intention of doing no more than his part is apt to be satisfied with doing only a part of that.

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Except for a scarcity of men, the possibility of a car shortage this fall and a strike next April, together with the new Pennsylvania tax on anthracite and a few other minor things, the coal operator has nothing to worry about.

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A recent government publication states that "Alaskan coal fields continue to be undeveloped, according to the United States Geological Survey." A Western paraphrase of the above statement would probably be: Alaskan coal fields continue to be undeveloped because of the United States Geological Survey.

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Apropos of a recent decision of the New York Court against the anti-smoke laws, a correspondent in the New York "Times" writes: "* * * * However turn on the smoke and the grime and the sulphur fumes; it is unconstitutional and unreasonable to interfere with anybody's business conducted at the smallest expense to the parties conducting it, and the rest of us be damned."

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

Illinois Mining Institute will hold its next regular meeting in East St. Louis, Nov. 22, beginning at 9:30 a.m.; two sessions will be held, morning and afternoon. All who are interested in mining are invited. Applications for membership can be had by writing the Secretary-Treasurer, Martin Bolt, 1526 So. College St., Springfield, Ill. Headquarters will be at the Illmo Hotel. Meetings will be held in the City Hall.

EDITORIALS

Where Responsibility Is Lacking

Anthracite operators and labor leaders alike are puzzled over the serious situation which confronts them in the anthracite-coal fields of Pennsylvania. In the first year since the signing of the four-year agreement between the anthracite mine workers and anthracite operators on May 20, 1912, there were more strikes, more losses in wages and more losses in business than in the whole nine years of the previous agreements, and the trouble is continuing up to the present time.

Figures covering the first year of the existing contract, gathered from all operators, show that there were 165 separate strikes which involved 139,486 men and cost the various collieries at which they occurred 312 days of work. These figures show further that the loss in wages to the mine workers during the year on account of these numerous strikes aggregated $886,327.92, and the loss in output from the mines amounted to 613,756 tons.

The appointment of local grievance committees, so eagerly urged by the mine workers and the labor leaders who represented them at the conference with the operators last year has proved fruitful of more strikes than any other cause. The men seem to have forgotten entirely their obligation to remain at work and subject their grievances through the proper channels to the Conciliation Board if they cannot be settled locally. It is even more discouraging to the operators that the promises and efforts of the labor leaders themselves are equally unproductive of results in the shape of continuous work.

Month after month there has been a series of "button strikes," which is simply another way of saying that, agreement or no agreement, union mine workers will not go into the mines with mine workers who are not wearing a union button. The operators have made every effort to emphasize in the minds of the men the section of the award of the Anthracite Coal-Strike Commission, which specifies that there shall be no discrimination against or interference with any person on account of membership or non-membership in any labor organization, and have printed it in half a dozen languages and posted it at the collieries. But according to them, the mine workers do not even seem to be informed of the provisions of the agreement entered into in their behalf by their representatives, in spite of the fact that this agreement was formally ratified at a general convention of the mine workers at Pottsville, Penn.

It is such examples of union domination that make mine owners in nonunion fields so determined in their resistance to the encroachments of the Mine Workers' organization. West Virginia operators, for instance, would never have fought so bitterly in their recent struggle if they had not known how union supremacy has practically bankrupted the industry in Illinois. Operators in the latter state today are principal actors in financing the fights of the United Mine Workers in Colorado and elsewhere.

There is no question but that when present anthracite agreements expire, the operators in the hard-coal field will refuse to enter into further contracts with the miners' union, unless there is some guarantee that the men will abide by the terms of their agreement. The menace of unionism today is its irresponsibility.

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Labor Leaders Sentenced to Prison

We are often forced to the conclusion that Canadian courts are more fearless and less sentimental in meting out justice to those who violate the law than are similar tribunals in the United States. In this country politics often reaches as high as the judge, and as a consequence, the administration of good government is thwarted. The recent judicial action at Nanaimo, B.C., whereby a number of rioters were sentenced to the penitentiary, is a case worthy of attention of all those who advocate proper punishment for the law-breaker, no matter whether he masquerades under the guise of a union labor leader or a trust official. Justice is not justice, unless it can reach in all directions with equal effectiveness.

On Aug. 11 and 12, serious riots occurred at Ladysmith, B. C., where a number of mines are located. Arrests followed, and those who were taken into custody pleaded guilty. On Oct. 23, after a lengthy trial of the cases, Judge Howay sentenced the strike leaders to two years in the penitentiary. One of the men, Taylor by name, is vice-president of the British Columbia Federation of Labor, and vice-president of the Ladysmith local of the United Mine Workers of America. Samuel Guthrie, a second offender, is president of the local chapter of the Miners' Union.

In passing sentence on these men the judge remarked:

> It is the custom when sentences are given that the judge make but little comment thereon, but in this case I am going to depart from the usual custom, for these cases are out of the ordinary, and call for a few remarks from me.
>
> This was not an ordinary riot. It was not a sudden ebullition of pent-up feeling, but it shows all down the line a deliberate scheme, a design from one end to the other. The riots at Nanaimo, South Wellington, Extension and Ladysmith all for one purpose, were simultaneous and carried out with one line of action. Bombs were thrown, property destroyed and peaceful citizens made to flee for their lives, and a persistent state of terrorism indulged in. After the bomb-throwing at the Temperance Hotel, parades were formed, evidently for the purpose of showing your numerical strength, and that you were in charge of the situation.
>
> Your counsel knows there is no more sympathetic man than myself, one ever ready to extend mercy, but I have read over all the depositions and find but little mercy you have shown. I read that the homes in which there was sickness were not free from missiles which you threw, and that little children hid in cupboards and under beds to escape rocks thrown upon them in merciless fullisade. The only mercy shown was the mercy of God.
>
> I was appealed to on behalf of your wives and children, but what do I find here? I find your women singing "Drive the scabs away," and throwing rocks themselves, and these actions take away much of the strength of the appeal for mercy on your behalf because of your women. The evidence shows not only that you have been rioting, but that a far more serious charge might have been laid against you.
>
> I recognize I have a duty to perform, painful in the extreme, but the law-abiding people in this community must be protected and punishment meted out, so that there may be no further occurrence of these lawless riots.

When our American courts learn to fulfill their duty in the same spirit of fearlessness and fairness, shown by Judge Howay, the strike-riot will cease to be an effective argument in the settlement of labor troubles at coal mines. We all should be ashamed of a civilization that will not accept some system of common-sense arbitration in preference to methods, based on violence and bloodshed.

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The Mine Cave Problem

The mine-cave problem, in Scranton, Penn., has recently assumed an interesting aspect, at least as viewed from a philosophical standpoint. With all justice to the large coal corporations operating in and about that region, it must be said that the stolid indifference of the management has at last aroused the merited indignation of the people whose property and lives are endangered by their greed, to a pitch that demands recognition.

The increasing menace to the surface rights and holdings, growing out of the unconscionable robbing of the pillars in the underlying mine workings, resulted first in the appointment of a so-called "Mine Cave Commission." After two years of patient waiting and endurance, the sufferers are asking the question: "What has the Mine Cave Commission done to relieve the situation and render lives and property in Scranton more secure?" This commission has been maintained at an annual expense of $7500, and further than making an extended investigation of the mine workings and reporting their condition, nothing has been accomplished of a tangible nature.

The feelings of the residents in West Scranton, who are the worst sufferers from surface settlement, are now wrought up to a pitch that compelled the Scranton Board of Trade, in defence of the business interests of Scranton, to take active steps looking to the adjustment of the conflicting interests of the respective owners of the surface and mineral rights. At a recent meeting of the board, the president, R. E. Weeks, referred to the mine-cave problem as "a danger that is overestimated by people out of the city and underestimated by many people in the city."

The entire question of liability for surface support in the extraction of the underlying coal has been very much confused by the fact that the principal surface holdings of residents in the city, have been acquired by purchase from the coal companies, who reserved the mineral rights, which reservation was made a clause of the deed to the surface, in each case. It has been claimed by the coal companies that the reservation of the mineral rights included the right to remove said mineral without liability for damage to the surface. This claim has received more or less support as being the logical result of purchasing surface property with such a reservation in the deed. It was claimed that the purchaser did so with his eyes open and in full knowledge of the possible results growing out of the extraction of the coal.

An important decision of the State Supreme Court, made recently, however, is more favorable to the surface holder. The Supreme Court has held that surface support is an inherent right of the purchaser. The grantor who owns in fee both surface and coal, cannot reserve to himself the inherent right of the grantee to surface support. If he attempted to do so, the court would restore those rights to the grantee.

This decision of the Supreme Court is in direct line with the argument advanced editorially, by Coal Age, Nov. 9, 1912, p. 651, which reads as follows:

> It may be an unwritten law, as far as the mine-cave problem is concerned: but, has a purchaser any power to waive an inherent right on which the value of his purchase depends? Does the vendor give value for value when he demads such waiver? Is such a waiver binding, notwithstanding the fact that it is written in and made a part of the contract of sale? * * * * In all exchange it is binding on both parties alike to give value for value. * * * *
>
> It is a question whether there is a lawful exchange in a contract that contemplates the subsequent right of the vendor to damage the property that has become the rightful possession of the vendee. A waiver conveying such right would seem to have no legal or moral binding, because of its being contrary to the recognized and established principles of equity and justice.

We believe thoroughly in the inherent rights of the individual, which are as sacred as the constitutional rights of the citizen. It is a principle of law that such rights cannot be waived or bartered away at will by the individual, and a contract containing such waiver naturally has no standing in court. It has been suggested by some that, while it may be granted, that the clause in a deed, reserving the mineral rights underlying the property, is not binding and does not exempt the grantor from liability for damage to said property; a clause releasing the grantor from such liability and subscribed to by the grantee would be effective. We opine, however, as stated above, that such release or waiver is without force in law. We base this opinion on the fundamental principle of commercial interchange, which demands, value for value and permits no gamble on a purchase.

The waiving of the right to surface support by the purchaser of a property is equivalent to writing a contract that would menace the valuation of that property, for years to come. Admitting for the sake of argument that allowance is made in the purchase price for such possible deterioation of value, the fact remains that the lives of the dwellers on the surface is endangered by the writing of such contract; because, the release of the owner of the mineral rights, from just liability for damage arising from the extraction of said mineral, gives to him a free hand, by reason of which the stability of the surface is jeopardized to a greater degree than would otherwise be the case.

It is true that the possessor of mineral wealth is unable to realize on his possession unless he can take that mineral from Nature's storehouse. But the extraction of the mineral must form a part of the consideration in determining its value and such extraction must not entail damage to adjoining property. The value of such mineral in place is necessarily affected by the paramount condition of its availability.

The large coal corporations operating at Scranton and elsewhere, are, we believe, too wise and broad minded to attempt to dodge the issue. We believe the management will eventually meet the surface dwellers and make an equitable adjustment of their conflicting interests. In this way only can the coal industry thrive. We believe the refusal to come to such an equitable understanding and adjustment of claims could only result in dishonor to the great coal industry.

The Mine Cave Commission should at this time exert themselves and prove their efficiency as a commission appointed in the interests of the people and the great coal industry that dominates not only Scranton but the entire anthracite valley.

SOCIOLOGICAL DEPARTMENT

Technical and Industrial Education

By H. V. Gummere*

Everyone who has studied the subject at all knows the intimate relation between the industrial standing of our country and the knowledge and the efficiency of those engaged in its industries. While this relation holds for all, from the humblest unskilled operative up to the corporation manager, it seems especially important to have those in the lower places realize it, since their educational opportunities are certain to have been the more limited. Thousands of boys yearly leave the lower grades in schools to go to work. To most of these will come later a keen realization of lost opportunities and the absolute necessity of making up for them, for they enter commercial or industrial occupations utterly unfitted for advancement to higher positions.

What they can do, how well their capabilities can be developed, will, in most cases, depend on what possibilities their employer brings to their attention and makes available. Most employers are well aware of this and try to help those who work for them to find ways of gaining the knowledge they need. Experience has shown that this pays merely as a business proposition. A young fellow whose character and habits of life are known, whose personality and ability have been tried out, is usually much to be preferred to any stranger when appointments are made to positions of large responsibility.

Objections to Institutes and Corporation Schools

Associations or clubs, whether local or branches of a national body, which meet periodically to hear an address or participate in a discussion are at best educational only in a supplementary way. Any study done in connection with them is not consecutive and usually to be beneficial needs a foundation which is too often lacking. The corporation school is rather new, and for every corporation large enough to organize and conduct one, has interesting possibilities; the tendency, however, is always to train for immediate usefulness in detail rather than in broad principles, while the variety of courses which can be offered is bound to be small. If, for example, the school is organized to benefit the workers in the shop, what shall be done with those in the business office who need an entirely different training?

A correspondence school, either within the corporation or outside its control, offers the only means of systematic study for those residing at considerable distance from the large centers of population, or where the number of persons interested in a given kind of work is too few to warrant the formation of a regular class. When schools can be reached where experienced teachers are in charge, where direct recitation methods are used, and where a variety of courses can be offered in a systematic way, the establishment of regular classes in off-duty hours offers the best method of giving the desired instruction. These usually take the form of night schools or evening classes.

Advantages of Night Schools

Night schools have flourished in the last 20 years wherever established. Their advantages are fully recognized by those who have been attending them. Such are: Immediate help over difficulties, procured by having an instructor at hand; the opportunity to learn by the mistakes of others in the class; compulsory regularity in study, so important even to a very earnest student; the stimulus of numbers; the desire of each student to stand well in his class; the possibility of drill; and many others. Such school work, offered not only in the evening, but in the late afternoon as well, is likely to have a remarkable growth in the future.

Some Unanswered Problems

To the general public the work which is being done as regards both scope and quality remains practically an unknown quantity at the present time. Employers are just waking up to what has been and can be done in this way. No matter what educational agency is used, a number of problems arise which can be solved only by the coöperation of employers, employees and teachers. What courses are needed? How much time can be required of busy men for school work? What fees are suitable? How shall those be accommodated who have long distances to travel and high carfares to pay? Should classes be established in locations remote from the schools, in shops or in offices, but under the control of their trained faculties? These are some of the problems which have never been fully answered. The answers would probably differ with a change in locality. Other questions are almost wholly the concern of the employer, such as: What school and what kind of education can best help my employees to gain what I want them to know? Which of them can profit most by systematic school work? How can I help them to get it?

A Conference on Industrial Education

The only satisfactory way to reach a conclusion on these matters is to have some common meeting ground for all interests where free discussion can have full play. In Philadelphia steps to this end have already been taken. Last spring representatives of the Central Educational Institute of the Young Men's Christian Association, Drexel Institute, the Franklin Institute, School of Industrial Arts, Spring Garden Institute, Temple University and the Wagner Free Institute of Science, joined with representatives of the Philadelphia Trades Schools and the Philadelphia and Camden Public Schools in arranging meetings for the purpose of becoming acquainted with one another's work and the educational problems employers have to face.

Wishing to avail themselves of the wide resources of the Public Education Association of Philadelphia, members of the faculties of the participating institutions are now organizing a section of that association to be known as The Industrial and Technical Education Conference of the Public Education Association. The membership is to consist of educators and employers, and the purpose is to seek earnestly the solution of the problems arising from the needs of the vast numbers of young people who have never had proper opportunities for securing that knowledge which will pave the way to better service and higher responsibilities.

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*Secretary, The Industrial & Technical Education Conference of the Public Education Association of Philadelphia, Penn., 1015 Witherspoon Bldg., Philadelphia, Penn.

It is hoped that the movement thus started will spread to include not only local representatives, but all those employers whose employees find in the large cities opportunities which cannot be offered nearer. This means extending the work to a great many miles from Philadelphia, for classes could easily be arranged outside the city, managed by experienced teachers who are specialists in any given line of instruction.

The Panther Valley Mining Institute Banquet

The second annual banquet of the Panther Valley Mining Institute was held in the Armory at Tamaqua, Penn. on Saturday evening Oct. 18. Although the night was rainy and exceedingly disagreeable, between 300 and 400 members of the institute and guests were present.

After a season of gastronomic activity, which was thoroughly enjoyed by all in attendance, W. J. Whildin called the meeting to order and made a few remarks upon the progress which had been made during the past year.

The Panther Valley Mining Institute is an organization for men and boys which has for its object (1) To advance the welfare of the men employed in and about the mines in the anthracite coal fields, and (2) to advance the interests of the mining industry itself.

To accomplish this end schools have been organized holding their sessions upon two evenings each week. In addition to this, regular meetings of the Institute are held from time to time when papers are presented upon subjects pertinent to mining, and calling out discussions upon various mining subjects.

During the past year these meetings were held each month, and the papers read covered such objects as "First-aid Work," "Mining," "Ventilation," "Method of Mining the Mammoth Vein," "Transportation," "Electric Haulage," and the "Geology of the Panther Creek Valley." Last year there was a total enrollment in the schools of 86, and an average attendance of 46. There were four departments in these schools; the primary, the mining, the electrical, and the mechanical departments, all well patronized, the electrical and mining being probably the most popular. An idea of what this school is doing for the men may be gained from the results obtained in the mining department. Fifteen members of the class in mining this spring took the examination for mine foreman's and assistant mine forman's certificates. Every one of the fifteen passed. Not only this, but the mine examining board stated that these men's papers were the best they had ever read. Futhermore, seven out of the fifteen are now filling positions and have filled them during the past several months as a result of their being able to qualify and having these certificates.

Although any one, regardless of where or by whom he may be employed, may become a member of this Institute and attend its school and meetings, the membership is nevertheless made up very largely of employees of the Lehigh Coal & Navigation Co. This firm, therefore, knowing that an educated man is much more efficient than an ignorant one, does all in its power to promote the welfare and encourage the membership of the Institute.

After Mr. Wildin's remarks, speeches were made by Edwin Ludlow, vice-president of the Lehigh Coal & Navigation Co., S. D. Warriner, president of the same company, Prof. Preston Lambert, of Lehigh University, and George M. Roads, attorney-at-law.

All of these gentlemen spoke of the universal regard for the man who, whatever his station in life might be, had the ambition and the stamina to rise through the improvement of his mental facilities to a higher plane in his work and in the community. Mr. Roads called particular attention to the miner's sturdiness of character and persistence of purpose in time of need which was well portrayed in the words of the Institute Song which had just been sung:

> "When their comrades are in danger,
> Without thought of praise, or gain,
> The faithful boss and miner
> At their posts will all remain."

A Motor Ambulance for Colliery First Aid

An ambulance car for colliery purposes has recently been built at Doncaster, England. It is made from kiln-dried birch, varnished natural color. The inside of the body is made smooth so that it can be readily cleaned. The equipment consists of two collapsible stretchers of the St. John Ambulance Society type, fitted with telescopic handles and included in the ambulance equipment are two sets of splints, liniment, bandages, hot-water bottle, etc. Immediately behind the front windows is an moveable seat for an attendant.

The ambulance is lighted inside by electricity and special provision is made for ventilation by means of louvers over the main windows which are controlled from the inside by shutters. Folding steps are provided at the rear. They are made very wide and have broad treads so that the entrance to and from the ambulance is as easy as possible. Two large doors are fitted at the rear with the same idea in mind. The springs on the vehicle are extra long and are provided with shock absorbers, the shelves being covered with seat cushions and the stretchers placed under them, thus making it possible in an emergency to take the members of the rescue brigade from one colliery to another.

The chassis is fitted with a 15.9 hp. engine having four cylinders cast in pairs with a bore of 80 mm. (3.1 in.) and a stroke of 130 mm. (5.11 in.). Thermo-siphon cooling is used; all valves are enclosed; the tappet valves are adjustable, the bearing surfaces are of ample dimensions, and are white-metalled. The lubrication is by forced feed, four speeds and reverse are provided and the chassis frame is specially constructed of a suitable length, the rear axle being of special strength and worm driven. Every attempt has been made by Messrs. E. W. Jackson & Son, of Doncaster, England, the constructors, to produce an easy riding vehicle adapted to the special purpose for which it is designed.

Lackawanna Steel Co.'s Contest

In remarkably realistic tests the 30 first-aid teams of ie Ellsworth Collieries Co. demonstrated to an assemlage of nearly 5000 people on Friday, Oct. 17, the methds to be followed after an explosion or other accident icident to the mining industry.

The towns of Cokeburg and Ellsworth observed a oliday, and the residents of the towns as well as the hool children witnessed the exhibition.

A procession of 880 scholars from Ellsworth and Cokeurg schools passed in review before those assembled nd were given a great ovation. Each of the rescue firstid teams then performed in the open field, and after ompleting its exhibition reported to the field hospital i charge of Drs. French, Rote and Kirby, and then the ommissary department of the company served a lunch hich had been prepared by the domestic-science pupils f the two schools.

Then followed an explosion in an improvised mine iat had been constructed of brattice cloth the width and eight of an ordinary gangway. Men supposed to have een overcome by fumes and smoke were carried from the iine by the helmetmen, the first-aid men reviving them ith respirators and pulmotors. The rescue men entered ie mine which was 200 ft. long, with a life line. A umber of men belonging to a rescue team were reprented as being caught in a fall of timber and other ébris and a rescue was effected.

The judges of the work of the teams were Dr. C. C. ans, of Uniontown; Dr. A. E. Baer, of Uniontown, and r. Geo. Hayes, of Monongahela.

D. L. & W. First-Aid Meet

Employees of the Delaware, Lackawanna & Western R.R. Coal Department, working in such of their mines as are situated between the Pettebone and the Nanticoke collieries, articipated in an interesting first-aid contest at the Nanticoke State Armory on Mitchell Day, October 29, in the presence of a large number of spectators, the contestants making an admirable showing.

The events were as follows:—

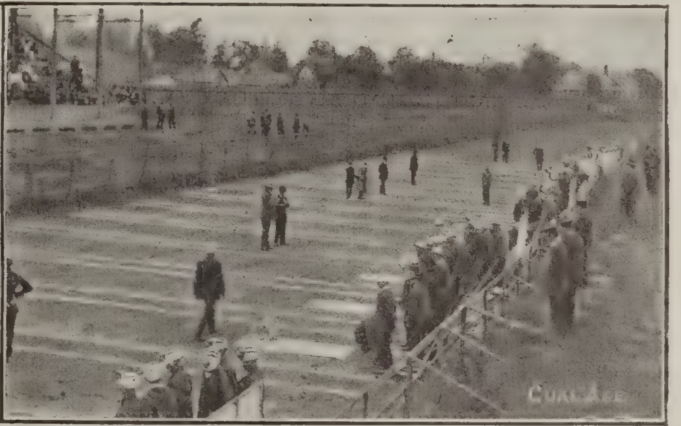
One-Man Event—Man has been overcome by gas in a low place, and has become unconscious. On falling he received a blow on the right temple. Drag him 10 ft. out of gas, and carry him 50 ft. and administer artificial respiration for one minute. This work to be done as you would do it in the mine.

Two-Man Event—Compound fracture of the left collar bone and fracture of the jaw. (Barton bandage.)

Full-Team Event—First. Gas burns on face, hands, arms and body. Second. Fractured ribs on left side, and fracture exposing ulna bone. Third. Compound fracture of left leg 6 in. below the knee, and simple fracture of right upper arm. Fourth. After a fall of rock the patient is found with the following injuries: Simple fracture of right forearm, both bones; severe cut in palm of left hand, bleeding in jets; simple fracture of left leg, 4 in. above the knee, and lacerations of the head.

The one-man event was won by William Jones, of the Bliss Colliery, who was awarded a gold signet ring. The two-man event was won by William L. James and David J. Williams, of the Truesdale. Both were given watch fobs. The full team event was won by No. 1 and 2 shaft team, of the Truesdale. The best general average was made by the Bliss colliery team, of which the captain is William Hill. The individuals in this team each received a prize consisting of a first-aid outfit.

The Jellico Creek Team Ready to Demonstrate



How the Field Was Arranged for the Contest

The Steel Explosion Gallery Used to Exhibit the Effect of Replacing Black Powder by Permissible Explosives

Scenes at the Knoxville Meet

The meet held by the Association of Tennessee Mine Foremen, the Bureau of Mines and the American Red Cross, at Knoxville, was skillfully planned. It will be noted how methodically the grounds were marked so as to place the teams without confusion. The canon used at the Pittsburgh meet in 1911 was set up at Knoxville and again proved the superiority of permissible explosives. This exhibit was the first of the kind held in the South and a committee was formed to examine the powder, the coal dust, the clay and the loading of the cannon. The precautions taken by this committee served more fully to convince the miners that coal dust is dangerous even when gas is not present.

DISCUSSION BY READERS

Starting Fan after Explosion

Letter No. 7—An experience of nearly 40 years in coal mining, eight-tenths of which has been in an official capacity, has made me deeply interested in the welfare of miners. Having engaged, many times, in mine-rescue work, following explosions and inundation of the workings, I am particularly interested in whatever pertains to such work.

An explosion in a mine results in the loss to the operator, not only of his workmen but also of much of the mine equipment. The one makes it difficult for him to again operate under the same favorable conditions, as before, even when he has repaired the damage done to the mine and its equipment. The other may have crippled him financially, or so embarrassed him that he must operate at a great disadvantage, for a long time to come.

In the rescue work in which I have engaged, it has always been my experience that the fresh-air current is of the first importance. In most of this work, we did not have the help of oxygen helmets, or any other breathing devices. Were it not for the fresh-air current that we carried with us into the mine, we could not have survived. The work had to be done with care and caution. The logical way is to consider the surroundings of the zone in which the explosion has occurred. The mine foremen and his assistants are the men who are or should be acquainted with the conditions existing in the mine. Briefly, the questions to be considered are: Was the mine free from gas and dust, in a general way? Was the mine a dry and dusty one? Was the mine damp or very wet?

My experience has proved that the answer to these questions are of the greatest importance to the men who are to undertake the work of rescue, and who must decide the question of whether or not the fan should be started immediately after the explosion. Human life may depend on this decision. In answering the question in reference to starting the fan as quickly as it can be repaired, let us consider different conditions.

1. Assume the mine generates some gas and is dry and dusty. In this case, whether the fan is blowing or exhausting, it would be better to explore the mine a certain distance at least, to ascertain, as far as possible, its condition. The information thus gained would enable you to arrive at an intelligent decision. If fire exists in the mine, this should be extinguished before starting the fan.

2. The mine may be divided into two sections—rise and dip workings. If the dip workings were damp or wet, so that pumps were required to keep the places dry, I would have no fear in following the air current as we restored the ventilation by repairing the doors and stoppings in that section The rise workings would be more dangerous to penetrate and great caution would be required in attempting to explore them.

In case electricity is used in the mine, it would be important to have the current shut off promptly to avoid the danger of the ignition of gas that is accumulating in the mine. The question of starting the fan would depen on the conditions I have named, and experience mus be the guide.

Robt. W. Lightburn.

Adelaide, Penn.

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Collapsible Stoppings

Letter No. 8—I have been greatly interested in th discussion of this subject in Coal Age, but have not bee converted to the idea of building such stoppings in mines The first consideration is to make the mine safe for work Whether the mine is gaseous and liable to a dust explosion, or whether the mine may be considered as practically safe from the explosion of gas or dust, does not, t my mind, alter the question.

In my opinion, all stoppings should be built in th center of the crosscut where they will be most protected They should be constructed of incombustible material an built in a manner to stand all shocks incident to coa mining. If possible, the strength of the stopping shoul be such that it will withstand the force of a small loca explosion.

It is important in building stoppings to start th foundation on the solid rock floor; and not, as I hav often seen done, leave two or three inches of dirt unde the walls. My reason for building a solid stopping o concrete, or stone or brick masonry is that this class o stoppings will maintain the circulation of the air bette and keep the working face more clear of gas, thereb making an explosion less liable to occur. A light collapsible stopping will necessarily leak air in a short tim owing to the settlement of the roof or of the stoppin itself. In case of a local explosion of gas or dust, suc permanent stoppings will not ordinarily be destroy and the rescue party will be able to enter the mine mor promptly and with less danger, because the air curren will still be circulating through the workings. Me working in such a mine would have a greater chance t escape than where the stoppings have been built ligh and are destroyed by the force of the explosion.

A. Miner.

Scranton, Penn.

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The Safety Lamp and the Eyesight

I have been much interested in the numerous letter that have been published relating to the effect of th continued use of the safety lamp on the eyesight o miners; and noticed one letter from a brother miner, a Wylam, Ala., who claims that the continued use of th safety lamp is the direct cause of the disease known a "miners' nystagmus." While such a statement may b true, in some exceptional cases, I believe the fact is no proved, as there are other causes common to coal mining that may be responsible for the trouble.

My experience has led me to believe that the practic of "solid shooting" with black powder may be one caus of this trouble; especially where the ventilation of the mine is not the best and the atmosphere is full of powder smoke, for the most of the day. I remember some 30 or 40 years ago, this was the condition in the Belleville Track mine near St. Louis. The coal was shot off the solid with black powder, and the mine air was thick with powder smoke. As a result, the miners were much troubled with a continual winking of the eye, and many suffered from a burning feeling and weak eyes. On coming to daylight, they were like blind men. I remember that some who did not remain at the mine recovered, while others were not as fortunate.

Scotch and English miners suffer much from fires. Many are troubled with blisters on their eyes, caused from undermining and cutting hard seams of coal. They could not look steadily at a safety lamp or a naked light. I worked 15 years in Scotch mines and 45 years in mines in the United States, and have used the safety lamp for nearly 50 years, and have not found that its use has injured my sight, in the least degree.

The fireboss, in examining a place for gas must look steadily at the light of the lamp, and it seems to me would be in more danger of the light affecting his eyes than the miner who seldom looks at the safety lamp; but sets it 6 or 8 ft. away from his work and only gives it an occasional glance to see that it is all right. But, strange to say, I have never heard a fireboss of any experience complain that the safety lamp hurt his eyes.

In my opinion, the miner's eyesight is injured more by the semidarkness and the dust and smoke in which he must work. I believe that these conditions have as much or more to do with the generally poor eyesight of miners than the continued use of the safety lamp.

George Templeton Main.

Republic, Ala.

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To Prevent Gas and Dust Explosions

The subject of the prevention of accidents to employees in a gaseous and dusty coal mine, is undoubtedly one of the most important in mining. By *important* I do not mean that there are more men injured and killed by explosions of gas and dust than from other causes incident to mining, although the public, at large, seem to be under that impression. The reason is that when men are injured or killed by falls of slate or coal, or some other mine accident, there is little heard of it; but should an explosion of gas or dust occur, in any part of the world, all the newspapers throughout the country are at once filled with big head lines "Another Mine Explosion," etc., giving the number of killed and injured. That is why I say this subject is an important one; because it is up to the officials of all coal companies, from the president down to the assistant foreman in the mine, to show the public that the coal-mining industry can be handled in a manner as free from accidents as any other business or industry.

Now, in the operation of a mine, the officials on the ground are and should be the men who should do their utmost to prevent accidents occurring; because the higher officials are not at the mine daily and are not, therefore, acquainted with the different conditions that constantly arise and which may cause the death or injury of one or more of their employees. The management lays down certain rules and gives general instructions how the mines are to be operated. If, however, mine officials—superintendents, mine foremen, assistant foremen and firebosses become careless, it will be difficult to convince the world that coal mines can be run without accident.

To prevent accidents to employees, from explosions of gas or dust, the most important consideration is the ventilation of the mine workings. In order to have good ventilation and to remove all obnoxious gases that the coal gives off, it is necessary, when opening a gaseous seam, to install a fan large enough to give sufficient air; and also to drive all airways large enough to make it possible to split the air current when needed, so as to ventilate each section separately, and do away with so many doors by building overcasts at the mouth of each section. Every foreman should see that the stoppings are put up in good shape and that no stopping is built under a drawslate, or any other loose slate. It is an easy matter for a foreman or fireboss to make his inspection and report everything in good shape; but while he is visiting some other section, possibly a piece of bad slate, which he did not notice, breaks down one of the stoppings and short-circuits the air. Then, perhaps, by the time the miners arrive at their working places, enough gas has accumulated to cause a serious explosion when it comes in contact with an open light, possibly killing every person in that split. Another important advantage in splitting the air current is that in case an explosion should occur, caused either by the negligence or carelessness of the foreman, or his assistants or otherwise, it will tend to confine the explosion to that section or split in which it occurs. There is no doubt in my mind but that nearly all accidents can be avoided if the mine foremen attend properly to their business.

About 17 years ago, I was a miner in a gaseous mine, in which open lights were used, and it did not take me long to find out that the seam was liberating a considerable amount of gas. After working for some time, I started to visit some of the workings in the section where I was working. I went into a room some 200 ft. in length, with an open light on my cap. I had proceeded up the room a hundred feet or more, when the miner at the face suddenly shouted, "Take that lamp off your head." I did so in a hurry and walked up to the face. The miner then showed me a chalk mark on a prop he had setting close to the face, showing how low the gas was found that morning by the fireboss. The chalk line was about a foot from the top. I gathered up my tools and left that mine in a hurry; as I came to the conclusion quickly that, some day, there would be an explosion there if things were not remedied. About two years later, the newspapers were filled with the account of an explosion that occurred in that mine, killing about 60 men. There is no doubt in my mind but that the fireboss' chalk mark kept coming down the post, till finally enough gas had accumulated to blow up the mine.

It is my opinion that all gases should be treated as dangerous; and no matter how slight the traces may be, men should be taught to treat them as dangerous. If all shotholes are properly charged, with a so called safety powder and properly tamped, the dust removed, and all precautions taken and rules carried out, we are certain to make a good showing during the year 1913.

A. G. Hahn, Mine Foreman,
United States Coal & Coke Co.

Gary, W. Va.

The Certificate Law

The article on The Certificate Law, by Charlton Dixon, Coal Age, Oct. 25, p. 604, is timely and very much to the point. Mr. Dixon says: "The certificate law, so prevalent in most mining states, practically confines men to a certain prescribed territory."

The coal fields of Tennessee and Kentucky furnish an apt illustration of the workings of the present law. The Tennessee coal lies principally in the eastern part of the state and in close proximity to the coal fields of southeastern Kentucky. These are, in fact, the same coal fields and are taken together to form what is known as District No. 19 of the United Mine Workers' Organization.

There are coal mines all along the border line dividing these two states. A man may hold a first-class certificate, allowing him to fill the position of mine foreman in Tennessee; but he cannot act in that capacity in an adjoining mine across the state line, without again going to the expense of another examination before another examining board in Kentucky. Likewise, a certified mine foreman in Kentucky ceases to be eligible to that position the moment he steps across the state line into Tennessee.

Mr. Dixon suggests that each state should incorporate in their statutes, some provision for honoring the bona-fide certificates of other states. I believe this is a good suggestion, but before that can be done, there should be an effort made to standardize the examinations held in the different states, in order to make them as nearly uniform as possible, in so far as they apply to the same position and practically the same conditions.

Not long ago, there was a man who took the examination in Tennessee and was awarded a second-class (Class B) certificate. A few years later, after a change in the administration of the state government and the appointment of an entirely new board of examiners, this man desired to go before the board and take the examination for a Class A certificate. In this examination, he failed to make a sufficient average to entitle him to even a Class B Certificate, which he already held under the previous examination.

This incident serves to illustrate the great difference in the examinations given in the same state, when the examining board is changed by a change of politics. In this connection, however, it may be stated that, in other professions and callings, certificates granted in one state are not good in another state. It would be well to have this question thoroughly discussed in Coal Age.

U. S. Wilson.

Briceville, Tenn.

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Study Course in Coal Mining

By J. T. Beard

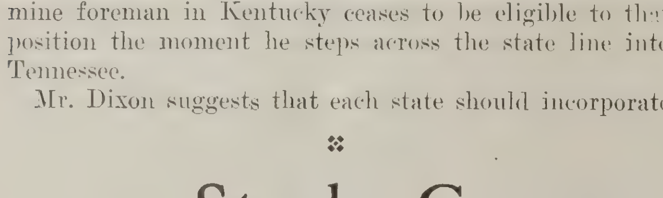
The Coal Age Pocket Book

WEIR MEASUREMENT

It is a common practice to measure the quantity of water flowing in a ditch or stream by constructing a weir similar to that shown in the accompanying figure, and allowing all of the water to flow over the weir. When a uniform flow has been established certain measurements are carefully taken and from these measurements the quantity of the flowing stream is calculated, in cubic feet per second, or gallons per minute, as desired.

Essential Points—In order to obtain fairly accurate results, it is important to observe certain conditions, which may be described as follows:

(a) The velocity with which the water approaches the weir called the "velocity of approach" must be reduced to a minimum; and to do this, the cross-section of the water in the weir or what may be called the "wetted area" of cross-section must be small in comparison with the area of the cross-section of the stream.



Longitudinal Cross-Section and Front View of Weir, Showing Important Dimensions

Referring to the figure, the wetted sectional area is represented by l × h = lh, and that of the stream by w (h + d). Good results are obtained when h does not exceed one-half d, and l does not exceed one-third w. The wetted area of the weir will then not exceed one-ninth of that of the stream, and the average stream velocity or velocity of approach will not exceed that proportion of the velocity of the water flowing through the weir.

(b) In order to avoid, as much as possible, the effect that an inclined surface would have to increase the velocity of the water flowing through the weir, beyond that due to the head h, the faces both back and front of the weir dam (ab) must be vertical; and to avoid any undue disturbance of the steady flow, the upper edge of the dam is beveled as shown at a, in the figure. As a further means of maintaining a uniformly steady flow that will represent more correctly the velocity due to the height h, the vertical sides (ss) are extended a short distance beyond the crest (a) of the dam. Also, the empty space (o) under the waterfall must be open at the sides, or, otherwise, a vacuous condition will be created owing to the partial exhaustion of the air by the falling water, which would act to increase the flow of water over the dam.

The Coal Age Pocket Book

Measuring the Head h—When the precautions mentioned have all been taken the velocity of the water flowing through the weir is practically that due to the height h or the vertical height of the surface level of the water above the crest (a) of the dam. To measure this height accurately a rod or gage (G) is usually set up in the stream a few feet above the dam. The rod is graduated in feet, the zero of the scale being level with the crest (a), as shown in the figure. To avoid the formation of ripples that would interfere with the accurate reading of the gage, the up-stream edge is beveled and the rod is made very thin.

Error Due to Velocity of Approach—Except in a still-water basin, the water at the gage always has more or less velocity (velocity of approach) for which allowance must be made if accuracy is desired. It has been shown by numerous experiments that when the velocity of approach does not exceed 1 ft. per sec. the velocity of discharge is equal to that due to the height h, within 2 per cent. of error.

Calculation of Quantity—When great accuracy is not desired and the velocity of approach at the entrance to the weir is small the quantity of water flowing through the weir may be calculated, in cubic feet per second, by the formula

$$q = 3\,lh\sqrt{h} \qquad (1)$$

in which q = quantity of water flowing (cu.ft. per sec.); l = length of weir (ft.); and h = vertical height (ft.) of level surface above edge or crest of weir.

When it is desired to make correction for the velocity of approach, that velocity can be closely estimated by dividing the quantity of flow, as calculated by formula 1, by the cross-section (lh) of the weir, which gives the formula for finding the velocity (v) of approach,

$$v = 3\sqrt{h}$$

It is then necessary to calculate the head h_1 due to this velocity, as follows:

$$h_1 = \frac{v^2}{2g} = \frac{(3\sqrt{h})^2}{2 \times 32.16} = 0.14\,h$$

The head h_1, calculated as producing the velocity of approach, must then be added to the head h, as measured by the gage, to obtain the total head (H), which is, approximately, the actual head producing the flow through the weir; thus,

$$H = h + h_1 = h + 0.14\,h = 1.14\,h$$

The quantity of water passing over the weir is then found by substituting this total head H for h in formula 1; thus,

$$q = 3\,lH\sqrt{H} = 3.65\,lh\sqrt{h} \text{ cu.ft. per sec.}$$

This last formula is practically correct for finding the approximate flow of water over a weir constructed according to the diagram shown in the accompanying figure.

The following formula is derived from the above and expresses the quantity of water flowing through the weir, in gallons (G) per minute.

$$G = 1640\,h\sqrt{h} \text{ gal. per min.}$$

EXAMINATION QUESTIONS

Examinations for Mine Manager, Mine Examiner and Hoisting Engineer, Held at Springfield, Ill., Sept. 8, 1913

(Selected Questions)

Ques.—An entry is parallel to a land line and 150 ft. from it. If the rooms turned off the entry run at an angle of 45 deg. with the entry; what distance can they be driven, allowing a barrier of 10 ft.?

Ans.—Deducting the 10 ft. for the width of the barrier pillar leaves 150 — 10 = 140 ft. of coal to be taken out between the entry and the barrier. The length of each room measured on the straight rib is 140 ÷ sin 45° = 140 ÷ 0.707 = 198 ft. This measurement is taken into the extreme corner and the face of the coal must then be kept parallel to the entry. If, however, the face of the room is squared with the track, the length will be less by an amount equal to the width of the room. Thus, for a room 24 ft. wide, the distance from the entry to the face would be 198 — 24 = 174 ft.

Ques.—What are the uses of the following instruments, in connection with coal mines: the anemometer, thermometer, barometer and water gage?

Ans.—The anemometer is used to ascertain the velocity of the air current, in feet per minute. The thermometer is used to find the temperature of the air current and the mine air, at different points in the workings. The barometer indicates the pressure of the atmosphere, in inches of mercury column. The water gage shows the difference of pressure between the fan drift and the atmosphere, or between the intake and return airways, at the point where the observation is taken. It indicates the ventilating pressure inby from that point, measured in inches of water column.

Ques.—What diameter of cylinder will be required to develop 50 hp., in a noncondensing engine that has a stroke of 4 ft. and makes 45 r.p.m., when working under a mean effective pressure of 30 lb. per sq.in.?

Ans.—Since the engine makes two strokes for each revolution, the piston travel is 2 × 45 × 4 = 360 ft. per min. Fifty horsepower is equivalent to 50 × 33,000 = 1,650,000 ft.-lb. per min. To develop this power at a speed of 360 ft. per min. will require a total pressure on the piston of

$$pa = \frac{1,650,000}{360} = 4583+ \textit{ lb.}$$

For a mean effective pressure of 30 lb. per sq.in., the required area of the piston or cylinder is

$$a = \frac{4583}{30} = 152.77+ \textit{ sq.in.}$$

The required diameter of the cylinder is, then,

$$d = \sqrt{\frac{152.77}{0.7854}} = 13.94, \textit{ say } 14 \textit{ in.}$$

Ques.—Describe a synclinal and an anticlinal axis, respectively.

Ans.—A "syncline," in geology, is a trough or valley formed by the dip of the strata toward the same line, which is the axis of the syncline or the "synclinal axis." In distinction from this, an "anticline" is a ridge from which the strata dip away on each side. The ridge line or a line parallel thereto and symmetrical to the sloping strata on each side is the "anticlinal axis."

Ques.—With a fan developing 30 hp. and a water gage of 2.3 in., if only 50 per cent. of useful effect is obtained, what quantity of air would be produced?

Ans.—The useful effect being 50 per cent., the power on the air is 0.50 (30 × 33,000) = 495,000 ft.-lb. A water gage of 2.3 in. corresponds to a ventilating pressure of 2.3 × 5.2 = 11.96 lb. per sq.ft. The quantity of air in circulation is then calculated as follows:

$$q = \frac{u}{p} = \frac{495,000}{11.96} = 41,388 \textit{ cu.ft., nearly}$$

Ques.—The anemometer indicates a velocity of the air current, of 200 ft. per min., in an airway 5x8 ft. and 4000 ft. long. Calculate (a) the quantity of air passing per minute; (b) the pressure in pounds per square foot; (c) the water gage; and (d) the horsepower on the air.

Ans.—(a) The sectional area of the airway is a = 5 × 8 = 40 sq.ft. Assuming the indicated velocity is an average velocity for this airway, the quantity of air in circulation is

$$q = av = 40 \times 200 = 8000 \textit{ cu.ft. per min.}$$

(b) The rubbing surface of the airway, assuming that the given length includes the return, is s = 2 (5 + 8) × 4000 = 104,000 sq.ft. The ventilating pressure is, then,

$$p = \frac{\kappa s v^2}{a} = \frac{0.00000002 \times 104,000 \times 200^2}{40}$$

$$= 2.08 \textit{ lb. per sq.ft.}$$

(c) The water gage is 2.08 × 5.2 = 10.8+ in.

(d) The horsepower on the air is

$$H = \frac{qp}{33,000} = \frac{8000 \times 2.08}{33,000} = 0.504 \textit{ hp.}$$

Ques.—Show by figures how to calculate the quantity of air passing in an entry 6 ft. high and 10 ft. wide, the velocity of the air current being 600 ft. per min.

Ans.—The sectional area of this airway is a = 6 × 10 = 60 sq.ft. The quantity of air passing is, then,

$$q = av = 60 \times 600 = 36,000 \textit{ cu.ft. per min.}$$

Ques.—If 10 hp. gives 20,000 cu.ft. of air per minute, in a certain mine, what horsepower will be required to produce 45,000 cu.ft. in the same mine?

Ans.—Assuming there is no change in the efficiency of the ventilator, the power varies as the cube of the quantity, or the power ratio is equal to the cube of the quantity ratio. Thus, calling the required horsepower x,

$$\frac{x}{10} = \left(\frac{45,000}{20,000}\right)^3 = \left(\frac{9}{4}\right)^3 = \frac{729}{64}$$

$$x = \frac{10 \times 729}{64} = 113.9 \textit{ hp.}$$

COAL AND COKE NEWS

Washington, D. C.

An interesting decision has been announced by the Interstate Commerce Commission regarding the case of the "Lebanon Commercial Club vs. the Louisville & Nashville R.R. Co. et al," which related to the local rates for the transportation of bituminous coal in carload lots from mines located on the Louisville & Nashville R.R. in Virginia and Tennessee, these being less to Louisville than to Lebanon, an intermediate local point 67 miles nearer to the mines than Louisville. Complaint was also made because the rates varied according to the grade of the coal while the rates to Lebanon were not varied in this way.

The commission now holds that as the rates to Louisville are influenced largely by the movement of bituminous coal over the Ohio River and by competing rail carriers the lower and varied rates to that point have not been shown to be unjustly discriminatory as against Lebanon.

In dealing with this case some interesting points were developed, notably the general question with reference to the proper method of treating points which enjoy water connections and which are more or less competitive with other points that do not enjoy such connections. In speaking of this matter, the Commission, in the decision referred to, says:

> The complainant admits that Louisville's position on the Ohio River, and as a railroad center, operates to give it rates which Lebanon may not reasonably claim. But it is insisted that these advantages do not warrant the existing differences between Louisville and Lebanon rates, and that the same should not exceed 15c. per ton. This particular figure, however, is merely the conclusion of the complainant's rate expert. The Commission finds the record quite bare of anything that will enable it to determine the extent to which the Lebanon rate should be allowed to exceed the Louisville rate. It must also be remembered that any change which may be made in the existing differential will necessarily reflect into the rates to other Louisville & Nashville points, intermediate, as is Lebanon, to Louisville. Under all these circumstances, it is the view of the Commission that final action on the fourth section element of this petition should await the disposition of the Louisville & Nashville R.R. Co.'s Fourth Section Application No. 1952, and also the construction of the fourth section to be made by the Supreme Court in cases now under submission.
>
> The only question remaining is whether or not there is discrimination against Lebanon, because its rates are not varied according to the grade of the coal, as are the rates to Louisville. Complainant contends that a number of years ago Lebanon enjoyed such rates through the medium of a tariff provision which granted a 30 per cent. refund from the published rate when the coal was used for steam purposes.
>
> The defendants say that when this refund was made the gross rate from Jellico to Lebanon was $1.65 per ton. This amount was actually collected and retained on domestic coal. The refund left the net rate on steam coal $1.15½ per ton. This refund was discontinued July 20, 1901, and the Louisville & Nashville then established the present rate of $1.20 per ton on all bituminous coal from Jellico to Lebanon. It will be observed that this effected a reduction of 45c. per ton on domestice coal and an advance of 4½c. per ton on steam coal.
>
> The Louisville market appears to be controlled by the movement of coal by river at a low transportation cost, and by the movement of coal from western Kentucky mines at a rate of 60c. per ton by the Illinois Central R.R. These conditions appear to compel the Louisville & Nashville to make a low rate to Louisville on slack coal and on nut and slack mixed, but permit a somewhat higher rate on other grades.
>
> An examination of the tariffs of the Louisville & Nashville R.R. Co. discloses that Lebanon, in this respect, is in no different position from the other local Louisville & Nashville points. Also the present rates to Lebanon appear to be so constructed as to equalize the former refund on steam coal. On this record the Commission cannot say that the present graded rates to Louisville result in unjust discrimination against Lebanon.

HARRISBURG, PENN.

The three-day Industrial, Welfare and Efficiency conference at the State Capitol came to an end on Oct. 29, with an "experience meeting," at which mayors, labor leaders and officials of industrial and labor commissions of this and other states gave the results of their observations and generally agreed that there should be concerted effort by employers and employees to work for abolition of dangerous practices.

The chief address was made by Dr. Lucien W. Chaney, of the United States Department of Labor, who in the course of his remarks, stated that the reputation of American industries for accidents was not good, yet statistics of late years showed that the majority of places were superior to European industries in the matter of casualities.

The conference adopted resolutions recommending that the department of labor and industry which had called the conference in conjunction with the Engineers' Society of Pennsylvania should encourage in every way the organization of safety commissions in works and that its efforts to secure mediation of disputes should be supported.

Naturally the bulk of the discussion and papers went toward the lines where statistics and experience show the casualties are greatest, the industries and the facts and figures presented during the three days of the convention should prove immensely valuable to students of welfare, etc., because they came from every angle of the problem. One of the most significant facts about the addresses was that while the speakers were regarded in most cases as advanced in the benevolent projects of the day, every one counselled study of the proposition and earnestly represented the danger of laws that are not workable or which in the language of the legislative body are "half baked." The only regret about the convention is that it could not have been held before the last legislature convened and the men elected there to have been required to attend its sessions and gain a little knowledge on what they were going to legislate on.

Individuals File Their Answers

George F. Baer, Edward T. Stotesbury, Henry C. Frick, Peter A. B. Widener, George F. Baker, Henry A. du Pont, Daniel Willard, Henry P. McKean and Samuel Dickson, individual defendants in the government's suit to dissolve the so called hard-coal trust, on Oct. 29, filed an answer in the United States District Court, denying the charges of conspiracy to monopolize the sale and production of anthracite in Pennsylvania.

Aside from the general denial of having formed a monopoly in violation of the Sherman anti-trust act and the commodities clause of the Hepburn act, the defendants refer to the answers of the defendant coal companies as filed last week through Charles Heebner. The answer, in effect, merely conforms with the rules of the court, the defense being outlined in the answers of the Reading Co. and the railroads.

Mine Cave Investigation

Charles Enzian, Mining Engineer of the U. S. Bureau of Mines, has been instructed by the Bureau to coöperate with D. T. Williams, former mine inspector, and H. D. Johnson, the two men selected by the city council of Scranton to check up the work of the city mine cave commission, with reference to the cave situation in West Scranton. The attorneys for the city have started two suits in regard to this matter, one of which will probably be settled in February, this being the suit of the Graff Furnace Co. vs. the Scranton Coal Co. The proposition involves three factors—surface, minerals, and surface support. The Supreme Court has held that surface support is the inherent right of the surface, as broad as the grant, and the grantor, who owns in fee both coal and surface, cannot reserve the right of surface support. It is this decision upon which the citizens of West Scranton are relying. One feature which causes considerable trouble is the fact that decisions have been handed down in the lower courts whereby it was held that operators are entitled to all pillars where the lease or deed calls for all the coal. In the cases where royalty is being paid, the lessors insist on their royalties under the ruling of the court entitling the operator to all the coal, and this is in the main responsible for the complete removal of pillars, and makes the situation difficult for the operators who would consider leaving sufficient pillars for surface support.

PENNSYLVANIA

Anthracite

Pottsville—The Philadelphia & Reading Coal & Iron Co. is preparing to tap the rich deposits of coal in the lower levels of the old Anchor Colliery, Heckscherville Valley, near Pottsville. Forty years ago the workings caught fire and the only way to prevent the complete destruction of the operation was to flood it. The water has just been pumped out. These are practically all virgin coal measures and it is thought that millions of tons can be mined. The coal will be prepared at the Pine Knot breaker, at Coal Castle.

Lykens—The Miners' Institute recently formed held its first banquet on Saturday evening. A wagon load of turkeys, forty in number, was prepared for the miners, and the Reading Railroad Co. ran a special train carrying 360 men. The Miners' Institute at this place was organized for the purpose of education as well as developing the town in any way necessary. One of the first questions to be considered is the New School Code passed by the recent legislature.

Wilkes-Barre—The first case wherein parents living in a foreign country, have sued a coal company in this country for the death of their son, was started on Oct. 29, when a suit in trespass was brought against the Delaware & Hudson Co., in behalf of Fredio Hudak and Pajza, his wife, who are residents of Austria. They ask $10,000 for the death of their son, who was killed in one of the company's mines.

The suit is being brought through the Austrian Consular agency and is the first of its kind to be filed in this section of the state. By an act of the legislature of 1911, parents and others living in foreign countries can institute suit for damages for injuries sustained by relatives whose heirs they would be in case of death. Previous to this relatives had to be residents of the state to enter such a suit. The victim was employed by the D. & H. Co., for about four months and was caught by a runaway trip on a slope.

Scranton—Five miners while employed at timbering in the Taylor mine of the D. L. & W. R.R. Co., were seriously burned by an explosion of gas recently. The men were carrying naked lamps and in going from one part of the mine to another they suddenly walked into a body of gas in the Big vein and the explosion followed. They were knocked down by the concussion and were burned about the face, hands and upper part of the body.

On Oct. 29 several miners employed in the Diamond mine of the Lackawanna Coal Co. had a narrow escape when men, blasting for a sewer, fired a heavy charge, knocking a hole 5 ft. long and almost as wide into the mine workings. The men were mining coal only a few feet away, but none were injured.

Shamokin—On account of a holy day on Nov. 1, many of the collieries were closed. Ministers interested in an evangelistic campaign to be waged next winter appealed to the miners to help them clear a plot of ground on which to erect a tabernacle. A large number responded to the call and by night had things in shape for carpenters to begin work. The building will seat 3000 persons. Even most of the carpenter work will be done by the miners free of charge.

Glen Lyon—A committee representing 4000 men and boys employed at the Susquehanna Coal Co.'s collieries have waited on Supt. Kohlbreaker to ask assistance in having non-union men employed at the collieries join the miner's union. The committee had to be referred to the general manager's office at Wilkes-Barre and will probably receive a hearing in a few days before another "button strike" is called in the lower valley workings.

Bituminous

Beaverdale—The Logan Coal Co. is installing extensive improvements at the workings, including a slope and motor system of haulage, in place of the present rope and shaft haulage. The improvements will greatly increase the daily output. The Pennsylvania Coal and Coke Corporation mine at this place is also to be converted into a drift mine.

Johnstown—It is likely that an appeal will be taken by counsel for E. H. Werner et al, in the case against the Western Maryland R.R. Co. in which damages to the sum of $110,000 were asked because of the building of a new spur of the railroad through properties of the defendants. Judge Reed of Jefferson County heard the award. There were four sets of plaintiffs, the Central Savage Firebrick Co., lessees of the coal and clay mining rights, Emanuel Statler who owned one-third interest in the coal, E. H. Werner, who owned one-third of the coal and Samuel U. Shober and George F. Kimmell, who owned the remaining interest in the coal.

Blossburg—The Carnegie Hero Fund Commission at its fall meeting in Pittsburgh on Oct. 31, awarded the widow of James Jack, Jr., who died saving Michael Gallant and Martin Gula, miners, from a runaway train in a coal mine at St. Benedict, Penn., a silver medal and a pension of $50 per month, with $5 a month additional for her daughter until the child reaches the age of 16.

Washington—Norvella V. Sower has filed his statement of claim against the Monongahela River Consolidated Coal & Coke Co., in which he asks $5000 damages for personal injuries received while employed on a motor in the mines of the company in July. The company is charged with negligence in not providing a safe place to work and in permitting a motor to remain out of repair. It is averred that the plates on a certain motor, which protect the gear wheels, became worn out and dropped off, leaving the teeth exposed, into these the plaintiff got his hands, receiving painful injuries.

Cairnbrook—The Berwind-White Coal Mining Co., which has a large tract of valuable coal land, is not ready to begin operation of the new field at this time. Preparations will be made this winter, however, to open the tract as soon as spring weather arrives. The Lochrie and Loyalhanna mines are ready to ship coal as soon as the branch line from Windber is completed by the Pennsylvania Railroad.

WEST VIRGINIA

Eskdale—Three hundred miners employed by the National Bituminous Coal & Coke Co., in Eskdale on Cabin Creek, recently struck because of a dispute over the price of pick mining.

Charleston—The coal-property assessment appeals heard recently by Circuit Judge Samuel D. Littlepage have been decided by him in favor of the coal company. State Tax Commissioner Fred O. Blue may appeal to the Supreme Court.

Gary—The Government Bureau of Mines' rescue car No. 7, in charge of Jesse Henson, after spending two weeks on Pond Creek, is now at Gary. This car is on the road for the purpose of giving men instructions and training in the use of oxygen breathing apparatus and first-aid work. It will remain at the operations of the United States Coal & Coke Co. until Nov. 8, after which time it will go to Jenkinjones, Switchback and Pocahontas.

ALABAMA

Tuscaloosa—The barge line connecting the coal fields of the Birmingham district with the Gulf, through the Warrior River, was opened last week. This barge line will give the coal fields of Alabama direct water connection with the Gulf, and opens up a rich field of coal deposits, Tuscaloosa, Ala., being the chief city from which shipments will be made.

Birmingham—Alabama had a decrease of nine mine fatalities for the first seven months of 1913, against the corresponding period of last year. The record of the United States as a whole is not so encouraging, as the 1913 list shows an increase of 18 over the same period of last year. In the Alabama mines during the first seven months of 1912, 64 men met death by fatal accidents. During the first seven months of 1913, 55 miners have been killed. For the entire country, there have been 1437 miners killed during this period, while in the same length of time last year 1419 miners were fatally injured in the mines.

KENTUCKY

Earlington—The Illinois Central R.R. has renewed its contracts for coal with the operators along its lines in western Kentucky. The contract runs for one year, the old contract expiring this month. The agreement was changed slightly, and there was a discussion of the amendment, the document finally being made on a mutually satisfactory basis.

Pineville—The Wallins' Creek Coal Co. has completed a new tipple, replacing that which was destroyed by fire several months ago, and is again delivering graded coal. It was compelled to market only run of mine during the time it was without screening facilities. The company has recently acquired additional property, and will enlarge its capacity.

Rockport—A few of the small coal mines, are having trouble with their miners, and at one mine the men have walked out. The walk-out resulted from the discharge of several men who quit work on the day of a rally at Madisonville intended for the purpose of organizing the miners of western Kentucky.

Morganfield—E. K. Ashby, who operated what is known as the Thomas coal mine, has disposed of the property to the Jackson Coal Co., Ft. Branch, Ind. The new owner will operate the mine, which has been idle for some time.

OHIO

Columbus—The Lorain Coal & Dock Co. has appealed to Judge Vickery to set aside a $111,000 verdict awarded by a jury in Judge Lawrences court against them and in favor of Anton Pietrowski, of Lorain. The corporation declares that it is not responsible because Pietrowski was injured when the corporation was a West Virginia company. It is now an Ohio corporation.

The Ohio Mining Commission, which has finished visiting mines in Ohio and adjoining states, had only a few sessions during the past week when Professor Ray of the department of Mines of the Ohio State University and Professor Bownocker, of the department of geology of the state institution, appeared before it. Arguments from the miners and operators will be heard beginning Nov. 5, according to the present arrangements.

As the aftermath of a fire which is said to have done thousands of dollars damage, caused it is alleged, by oil being allowed to escape in coal, the Rock Run Coal Co. has filed suit for $50,000 damages against the Chartiers Oil Co. The coal company is the owner of what is termed the No. 6 vein in Coal Township, Perry County, Ohio, and declares that although the oil company knew it was the owner of the 20-acre tract and was mining therein, it drilled a well for some distance below the coal.

Dayton—The announcement is made that the W. P. Rice Coal Mining Co. recently incorporated with an authorized capital of $75,000 will develop coal lands in Athens county, Ohio. The conpany's headquarters will be located at Dayton.

INDIANA

Indianapolis, Ind.—The Monon Coal Co. and the Consolidated Coal Co., operating mines in the Sullivan-Linton group, embracing the counties of Sullivan, Green, Owen and a part of Clay, have petitioned the Interstate Commerce Commission for a regrouping of the mines in Indiana with reference to rating to the Chicago district. Mines in the Brazil-Clinton group, comprising the counties of Vermilion, Vigo, Park, and a part of Clay have a rate of 77c. to Chicago, and the mines in the other group 87c. Being competitive, it is claimed the mines in the two districts should have the same rating.

Petersburg—The Knox Mining Co., of Bicknell, and Martin & Miley, of Montgomery, have leased more than 2000 acres of coal land near here.

Princeton—The fire in the Ft. Branch mine of the Ft. Branch Mining Co., which it was thought had been extinguished last week after three days' burning, has broken out again and is more threatening than at first. The mine-rescue car was summoned from Evansville.

ILLINOIS

Benton—The cages at the shaft of the Benton Coal Co. dropped to the bottom of the shaft a few days ago, putting the mine out of commission for several days. No one was seriously injured.

East St. Louis—At several points in Southern Illinois there are many petty strikes on account of local grievances. This is a forerunner of what is to be expected Apr. 1, next, when the present agreement expires.

Decatur—A miner, John Magill, in the Lovington Mines, dug out a few days ago a petrified human foot. It was imbedded in rock almost a thousand feet below the surface. It has been sent to experts for examination.

Zeigler—Some little time ago a slight explosion took place in the mine at this place; there were about 450 men in the mine when the explosion occurred, but only one was burned by the explosion and no one was fatally injured.

Livingston—The No. 1 mine of the New Staunton Coal Co., located at this place, made the following averages for the first half of the month of September: The average output per day of eight hours was 4277 tons and for the last half of the same month the average daily hoist was 4318 tons, the later figure means about 539 tons per hour, or nearly 9 tons per minute. This is a machine mine, operating in the No. 6 seam and is 286 ft. deep.

Springfield—The State Mining Board will hold an examination for state mining inspectors, beginning Monday, Nov. 17, in the office of the Board, Springfield, Ill. This Board has been reorganized recently, the following members having been appointed: John Bohlander, president, Pekin, operator; James Forester, Hallidayboro, operator; James Shaw, secretary, Virden, miner Thomas L. Jones, Ladd, miner; J. B. McKiernan, Peoria, hoisting engineer.

The mines of the O'Gara Coal Co., located in the counties of Sangamon, Macoupin and Saline, have resumed operation after an idleness of several weeks owing to financial troubles.

ARKANSAS

Fort Smith—The recent coal-mine strikes, affecting nearly 700 miners in Oklahoma and Arkansas, were amicably settled Oct. 29. Five hundred men returned to the Oklahoma Co.'s mines, at Dewar, Okla., and 175 men to the Eureka Coal Co.'s mine at Montana, Ark.

NEW MEXICO

Dawson—Work was resumed Oct. 30 in Mines Nos. 1, 4 and 5 of the Stag Cañon Fuel Co., with about one-third of the normal force. Forty-two bodies still remained in mine No. 2. The wrecked workings have been explored and the remaining bodies will be brought out as soon as possible. Upon this date 219 dead had, in all, been taken from this mine.

OREGON

Portland—Anthony Mohr who is interested in the development of a coal proposition south of Fossil, Ore., has extensive reports to present to the officials of the Oregon-Washington R.R. & Navigation Co., with a view of having the road extend its line to the fields. Mr. Mohr reports having put in the months of June and July in the coal district, where his syndicate holds leases on 2000 acres of land. He says an 8-ft. seam of semi-bituminous coal equal to the Rock Springs variety has been located. He also says further work will be prosecuted in February.

FOREIGN NEWS

Juneau, Alaska—A despatch from Juneau states that the registrar and receiver of the Juneau land office have recommended to the commissioner of the general land office that the Hartline group of coal claims in the Bering River district, Alaska, located by various members of the Hartline family of Anna, Illinois, be canceled for failure to open and develop the claims. The local land office found that the charges of fraud alleged to have been committed by John W. Hartline and others in locating the claims were not proved.

Lingan, Nova Scotia—Owing to the increasing demand for Cape Breton coal, which cannot be supplied by the companies now operating, it is proposed to develop on a large scale the coal areas owned by the Lingan Coal Co., Ltd., in the vicinity of the old Gardiner mine at Lingan. This property is stated to contain 40,000,000 tons of good workable coal. The movement is being promoted by A. C. Ross, who has been for many years prominent in connection with the mining and industrial development of Cape Breton. Mr. Ross will make Montreal his headquarters and will endeavor to interest Canadian and American capitalists in the enterprise

Udi, Nigeria—It has been announced that extensive coal deposits have been discovered at Udi, Southern Nigeria, West Africa. Tests carried out by the Government and analyses at the Imperial Institute in London are said to have given results, at least two-thirds as good as those of the best Welsh coal. It is also stated that a survey for a railway to connect this coalfield with the river port of Onitsha is being carried out. The importance of this line as affording cheap fuel to the two Nigerias would be great, while it would make for the development of the trade of this rich district and the settlement of internal disputes among the natives of the hinterland.

Vancouver Island, British Columbia—Progress toward resumption of production of coal at normal rate is slow, except in the case of the mines of Comox colliery (Cumberland) of the Canadian Collieries (Dunsmuir) Ltd. For the month of September the output of the Cumberland mines was 52,187 tons, nearly one-third of which was from No. 5 mine.

The riots of the strikers that took place in August did not cause a stoppage of work at Cumberland. At the same company's Extension mines, though, operations had to be suspended, following destruction of three electric locomotives, a number of mine cars, and part of the surface buildings, to which the strikers set fire.

The Vancouver-Nanaimo Coal Mining Co.'s Jingle Pot mine is the only one on Vancouver Island being worked with U. M. W. of A. men; its production is probably about 200 tons a day, but definite information has not been obtained. The Pacific Coast Coal Mines, Ltd., is working its South Wellington mine, but as miners are not yet obtainable in sufficient numbers to admit of a larger production, output is only about 200 tons a day. This company is proceeding with the equipment of two new mines in the northern part of Vancouver Island. The Western Fuel Co., which has large mines near Nanaimo, is not yet making any regular production worth noting, though it is stated it is getting out a little coal.

PERSONALS

J. Warber Shook, vice-president and general manager of the Central Iron & Steel Co., at Holt, Ala., has tendered his resignation, and will enter other business. Mr. Shook is one of the best known coal and iron men in the South.

Erskine Ramsey has been appointed as the Birmingham member of the American Executive Committee of the Anglo-American Exposition to be held in London next year.

W. L. Klutz, formerly superintendent of the Thomas furnace of the Republic Iron & Steel Co., at Thomas, Ala., has been appointed general manager of the Central Iron & Coal Co., at Holt, Ala.

W. A. McDonald has been appointed manager by the Vancouver, B. C., men who recently acquired the coal property of the Columbia Coal and Coke Co. formerly controlled in Winnipeg, Manitoba.

John Mitchell, former president of the United Mine Workers of America, was honored by thousands of miners throughout the various coal fields of Pennsylvania, on Oct. 29. Little or nothing was done at the collieries. Parades, mass meetings and many large demonstrative celebrations were held at Wilkes-Barre, Pottsville, Scranton, Shamokin and Hazelton.

E. N. Saunders recently elected president of the Northwestern Fuel Co., is one of the youngest men in St. Paul at the head of a large corporation. The Northwestern Fuel Co., with a capital of $4,500,000, has extensive interests in this section, while the docks at Duluth are among the most modern in the country. Mr. Saunders is 36 years of age and a graduate of Yale.

Jas. McEvoy, of Toronto, Ontario, who was associate leader of one of the International Geological Congress excursion parties that went west after the close of the congress, has recovered from the attack of pneumonia that necessitated his going into hospital in Vancouver, B. C. Before returning to Toronto, he examined the property of the Columbia Coal and Coke Co., situated in Similkameen district, B. C.

CONSTRUCTION NEWS

Pomeroy, Ohio—The K. & M. Railway Co. has started to build a two-mile branch up Thomas Fork to tap a new coal territory which is being opened by the Stalter-Essex Coal Co. It is expected to have the mines opened by the first of the year.

Butler, Penn.—Work has been commenced on the plant of the Lake Trade Coal Co., located a short distance from Argentine. This company has more than a thousand acres of coal land under contract in this district, and the intention is to mine 1000 tons of coal per day when in full operation.

Venice, Penn.—Work on the new Montour branch of the P. & L. E. railroad is progressing rapidly, and should be ready for the ties and track in a few weeks. Work on the new mines No. 1 and 2, is being pushed and it is expected that the mines will be producing by the time the railroad is completed.

Crow's Nest Pass, B. C.—The building of a new locker house has been undertaken at the Crow's Nest Pass Coal Co.'s Coal Creek mines, present locker accommodation being inadequate. Production of coal from the B North mine, Coal Creek, has been considerable lately; the new jig is now in operation there.

NEW INCORPORATIONS

Columbus, Ohio—The Kingwood Collieries Co., of Columbus, Ohio, has been incorporated with a capital stock of $100,000 to mine and deal in coal. The incorporators are J. W. Miller, J. S. McVey, D. N. Postlewaite, L. M. McGrath and M. A. Fanning.

Glen Campbell, Penn.—A charter was granted the Superior Coal Co. to mine coal; capital $5000. The incorporators are George S. Hampton, Harry T. Rotenbury, and H. J. Ehrlech all of Philadelphia.

Harrisburg, Penn.—The following companies have filed notice of an increase of debt with the Secretary of State. The Susquehanna Coal Co. from nothing to $10,000.000 for the ultimate purpose of absorbing the coal properties of the Pennsylvania R.R. Co.; the Wilkes-Barre Colliery Co., of Wilkes-Barre from $310,000 to $500,000; Dexar Coal Co., of Philadelphia from $5000 to $50,000; and the Hawthorne Coal Co., of Williamsport from nothing to $67,000.

Philadelphia, Penn.—The Eastern Ore Co., of Philadelphia, has been incorporated under the laws of Delaware, with a capital stock of $1,000,000. Object to acquire coal, iron and other minerals and ores.

INDUSTRIAL NEWS

Glasgow, Scotland—One hundred thousand miners in Scotland have received an increase of wages amounting to 6c. per day.

Lansford, Penn.—The boiler makers and apprentices of the Lehigh Coal & Navigation Co. have received an increase of wages, ranging from 2c. to 5c. per hour. This increase is to last for one year.

Birmingham, Ala.—The Philadelphia furnace of the Sloss Sheffield Steel & Iron Co., at Florence, Alabama, which has been out of blast since last May, has been relined, and was blown in in October.

Steubenville, Ohio—The tow-boat "Robert Jenkins" on its way south with a coal float, lost five barges here. The barges crashed into a pier of the Panhandle railroad bridge and sank. The tow boat was not damaged.

Columbus, Ohio—The Ohio State Utilities Commission has granted permission to the officials of the Hocking Valley Railway Co. to issue $4,000,000 one-year notes for the purchase of equipment providing they are not sold under 98 per cent.

Carrollton, Penn.—T. S. Davis recently purchased a tract of about 1100 acres of coal in the vicinity of Bradley Junction, representing an expenditure of close to $50,000. The coal brought an average of $40 per acre, and was purchased from Peter Bertram, John Hershell, and others.

Sydney, N. S.—Nearly 7,000,000 tons of coal were mined in 1912 from the four Nova Scotia coalfields; Sydney, Inverness, Pictou and Cumberland. Approximately half of this amount was sold in the Maritime Provinces, the rest going to Quebec and the United States.

Washington, Penn.—In connection with the trouble at the Reliance Coke Works, near Centerville, attorneys, on Oct. 30, filed 11 more ejectment suits against miners living in company houses who refused to work in the mine. The court honored the request of the company and directed the sheriff to eject these 11 men and their families.

Duluth, Minn.—The barge "Santigo," of the J. J. Boland line, Buffalo, with 2500 tons of anthracite, cleared for the Soo recently with the first load of coal ever shipped east from Duluth by way of the Great Lakes. The cargo consisted of screenings from anthracite shipped uplake in the summer and has been sold to a company at Sault Ste. Marie.

Philadelphia, Penn.—Hearings of the Interstate Commerce Commission on the anthracite coal rates will begin at the Bellevue-Stratford Hotel, Philadelphia, on Nov. 17, with Commissioner J. H. Marble in charge. It is reported that the anthracite carrying roads will be called upon to submit evidence. The hearings will be the first held since the recent investigation was started.

Hickory, Penn.—Charles Marquis, of Woodrow, has sold his farm containing 260 acres to Virgil McDowell of Midway. The consideration was about $33,000. Mr. McDowell is the agent for the Carnegie Coal Co. The farm is known as the Thomas McCorkle farm. It came to Mr, Marquis through the will of Mrs. McCorkle. This farm is one of the last to be sold in this section for its coal.

Crow's Nest Pass, B. C.—The Crow's Nest Pass Coal Co. has contracted to supply coal to the City of Spokane, Washington, at the following rates: For slack, $4.80 a ton; mine run, $5.55; No. 1 lump, $5.75; No. 2 lump, $6.15. These prices include delivery at the city buildings, which means about 50 cents a ton in favor of the city. Tenders had been invited, but the Crow's Nest Co. declined to put in a bid; the bids received showed an increase on last year's prices for mine run and lump coal, notwithstanding the recent tariff reduction of 45 cents a ton.

Vancouver Island, B. C.—The Canadian Collieries (Dunsmuir) Limited has ordered electrically driven pumping plants for three of its mines—one unit each for its No. 5 mine, Comox colliery, Cumberland, and Extension colliery near Ladysmith, and two units for its newly opened No. 8 mine, situated about four and one-half miles from the town of Cumberland, Comox district. One of the last-mentioned will consist of two pumps working in series, to deliver 350 gal. per min. against a head of 740 ft. Of the others, two will be driven by 75-hp. alternating-current motors, and the third by a 75-hp. direct-current motor; each of these will be capable of delivering 350 gal. per min. against a head of 370 ft. The pumps will be manufactured by Canadian Allis-Chalmers, Ltd. and the motors by Canadian General Electric.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite trade assuming the usual winter activity but lacking snap except in certain grades. Soft coal showing wavering tendency in spots. Lower temperatures and a tightening in car supply having a steadying influence. Most grades now in good supply.

Hard coal operations are more or less closely confined to certain sizes, and the trade lacks the characteristic snap usual at this time of the year. However, the slow movement is causing a certain uneasiness, and the companies are not inclined, as a rule, to take on any new business. Indications are that there is not a great deal of coal in dealers' hands. Stove and broken are short, particularly the former, and dealers are finding it necessary to do considerable jockeying to keep supplied in all grades.

Bituminous operators have so far held the market firmly but there is an undeniable wavering tendency, due to the unusually heavy business through the summer, and the absence of any new demand. This is particularly the case in the Eastern Coastwise trade where large corporations are asking that shipments on contracts be delayed, and producers are inclined to modify prices although no shading of consequence has yet developed. Wholesalers are finding themselves unable to place the unexpectedly heavy tonnages from West Virginia, particularly as a great deal of this trade was covered by Pennsylvania coals in anticipation of a shortage in the former grades. Plentiful supply, even of the better qualities, is the feature of the situation at the moment.

A complete absorbtion of the abnormally heavy production of slack, incident to the large movement to the lakes is the feature of the situation in the Pittsburgh district. The car supply has been better than was anticipated, while the increased retail demand has about equalized the decreased industrial consumption. The situation in Ohio is more encouraging. Production is being steadily restricted, due to the short car supply, and demand is on the increase. The recent cold snaps resulted in a heavy rush for coal, and prices are ruling firm with a tendency toward higher levels.

Trade at Hampton Road is brisk, with a good supply of both coal and vessels; the demand is heavy, extending even into the high volatiles. The car situation has been somewhat easier, and producers are optimistic in spite of unfavorable reports in other parts of the country. In the Southern market, both coal and coke are quiet, particularly the steam grades, and there is little indication of any immediate improvement.

Low temperatures and a further restriction in the car supply has had a tightening effect upon the Middlewestern situation. The trade is on a comparatively strong basis, with prices on certain grades exceptionally high. There is a heavy movement in anticipation of a severe winter; the country districts are also coming into the markets stronger, and the outlook is good at the present.

BOSTON, MASS.

Pennsylvanias seem to find a ready sale. Uneasiness over anbordering on a weak market. Market cargoes at distributing points. Georges Creek in plentiful supply. Higher grade Pennsylvanias seem to find a ready sale. Uneasiness over anthracite supplies, particularly on stove.

Bituminous—Pocahontas and New River are apparently entering on a dull season. No intimations of any shading of the $2.85 f.o.b. price have been heard but the market cannot be said to be very strong. The export business has slumped for the present. Coastwise there is almost no inquiry and conditions are as easy as though it were midsummer. Even the corporations are asking that shipments on contract be postponed and there is a general anxiety on the part of the agencies to make sales.

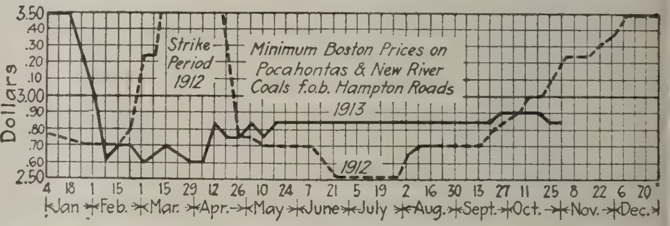
Market cargoes, a sure index of a weak market, have appeared this week and on car prices have dropped a notch or two lower; $3.70 has been reliably reported for Hampton Roads coal for inland delivery, a price that would net $2.70@2.75 f.o.b. loading port.

The outlook is not particularly encouraging, although much may happen at this season either to cut down output or stimulate demand. The West Virginia production has been rather heavier since July than was anticipated and contractors at this end have not absorbed fuel to quite the extent that was looked for. During the suspension, too, when there was uncertainty over necessary supplies, considerable tonnages of the Pennsylvania grades were picked up by the large consumers. Everything considered it is not surprising the market is druggy now.

Georges Creek is also in strong supply and with not the spot business in sight that is necesary to keep car equipment working. It looks now as if this popular grade were over the hump and that for the balance of the season there would be supply enough to meet contract demands.

More is being heard of car shortage in different districts in Pennsylvania. The market on the better grades continues fairly firm with moderate inquiry. Some of the operators have modified prices 5@10c. in order to take business for which cars are likely to be in better supply and also to tide them over what they consider only a temporary dullness.

There has been a slight stiffening in water freights since the bad weather in October, particularly on the smaller craft out of New York; 75c. is about the rate from Hampton Roads to Boston for sail and barge tonnage. There is a call now for outside transportation to bring anthracite that is furnished by individual operators and rates are understood to be around 65c. to Boston.



Anthracite—All the companies are slow on deliveries and have instructions out to be wary of new business. Dealers are doing everything possible to get stove coal in something like the proportion demanded by their trade but that size as well as broken is coming forward extremely slow. Premiums f.o.b. New York for stove are reported to be 25@35c. and straight cargoes are out of the question. The continued slow movement of tows and the colder weather are making some of the Eastern dealers uneasy on account of the short time left for receiving cargoes up the rivers.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.60	$1.30@1.70	$1.67@1.77	
Philadelphia*	2.30@2.85	2.55@2.95	2.92@3.02	
New York*	2.60@3.15	2.85@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Providence†				3.70@3.80
Boston†				3.70@3.88

*F.o.b. †On cars.

NEW YORK

Recent holidays have restricted both anthracite and bituminous production and steadied up local markets. Production up to full limit but demand not so urgent. Colder weather having a stimulating effect.

Bituminous—There is no material change in the soft-coal market, although the tendency, if anything, is easier. The holidays last week, together with Election Day this week, have resulted in a short output which has had a steadying effect upon the situation. Mines as a rule continue working up to full capacity.

On the other hand, the car supply seems to be holding better than was anticipated, and there has been a heavy movement of soft coal; cars on the Pennsylvania and B. & O. railroads are reported at 60@75% of requirements. Supplies at tidewater have increased some during the week. The market is now waiting the advent of the consuming interests into the trade. So far as the prompt demand goes, it has been principally confined to the jobbing interests, and a further expansion does not seem probable until the real consumers appear.

The market in the wholesale trade is not quotably changed from last week, which prices we continue as follows: West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

Anthracite—The hard-coal situation has failed to show any material change as yet, due to the colder weather; apparently this has been of a too intermittent character to have any effect. However, this has started coal moving out of the dealers' hands, and it will not be long before the effects are felt in wholesale circles. Stove coal continues to be the leader among the short sizes, although it is a trifle easier this week. Egg is rather heavy and difficult to move. The steam sizes continue about the same, the low grades being in long supply.

Production in the mining regions was badily restricted by two holidays last week and by Election Day this week, although a number of the mines attempted to work on this latter holiday. Aside from these interruptions, the companies are working full time. The car supply is still inadequate; this has not as yet seriously affected the production, but, in view of the early development of this trouble, operators are apprehensive over what conditions will be when the general car situation reaches serious proportions.

We continue New York hard-coal prices unchanged, with the exception of stove, which is now quotable at the regular circular as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.40@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.75@2.20
Barley	1.75	1.75	1.70	1.50@1.70

PRILADELPHIA, PENN.

Market lacks the general urgency, customary at this period of the year. Active business restricted to certain grades. The new Pennsylvania state tax again becoming a feature in the situation.

The anthracite trade in this vicinity, still seems to lack the snap that should chacterize it at this season of the year. Outside of broken and stove coal, there does not seem to be a particularly urgent market. Of course, dealers that place orders expect them filled promptly, an indication that points to the fact that there is not a great deal of coal on hand in the dealers' yards, but the operations of the retailers, as well as the wholesale market, seems to be concentrated on certain sizes. The movement of egg and chestnut is enhanced by the decree of the operators that orders for the scarce sizes shall be accompanied with a certain proportion of the other sizes, but this argument cannot be passed along to the consumer; it requires considerable jockeying on the part of the dealers to so adjust their stocks that they will get a proportion of the sizes they are in urgent need of.

It is understood that, with the beginning of the winter season, the addition of the Pennsylvania State tax is being more generally observed than has been the case heretofore. Those operators or companies who have absorbed this tax during the hot spell, established no precedent, they say, and now that business is moving along with practically no concessions of any kind, the dealers are being saddled with this additional expense. In the city proper, this tax still continues to be absorbed, but in the suburbs, many of the dealers are including it in their price to the consumer.

The market for pea is increasing daily, with the supply only governed by the ability to load. There is as yet no indication of shortage in this size, it being understood that the large companies are fairly well stocked. The other steam sizes are also looking up, and as the winter advances, will show considerable improvement.

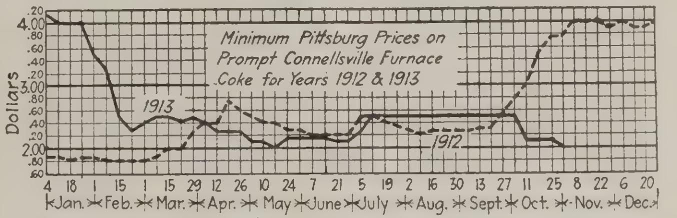
PITTSBURGH, PENN.

Heavy demand for slack the feature of the local market. Increased domestic consumption equalizing the lessened industrial demand. Full competition in Connellsville coke and market demoralized.

Bituminous—Lake shipments continue heavy, and will be kept up, weather permitting, until the last moment, the vessel insurance coming off Dec. 1. Despite the heavy shipments there is practically no accumulation of slack, and it is commanding $1@1.10 right along. A large interest which normally accumulates considerable slack to dispose of in the winter has relatively little so far, while another large interest which intended to begin piling up slack July 1 has piled none as yet, and may be inconvenienced in meeting its contract requirements this winter. There would be a ready sale to operators at the circular price of 90c., to apply on contracts, but none is available at this figure.

Demand for 1¼-in. from retailers is heavy now, apparently equalizing the slight decrease there has been from manufacturers, owing chiefly to the slowing down in iron- and steel-trade activity. While car supply is not good, it is better than was expected for this period, and coal production is nearly at capacity. Some operators would make contracts for a full twelvemonth at the regular circular prices of the season, based on $1.30 for mine-run, but others would not, while earlier deliveries command higher prices, which may be quoted approximately as follows: Slack, $1@1.10; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75 per ton at mine, Pittsburgh district.

Connellsville Coke—The coke market has been in mixed condition since the break reported last week from the $2.50 quotation of a group of operators. For several weeks previous the condition had been as follows: The Producers' Coke Co., the accredited sales representative of operators having about 5000 ovens, was quoting a uniform price of $2.50 on furnace coke, irrespective of delivery, while a second group of operators having about the same number of ovens sold their coke independently but quoted $2.50 as minimum, and a third group of about 5000 ovens were selling at various prices as occasions seemed to suggest. The market was made exclusively by these last, and was $2@2.15 for furnace coke. Some three weeks ago some of the second group of operators quietly quoted cut prices, down to $2.25 or lower; about ten days ago a sale was made, according to authenticated accounts, by the Producers' Coke Co. of 10,000 tons November to an Eastern steel company, at $1.90, as reported a week ago. At the same time it was admitted that the $2.50 price had been abandoned.



The expectation of the $2.50 operators had been that when contracts expired quite generally Dec. 31 there would be such a redistribution of business as would give them a fair operation, their output recently being less than 50% of capacity, but with decreased consumption of coke it appeared probable that the business would do little more than fill up the cut price operators. There is now full competition between all the operators not provided with contracts, and the market is quotable at about $2 for prompt furnace, and possibly $2.25 for contract furnace, though without any serious negotiation. Foundry coke is about $2.75 for prompt or forward. The whole market is in uncertain position, reflecting not only the break among the operators, but also the continually decreasing activity in the iron and steel trade.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 25 at 385,670 tons, an increase of 6065 tons, and shipments at 389,068 tons, an increase of 5055 tons. Prospects are that the next report will show a great reduction in both production and shipments.

BALTIMORE, MD.

Market remains rather unsteady. Mine interests determinedly holding to old standards. Exports showing improvement. Anthracite much more active with colder weather.

That the coal market here is wavering seems to be undoubted. In view of the abnormally good conditions prevailing through the fall and summer the best posted coal men have been predicting for some time that a drop would occur. The previous week's break, in both demand and prices has continued and it is generally reported that there was practically little or no new demand. Prices have held about the same, although an exception was slack, which sold down to $1 and $1.05 in some cases, a drop of about 15c. from the figures of a couple of weeks ago.

Operators are working desperately to hold the market. With plenty of coal on hand and a liberal supply of cars at most of the operations, there was a general refusal to sell at less than prices that were obtained recently. Although many coal men are predicting that a flat period is yet to be passed through, the operators for the most part appear sanguine and expect an early strengthening all along the line. There seems to be a determination on their part not to sell coal at low prices.

The situation locally is rather slow, as there is not much spot demand. Considerable coal is reaching tide for shipment over the piers, but this is mostly for domestic coastwise delivery or on export, and under contract. The export trade shows distinct signs of improvement.

Along anthracite lines there is some real activity. The past week brought the snappy sort of weather that meant business. Domestic sizes were all in excellent call and jobbers have orders for quick delivery that will mean a busy November.

BUFFALO, N. Y.

Weather and transportation conditions against bituminous trade. Much activity in anthracite in the West. Car shortage as great as ever. Coke continues weak.

Bituminous—The market for sizes in bituminous is not so strong and various members of the trade differ as to prices. The producer is certain that with winter coming on and cars scarcer that it is not going to be difficult to maintain a price which was strong last July. There is not much more talk about a special weakness setting in when the lakes close, as slack is much firmer than sizes and besides the demand for lake tonnage is heavy; coal is now being shipped out from upper-lake docks to country points beyond Lake Michigan faster than it can be obtained for shipment at lower-lake ports. It will be another month before the heavy demand for coal in the lake trade is over, and in the meanwhile the misunderstanding about the rail-freight rate will be settled. Some shippers still believe that the 5% advance is to go in, but it is supposed at the same time that the consumer has no such idea now and has stopped buying on the strength of it.

There will also be a strong effort to put in at least two months' supplies ahead of a possible strike next April.

Actual consumption of bituminous does not seem to have fallen off. Shippers as a rule say that they can hold the price till the stocking up against the spring suspension begins. Cars are so short that it will not be possible to flood the market when the lakes close and the uncertainty as to the turn of business generally may give way to firm confidence any day. Prices hold, but not with anything like the firmness of the earlier part of the season.

Quotations continue as before, $2.90 for Pittsburgh lump, $2.80 for three-quarters, $2.65 for mine-run and $2.25 for slack, which is much stronger than sizes. High-grade Allegheny Valley coal is steady at about 25c. less than Pittsburgh.

Coke—Reports are still against any stability in coke. All prices are weak and though the trade continues to maintain a basis of $4.85 for 72-hr. Connellsville foundry the conditions are not favorable to holding it long.

Anthracite—The difficulty with anthracite in this market and Westward is the impossiblity of getting a satisfactory supply. Some shippers express a readiness to go into the open market and buy in large quantities. The local demand is moderate, on account of warm weather. There is no surplus of independent anthracite, though no premium is yet reported. Lake shipments for the week were 106,000 tons and for October. 564,160 tons. For the season to the end of October the shipment is 4,404,696 tons, as against 3,241,653 tons to the same time last season.

COLUMBUS, OHIO

Decrease in the car supply on most roads has still farther curtailed production. Prices continue at the Nov. 1 circular and are well maintained; higher quotations freely predicted. Domestic demand particularly strong.

Operators in all of the mining districts are complaining of the short car supply which has decreased operations to a greater extent. As a result the tonnage is falling off in the face of increased demand. Prices are ruling firm and all changes are toward higher levels.

The first cold snap of the season produced such a rush of domestic orders that operators and jobbers were unable to take care of the business. One of the big drawbacks is the car shortage which is gradually increasing and from which there is little hope of remedy. Most of the retailers have asked for immediate shipment as they are desirous of accumulating stocks to guard against a famine. In the Hocking Valley the output is estimated at 50% and the same is reported from the strictly domestic fields. In the Pomeroy Bend the production is about 40 per cent. while Eastern Ohio reports about the same.

There is still a good demand from the Northwest and boats are still being chartered but some delay is occasioned in loading. Up to Nov. 1 the total tonnage handled by the Hocking Valley docks at Toledo was 2,500,000 which is about the average in previous years. Lake prices are still strong in every way. Steam demand is good with signs of improvement. Railroads and many factories are using quite a tonnage. Manufacturing generally is holding up and the fuel requisitions are as large as usual for this time of the year.

Quotations in the Ohio field are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$2.00 @ 1.90	....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch...........	1.85 @ 1.75	$1.50 @ 1.40	2.00 @ 1.90	1.85 @ 1.75
Nut...............	1.30 @ 1.20	....	1.75 @ 1.65	1.40 @ 1.35
Mine-run..........	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack..	0.90 @ 0.85	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack........	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.75 @ 0.70

DETROIT, MICH.

Price advance due to heavy demand and car shortage. Domestic grades quiet, except Hocking and Pomeroy, which are more active.

Bituminous—A feeling of uncertainty prevades the local trade, although there has been a general advance in quotations on steam coal, due partially to the inability of shippers to get consignments through to this point. The car shortage has apparently reached an acute stage as regards the local situation, while operators are making every effort to rush shipments forward with the utmost dispatch. Because of the particularly bad conditions prevailing in West Virginia in this respect, many of the miners there are reported to be leaving for other districts where the situation is more favorable. As a result of these conditions, prices have advanced, both Hocking and Pomeroy lump now being quoted at $2. Three quarter Hocking is selling at $1.65, mine-run $1.35, and slack at 90c. Domestic grades remain practically unchanged, with the exception of Pomeroy and Hocking lump, and Pocahontas lump and egg is in a little better supply, while the demand is not so heavy as was the case a week ago.

The market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.75	....	....	....	....	$2.75	$2.50
Egg...........	1.75	....	....	....	....	2.75	2.50
Nut...........	1.40	....	....	....	....	....	1.75
Steam lump....	1.50	....	....	....	....	....	....
¾-in. lump......	1.35	$1.35	$1.65	1.50	1.50	....	....
Mine-run.......	1.25	1.25	1.35	1.25	1.25	1.60	....
Slack..........	0.90	1.00	0.90	0.85	0.85	....	....

Anthracite—The hard-coal situation has not changed materially, the demand being less at the moment, if anything. All grades appear to be in plentiful supply, including stove coal, but jobbers are asking premiums in some instances.

Coke—Connellsville, 72-hr. coke is quoted at $3, with Semet Solvay at $3.25, and gashouse at $3.10, all f.o.b. ovens.

HAMPTON ROADS

Heavy demand for coal Coastwise and foreign. Large movement from all piers. Virginian Ry. breaks all previous records for heavy dumpings.

Business from Hampton Roads for the week has been brisk particularly in coastwise, foreign and bunker shipments. There has been a good supply of steamers, barges, and schooners all week which has enabled the piers to work almost continuously. The demand for coal continues good and in addition to shipments of Pocahontas and New River there has been a fair movement of the high volatile grades.

There have been some spot sales during the week, and at a price said to be around $3 but exact prices have not been obtainable; this quotation was for New River and Pocahontas. There has been little change in prices for high volatile coals although the demand is better than it has been for some time.

During the month of October just ended a total of 971,270 tons of coal were dumped over the Hampton Road Piers. The N. & W. Ry. led with a total of 437,787 tons over the Lamberts Point piers, the Virginian Ry. was second with 304,779 tons from Sewalls Point while the C. & O. Ry. dumped at Newport News 228,704 tons. The month of October has been a record one with the Virginian Ry, their best previous dumping having been made in September when 300,386 tons went over the Sewalls Point piers.

LOUISVILLE, KY.

Producers optimistic in spite of a general slowing down in business. Car supply better. Illinois Central places heavy contract with western Kentucky operators. River movement improving.

The continued active demand for domestic grades and the slowing down of the call for steam coal have been the features of the local market. Eastern Kentucky operators seem to feel that the outlook in this immediate section is somewhat brighter than the general situation would indicate, and they will be able to market most of their steam grades without serious difficulty. The active demand for domestic coal has kept the operators cheerful, and they feel optimistic regarding the situation in spite of the relatively slower call for steam coal. With prices on domestic grades at current figures, the operator who is able to get out a capacity production has little to worry about, even though his business on steam coal is not what it might be.

The car situation has been easier of late, some of the operators being able to work full time, as against an average loss of two days a week, which was noted from Sept. 15 to Oct. 15. The improved situation in this respect apparently reflects a slack call for equipment elsewhere. However, few are inclined to feel pessimistic especially when sufficient orders are on their books to enable the equipment to be used to good advantage. The adoption of a contract between western Kentucky operators and the Illinois Central whereby that road is to take its coal for the ensuing year from the mines on its lines has been an encouraging development of the week. The Illinois Central is one of the largest buyers of coal in the South. There has been a good movement of river coal from Pittsburgh and West Virginia of late. Seasonably cool weather has had the effect of increasing the retail trade, and business with most yards is excellent.

Prices f.o.b. mines are quoted on eastern Kentucky as follows: Block, $2.35@2.50; block and lump, $2.10@2.25; round, $1.70@1.90; nut and slack, No. 1, 70@80c.; No. 2, 50@60c. Western Kentucky coal is being offered on a f.o.b. mines basis as follows: Lump, $1.35; egg, $1.25; run-of-mine, $1; nut and slack, 65c., and pea and slack, 35c.

BIRMINGHAM, ALA.

Both coal and coke still quiet and showing little improvement. Smithing coal about the same as last week. Furnace and foundry coke dull. Little buying in pig iron.

This week shows little change over last week, either in lump or steam coal. The market is quiet, especially on steam grades, and unusually so for this season of the year. Smithing coal is practically the same, with probably slightly larger sales. There is nothing doing in the furnace and foundry cokes, except in small lots. Prices though are satisfactory. Little buying was done in pig iron, and the price was a shade under that of last week. A week or ten days of good cold weather will materially aid business. The car supply shows little improvement.

NEW ORLEANS

Formal opening to navigation of Warrior River. Rise in Ohio releases large shipments for New Orleans. Storage capacity doubled.

Representatives of every coal company maintaining offices locally attended the "Open Warrior" celebration last week. By the successful voyage of a self-propelled barge 200 ft. long and 32 ft. wide up the Tombigbee and Warrior Rivers at the period of lowest water, one step in the realization of the project to bring coal to New Orleans harbor has been proved. The trip was made under adverse conditions due to the fact that two of the Government locks in the Tombigbee are uncompleted. Borden Covel, general manager of the Northern Coal Co., of Boston, has organized a subsidiary company for the marketing of coal that will be handled by the new barge line. The new company is known as the Lake Borgne Coal Co.

There was much rejoicing in New Orleans last week when the stage of the Ohio River permitted the releasing of 155,000 tons of coal for this city. Stocks in the yards of the northern companies were becoming dangerously low, and there was no attempt made to conceal the satisfaction in the early rise. Provisions are being made for storing double the usual quantity of coal this winter.

CHICAGO

Demand continues strong with prices firm and high on some grades. Boom in Franklin County coal. Supply of anthracite still inadequate. Volume of business in Springfield district increasing. Car supply and low temperatures chief factors.

Chicago market conditions are on an exceptionally satisfactory basis with practically all prices firm and some at unusually high levels. Low temperatures and further tightening in the car supply have contributed chiefly to this situation.

Reports from various sources indicate that there has been heavy buying in anticipation of severe weather this winter. There has been a boom in the Franklin County coal district. Orders have been so plentiful that the price for lump, egg and No. 1 nut has been boosted in nearly all instances to $2.25, the mines. A few companies, however, still adhere to the old price of $2. Many operators in this field are oversold and will have a heavy run of business for some time. A larger movement of splint coal in box cars has been noted. Requirements by owners of flat buildings and others have increased the demand for smokeless coal. The minimum price on mine-run is $1.40, while on spot sales, prices ranging from $1.50 to $1.60 have been obtained. Lump and egg vary from $2.25 to $2.50.

Dealers are not obtaining sufficient anthracite to meet demands. Box cars are now being used to haul it to Chicago as a result of a shrinkage in the supply of open equipment. Quotations on the various sizes are firm with little or no discussion about premium prices. Carterville operators are retaining their $2 level on all sizes except No. 1 nut which is commanding as high as $2.25.

In the Springfield territory the volume of business is showing a consistent increase. Domestic lump is selling at $1.75 and steam lump at $1.25, the mines Shipments of Hocking to this market have been reduced and with additional orders from country points the price list has been strengthened; price at the mines for 1¼-in. lump is $1.75. The larger sizes of Indiana domestic lump are selling here at $1.75. The market for byproduct coke is firmer and there is an increasing demand for gas coke.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1 22	1.55@1.80	1.12@1 22	

Carterville prices are: Lump, egg and No. 1 washed, $3.05; No. 2 washed, $2.65.

Harrisburg quotations are: Domestic lump and egg, $3.05; steam lump, $2.65@2.30; mine-run, $2.40@2.55; screenings, $1.55@1.80; No. 1 nut, $1.75@1.80; No. 2 nut, $2.55@2.80.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byproduct, egg and stove, $4.90@5; byproduct, nut, $4.95@5.10; gas house, $4.65@4.75.

INDIANAPOLIS

The weather is mild and is affecting the volume of trade. This has had the effect of tempering prices in spots. The car situation has been relieved somewhat but operators are still nervous.

The weather continues rather mild, interfering materially with a large consumption of coal, especially domestic grades. While the retailers of the city have the same prices presumably, it is said that at least one large yard has been cutting 25c. under the prevailing scale, in order to accelerte the movement into cellars. It is predicted that it will be hard to maintain uniformity in prices unless some real winter weather arrives. Stocks are ample and there are plenty of orders yet to be filled. The railroads are making some headway in relieving the car shortage but operators fear it is only temporary. Some factories, not being able to get deliveries from their usual source of supply have had to go into the open market.

Eastern bituminous coals are selling at retail in this city at $4.75, but an occasional dealer quotes $4.25; anthracite is $7.75@8.50, according to size, Pocahontas $5 to $6; Indiana lump, $3.50; Brazil block, $4.25. One yard advertises: " ton of good coal, delivered, $2; guaranteed to give satisfaction." Inquiry develops that it is nut coal, taken out of screenings over 1½-in. screen.

ST. LOUIS, MO.

Market conditions improving. General advance in domestic prices caused chiefly by car shortage and increasing country business. Immediate future looks optimistic.

The market has been somewhat slow until the beginning of the present week when it seemed to pick up some. There was apparently no reason for this other than business has been gradually getting better in the country districts, although it was predicted a week or ten days ago that after the first of November the demand for domestic coal would drop off.

Car shortage conditions have been unusually severe the past week, the Illinois Central and the C. & E. I. about two days, and the Iron Mountain the same. The Southern Railway and the M. & O. are the joke roads when it comes to car supply, for if their mines get one day a week they are lucky. The Wabash is also in bad shape. The B. & O. is perhaps in the best condition of all roads entering East St. Louis.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump				$1.15@1.25
3-in. lump			$1.60	
6-in. lump	$1.75 @ 2.00		1.75	1.40@1.50
Lump and egg	1.85 @ 2.15	Over sold		
No. 1 nut	1.50 @ 1.75			
Screenings	0.40 @ 0.50			0.10@0.20
Mine-run	1.10 @ 1.20			
No. 1 washed nut	2.00		1.40	
No. 2 washed nut	1.40		1.60	
No. 3 washed nut	1.20			
No. 4 washed nut	1.05			
No. 5 washed nut	0.30			

KANSAS CITY, MO.

Unfavorable weather and trade quiet. Strike in the Colorado fields may affect the local markets.

With the weather unfavorable, the coal situation has undergone no change of consequence during the past week. The expected 25c. advance failed to materialize, due to the fact that the cold weather was short-lived. The increase, however, will probably come within the next few weeks, being regarded as inevitable.

There has been no great change in the Colorado situation and that coal will be missed by Nebraska, Colorado, and Kansas consumers. Dealers have comparatively little Colorado coal on hand and a few cold days will see their stocks narrowed to nothing. In the meanwhile, operators of Kansas and Missouri are working full time. All lines are moving fairly well though Cherokee nut and one or two other grades have shown signs of weakening, rather than gaining strength.

PORTLAND, ORE.

Labor troubles in both Colorado and British Columbia affecting the Pacific Coast markets. Removal of import duties will not change the situation locally.

Owing to the strike in British Columbia Utah mines are now shipping coal into Seattle, 2500 tons having been forwarded into that city since the opening of the season. Heretofore, Seattle has drawn its coal supplies largely from the British Columbia mines. The Washington mines are shipping coal into British Columbia cities and some even finds its way into Alaska. As a result of the strike in the Colorado mines, the car situation is easier here than for some time and no trouble is now experienced in getting coal from Utah or Wyoming. Receipts are lighter this month than they were during September. Local business is a little quiet for the time being, but has been good for several weeks past. Prices have shown no change during the month.

It is reported that 900 tons of coal will arrive here soon on a vessel from Australia. Dealers do not regard the removal of the 45c. per ton duty on coal as affecting values here this season at least, owing to the high freight rates, but it may be of some consequence next year.

COAL FREIGHT DECISIONS

Sheridan Chamber of Commerce vs. Chicago, Burlington & Quincy et al.

Rehearing. The original hearing dealt with rates on coal from Sheridan, Wyo., to destination on the Chicago & North Western in Nebraska and South Dakota, on the Chicago, Milwaukee & St. Paul in South Dakota, and on the Northern Pacific east and west of Billings, Mont. Upon the rehearing the Big Horn Collieries Co., Owl Creek Coal Co., and Board of Railroad Commissioners of Montana were granted leave to intervene. The first two ask that the rates from mines near Kirby, Wyo., be adjusted so as to bear a proper relationship to rates established from Sheridan to destinations in the three cases under consideration. **Held:**

Sheridan coal should move to points upon the Chicago & North Western and the Pierre, Rapid City & Northwestern herein involved at the same rate enjoyed by Hudson. Proper routing for coal moving from Sheridan to these destinations is prescribed.

Joint rates should be established from Kirby to destinations on the Chicago & North Western and the Pierre, Rapid City & Northwestern herein involved no higher than $1 above the rates prescribed from Sheridan.

For distances within 500 miles of the point of origin joint rates should be established from Sheridan to points on the Northern Pacific east of Billings not more than 40c. over those prevailing from Red Lodge, and to points west of Billings 55c. over Red Lodge, and from Kirby to points on the Northern Pacific east and west of Billings joint rates should be established not more than 65c. over the prevailing rates from Red Lodge. To points between 500 and 600 miles from Sheridan the differentials suggested as compared with rates from Red Lodge should be decreased 10c., and for each 100 miles additional a further reduction of 10c. should be made in the differential.

It is possible for a carrier to discriminate unjustly and unlawfully against a point which it does not reach over its own rails.

The difference in cost of production cannot be recognized as a basis for the adjustment of freight rates between different localities.—**(28 I. C. C., 250.)**

FOREIGN MARKETS

GREAT BRITAIN

Oct. 24—The market maintains a firm tone for admiralty list coals, which are well booked for prompt shipments. Ordinary Monmouthshire large coals are still plentiful. Best Cardiff smalls are in better demand, and inferior classes freely offered at cheap prices. Quotations are approximately as follows:

Best Welsh steam	$4.68@4.80	Best Monmouthshires	$3.96@4.08
Best seconds	4.44@4.62	Seconds	3.72@3.90
Seconds	4.26@4.44	Best Cardiff smalls	2.52@2.64
Best dry coals	4.32@4.56	Seconds	2.34@2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

British Exports—The following is a comparative statement of British exports for August and the first eight months of the last three years, in long tons:

	August		8 Months		
	1912	1913	1911	1912	1913
Anthracite	237,015	254,811	1,762,204	1,770,490	2,189,491
Steam	4,439,596	4,467,111	34,735,081	32,810,201	39,755,473
Gas	963,176	996,158	7,743,871	7,755,023	8,583,712
Household	154,705	175,022	1,098,581	1,146,393	1,335,833
Other sorts	283,067	304,078	2,278,953	2,268,316	2,653,279
Total	6,077,559	6,197,180	47,618,690	45,750,423	54,517,788
Coke	97,679	125,357	711,697	680,713	838,055
Manufactured fuel	125,373	179,041	1,236,582	1,115,631	1,542,365
Grand total	6,300,611	6,501,578	49,566,969	47,546,767	56,898,208

NATAL

The British Trade Commissioner for South Africa furnishes in the "Board of Trade Journal" the following data rebarding the coal industry in Natal for 1912:

The output of coal from Natal collieries in 1912 was 2,472,100 long tons as compared with 2,394,200 tons in 1911 and 2,296,700 tons in 1910. The total for 1912, although more than in former years, is not considered satisfactory in view of the number of collieries producing and the markets which may be considered as within the sphere of Natal's trade. The increase of exports to Cape ports is more than sustained, and whereas in 1911 the amount sent to Union ports was 270,300 tons, that of 1912 totalled 403,000 tons.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Nov. 1.

Stocks	Week's Range			Year's Range	
	High	Low	Last	High	Low
American Coal Products	..	..	80	87	80
American Coal Products Pref.	..	..	105	109¼	10
Colorado Fuel & Iron	29⅝	27⅜	27⅜	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	15
Consolidation Coal of Maryland	....	....	102¼	102¼	10
Lehigh Valley Coal Sales	210	200	210	....	[illegible]
Island Creek Coal Com.	47	46¼	46¼	53½	4
Island Creek Coal Pref.	84	83½	83½	85	8
Pittsburgh Coal	20⅜	20	20¼	24⅜	1
Pittsburgh Coal Pref.	90½	89⅞	89⅞	95	7
Pond Creek	19¾	19	19	23¾	1
Reading	164	159¾	160½	171	15
Reading 1st Pref.	85	85	85	92½	8
Reading 2nd Pref.	86	85	85	95	8
Virginia Iron, Coal & Coke	..	..	42	54	37

Bonds	Closing		Week's Range or Last Sale		Year's Range	
	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	93½	95	96	96	93½	99
Colo. F. & I. gen. 6s	104	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	79¾	Sale	79¾	80½	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	91	91	98
Pocah. Con. Coll. 1st s f 5s	86	Sale	86	86	85	87
St. L. Rky. Mt. & Pac. 1st 5s	78	79	78	Oct. '13	73	80½
Tenn. Coal gen. 5s	..	98½	97¾	97¾	97¾	103
Birm. Div. 1st consol. 6s	100⅞	Sale	100⅞	100⅞	100⅝	10
Tenn. Div. 1st g 6s	100⅞	Sale	100⅞	100⅞	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	10
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	94	93	Oct. '13	92	9

DIVIDENDS

Lehigh Col & Navigation Co.—Regular quarterly dividend of 2%, payable Nov. 29, to holders of record Oct. 31.

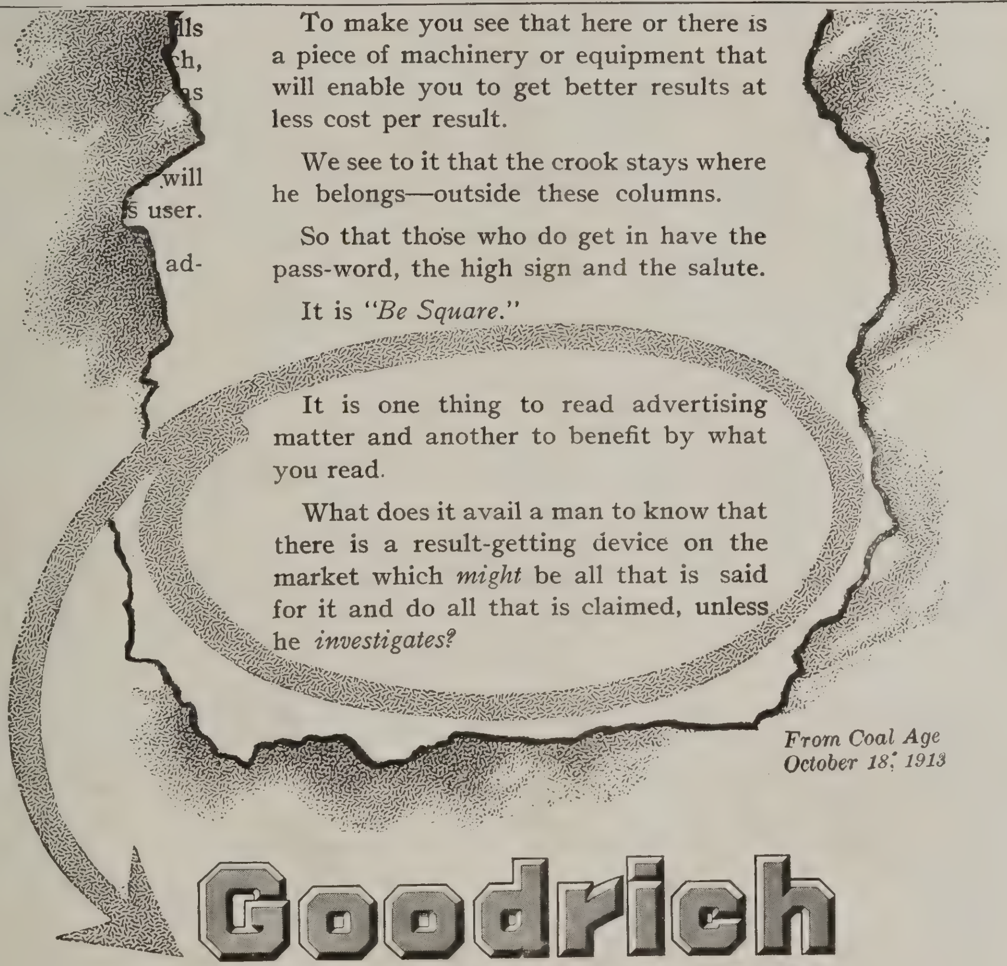
COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

olume 4, No. 20
ssued Every Saturday
ill Publishing Company

NEW YORK, NOVEMBER 15, 1913

Ten Cents per Copy
Contents, First Page
Advertising Index, Last Page



lls
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s user.
ad-

To make you see that here or there is a piece of machinery or equipment that will enable you to get better results at less cost per result.

We see to it that the crook stays where he belongs—outside these columns.

So that those who do get in have the pass-word, the high sign and the salute.

It is "*Be Square.*"

It is one thing to read advertising matter and another to benefit by what you read.

What does it avail a man to know that there is a result-getting device on the market which *might* be all that is said for it and do all that is claimed, unless he *investigates?*

From Coal Age
October 18, 1913

Goodrich
LONGLIFE
CONVEYOR BELT

Positively reduces tonnage costs

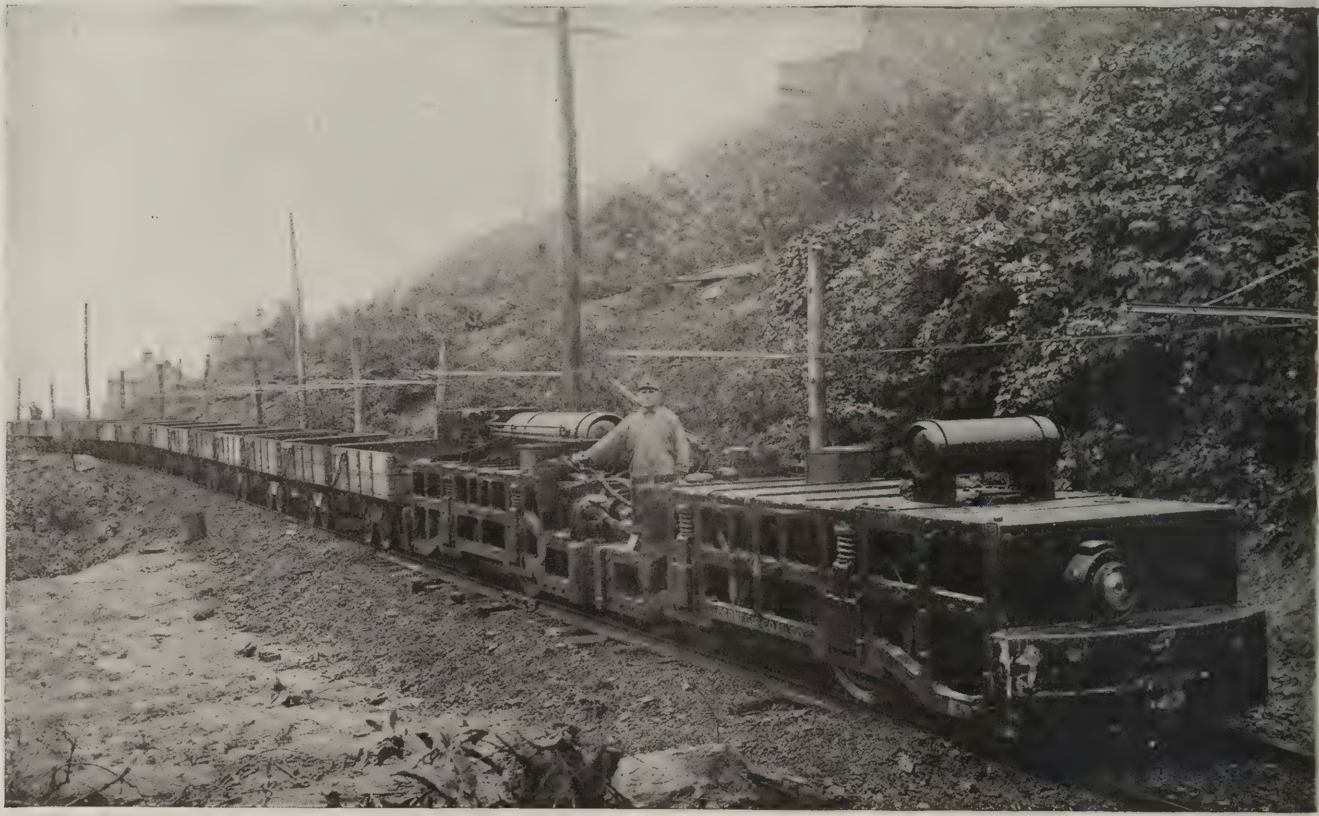
If you will write us, we shall be glad to refer you to plants using our products.

Investigate!

The B. F. Goodrich Company
Factories: Akron, Ohio
Branches in All Principal Cities

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Makers of Goodrich Tires and Everything That's Best in Rubber



Two Units in Tandem, used as a 30-Ton Locomotive.

The Largest Mine Locomotive That Has Ever Been Built

was recently installed at the mines of the Charleroi, Pa., Coal Works. This locomotive (*Baldwin-Westinghouse Barsteel type*) weighs 30 tons, and, it is estimated, can haul 100 cars, each loaded with three tons of coal, over the local grades, which are two miles long and largely against the load.

The locomotive consists of two units which can be separated and used as 15 ton locomotives if desired.

The use of two units in tandem distributes the weight over 8 wheels instead of 4, and hence the locomotive has great tractive power and also is easier on the track than if the weight were more concentrated.

The **Barsteel** frame construction gives ready access for inspecting, oiling, replacing brake shoes, adjusting brake rigging, etc., and also allows excellent ventilation to the electrical apparatus.

If you want to get out maximum tonnage at the least expense and in the shortest time ask for the advice of our mining experts.

One Unit, used as a 15-Ton Locomotive.

Address either Company

The Baldwin Locomotive Works, Philadelphia, Pa.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada.

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

The Tammany Tiger and Advertising

The Weekly Ad-Talk Page

Robert Adamson, who was the late Mayor Gaynor's private secretary and who handled the Fusion campaign in the recent New York City election, made a speech the other night before the Advertising Men's League of New York. It is interesting to note how he gives the credit for the now famous Fusion victory to advertising.

"The press simply elected our ticket," said Mr. Adamson, "that's all. All the other work would have been in vain but for the newspapers. The campaigns of the future will be largely decided by the light thrown upon them by the newspapers.

"Our campaign methods were almost as out of date as Tammany Hall's itself. Three-quarters of the money spent was wasted. Banners, buttons and red fire were useless. They don't change a vote. The money spent on the day of election is also wasted.

"The newspapers were complained of a great deal, but so far as I can see there was no unfairness—they printed fairly all statements issued, and left it to the public to decide where the truth lay. There was probably a great deal of exaggeration and injustice in this campaign, but a correct decision was reached.

"The press has no power except on the side of the right. It can no more write you down or write me down than it can the Palisades. Our problem was to convince the people that we had the side of the right, and not until the press began to present the facts did the people begin to see."

Thus have the great political parties of the country come to realize the tremendous force and value in truthful advertising.

As William C. Freeman, addressing the same gathering the other night, said, "There has been a general clean-up. The old time things that faked and lied are dead. In old days the proportion of bad advertisements to good advertisements was 90 per cent.; now it is just the reverse."

Advertising is so general, so thoroughly read, and so thoroughly understood today, that anyone who is untruthful in his advertising, is committing business suicide.

One of the greatest commercial assets of the manufacturers of this country, is the universal confidence in advertising—

And this is true, simply for the good old reason we have told you before—namely, that it pays to advertise only in proportion as it pays the readers to read the ads and buy the advertised goods.

Two Recent Coal-Mining Disasters

By R. Dawson Hall

SYNOPSIS—The need for more safeguards against explosions. Sprinkling with a water car and loading out dust are only palliatives. With the coal dust loaded out is often a great deal of available stone dust, which would tend to prevent an explosion. Some more details relative to two recent explosions at Senghenydd, Wales, and Dawson, N. M.

⁂

The recent disasters at Senghenydd and Dawson renew the conviction that there remains much to be done before safety can be assured. The steady reduction of accidents in American mines since 1907 is this year to be turned into an increase, and the fatalities will in all probability, easily explained the 5 per cent. excess over last year's figures, but the Dawson explosion has shown that the orderly procession of accident reduction is liable at any time to be disturbed.

It is important to remember that while the Bureau of Mines has proved to almost all the bituminous coal operators that coal dust is dangerous, unfortunately that is only a part of the necessary propaganda. Equally important is it to find a cure, and almost as necessary is it to show that the water car, especially when only carried into headings, is merely a palliative and not a *remedy* for dustiness in a mine. There are many people who have not been assured that dampening a mine with steam can augment not only per thousand men employed, but per million tons mined.

The Mine and Town of the Lewis-Merthyr Collieries, Ltd., at Senghenydd, Wales, Where the Recent Explosion Occurred

Increase in Death Rate

The returns of the Bureau of Mines for the present year, from January to August, showed an increase of 83 deaths or 5.1 per cent. over the fatalities of the previous year. As the tonnage increase has probably been 15 per cent., a decrease in death rate per million tons mined would probably be shown for the first eight months. Unfortunately, the accident in the Dawson mine makes such a desirable reduction for the whole year almost impossible.

The steadiness with which the men have worked in the mines, and the increased number of them employed be done without adding to the danger by increasing falls. There are many operators who do not believe in systematic and extensive stone dusting as a cure for explosions, and there are also a great number who believe it may cause tuberculosis. Also few there are who know that abroad it has long passed from a scientific fad to a general practice, and that at least two manufacturers are recognizing the need for rock pulverizers in coal mines by making machinery for that express purpose.

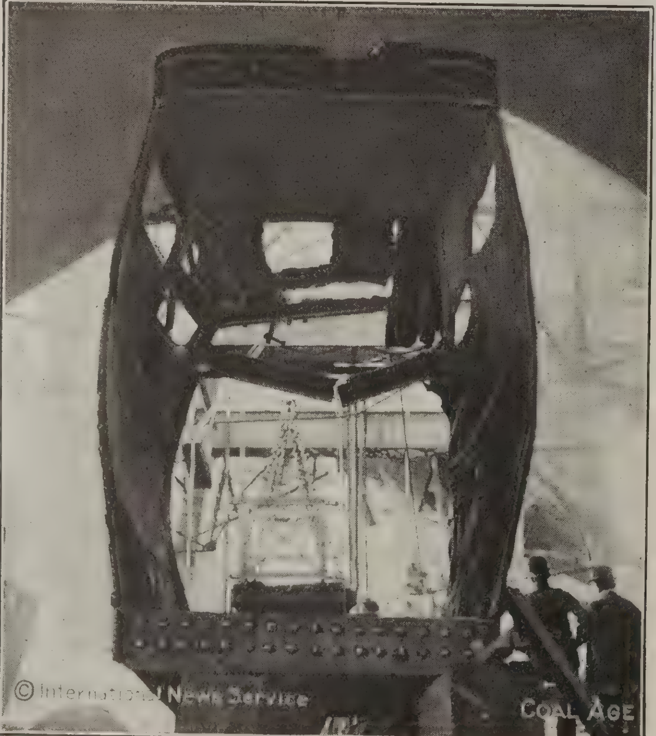
It is these uncertainties, or lack of information, which make operators slow to adopt the right correctives. There is no question among people who are informed that moistening has never destroyed a mine roof, that shale dust spread on mine headings has never and never will cause tuberculosis, that a sufficient quantity of reasonably non-

Scene of the Explosion at Dawson Mines of the Stag Canyon Fu

carbonaceous stone dust will put out an explosion, and that moistening the air and stone dusting should be practiced in every mine making an explosive dust, in fact, in almost all bituminous mines.

Dangers of the Half Measures Frequently Advocated

In any mine the use of electric shot-firing from the surface, like other excellent practices, has disadvantages, because it is likely to make the men disinclined to be on their guard. They are apt to argue that at the worst an explosion will only cause a property loss.



The Cage Which Was Blown from the Lancaster Shaft at Senghenydd

Unfortunately, a small explosion of gas or a mine fire may easily start a larger explosion if the mine is not safeguarded against such an event. Probably at the Dawson mine the principal reliance was on loading out dust and sprinkling it with water. Even when done with all due diligence, such an action can only serve to reduce the violence of the explosion, and may remove much of the motor-braking sand and powdered roof rock by which the force of an explosion would be lessened, leaving only freshly mined coal of a most dangerous description.

Water sprinkled on dust in the mine is probably quite unequal to the task of stopping an explosion once well under way. It is chiefly valuable where the explosion starts.

A little dust is as dangerous as a great deal, in fact it may be more dangerous, as an excess of coal dust, like an excess of methane, may render an explosion less severe. These are reasons why cleaning headings and spraying them will fail to give perfect immunity from explosions.

Senghenydd Explosion

The Senghenydd explosion is the worst England has ever experienced, as far as the number of its fatalities is concerned. It is second only to that at Courrières. The mine was known to be dangerous, for on May 24, 1901, an explosion occurred by which 81 men out of 82 in the pit were killed. The recent catastrophe occurred at 8:20 a.m., the men having gone to work at 6 o'clock, and this fact may have some relation to the cause of the accident. Most of the explosions in the United States have happened early in the morning and been caused by gas exploding when a man entered a place which had not been properly ventilated during the idle period preceding. According to the *London Times,* the hours of working were

NG VALLEY OF RAIL CANYON, TRAMROADS, RAILROAD TRACKS AND HOUSES

from 6 a.m. to 2 p.m., 2 p.m. to 10 p.m. and from 10 p.m. till 6 a.m., the night or repairing shift employing only a few men. This explosion need not have resulted from a lamp; a spark from a pick would be sufficient.

The Universal Colliery at Senghenydd, Glamorganshire, Wales, was owned by the Lewis-Merthyr Consolidated Collieries Co., Ltd., Lord Merthyr being chairman. The explosion was so severe that it blew the galvanized iron roof off the head house and broke the sheaves of the downcast, or Lancaster shaft, the direction of the explosive violence apparently opposing the intake current. The head of the top cageman was cut or blown off and his assistant was seriously injured. The cage was badly damaged, as can be seen in the photograph. The Lewis-Merthyr Consolidated Collieries Co. owns seven mines and produces steam coal for the British navy. The two shafts, Lancaster and York, employ 2200 men, according to one authority and 1700 according to another.

RESCUE TEAMS AT A MINE OF THE STAG CANYON FUEL CO. DR. ROBERTS, OF THE UNITED STATES BUREAU OF MINES, INSPECTING MAPS

Fortunately, these men work in three shifts, and of those actually in the mines over half were saved, as they worked in the 6-ft. and 9-ft. seams in the east district, which are ventilated by a separate air current. They were brought out by the York shaft and numbered 489 men.

The Rescue Work

Edward Shaw, the general manager, at the head of a rescue party went to the bottom of the shaft. About 300 ft. in on the main haulage road he found a blazing fire, but went on nevertheless amid the smoke and fumes, only to be driven back, so blinded that he was unable to see during the remainder of the day. The fire was put out, and the rescue work proceeded slowly, but other fires were discovered, and recovery of the mine was delayed by the necessity for quenching or smothering these fires. About 18 men were rescued from the Britannic section of the mine, but no others were saved. In all 935 entered the mines in the morning and 434 were killed, including the cageman and a rescuer.

The following rules were adopted for rescue work:

1. All exploration work must, as far as is practicable, be carried on through the intake airway.
2. No person, except officials of the mine or responsible leaders of shifts shall enter any return airway or unventilated place.
3. When unexplored roads are about to be entered, it must be done with fresh air.
4. All roads which are unexplored must be "crossed off" for the time being.

Mine at Dawson Caved In as Result of the Explosion

Apparently the rescuemen appear to have had some trouble with their apparatus. "In one place," says the *Colliery Guardian* (to which we are indebted for most of this information), "nine members of a rescue brigade wearing breathing apparatus were overcome and with difficulty brought out by men not so protected."

Dawson Explosion

The number killed in the disaster at No. 2 mine of the Stag Canon Fuel Co., Dawson, N. M., is still believed to total 263 men. It is expected that the government car will continue in Dawson for two or three weeks, making a careful study of the causes. Mining work was resumed Oct. 27 in No. 4 mine, which is on the opposing side of the Rail Cañon.

The coal in Dawson No. 2 mine contains 37.93 per cent. of volatile matter, 45.08 per cent. of fixed carbon, 2.17 per cent. of moisture and 14.82 per cent. of ash. It is a highly bituminous coal. The Merthyr coals in England run about 18 per cent. volatile matter and are, therefore, only one-half as bituminous as those in Dawson. It is due to the Stag Cañon management to state that two days before the explosion, Inspector Rees H. Beddow examined the mine and declared it in good condition. The ex-territorial inspector, Jo. E. Sheridan, spoke most highly of the management.

⁂

Recent Legal Decisions

By A. L. H. Street*

Reasonableness of Demurrage Charge—A rule of a railway company, operating in Kentucky, imposing a charge of $1 a day for detention of cars more than 48 hours, not including Sundays and holidays, after the cars have been delivered for loading or unloading is valid and enforceable (Kentucky Court of Appeals, Louisville & Nashville Railroad Co. vs. Waller & Co., 159 Southwestern Reporter 590.)

Liability of Carrier for Delay on Connecting Line and Measure of Damages—Under the Carmack Amendment to the Interstate Commerce Act, a railway company which receive a shipment of coke, or other freight, for carriage to a point in another state is liable for damages sustained by the consignee, through unreasonable delay of a connecting carrier in making delivery, of the first carrier contracted for through shipment. A clause in the bill of lading covering such a shipment, providing that, in case of loss of the shipment, its value or cost at the point of shipment shall govern settlement of the shipper's claim for damages on account of the loss, does not affect the measure of damages recoverable on account of delay in transportation. (Oklahoma Supreme Court, Ft. Smith & Western Railroad Co. vs. Awbrey & Semple, 134 Pacific Reporter 1117.)

Effect of Pennsylvania Mining Act—Although, under the laws of Pennsylvania, a miner cannot recover from his employer for injuries solely caused by the mine foreman's failure to supply props to support a mine roof, the operator is liable if it appears that the mine superintendent was notified of the foreman's failure to furnish props on request, and promised to furnish them immediately. A miner who has requested props is not guilty of contributory negligence as a matter of law in cutting and loading coal before the props are furnished, if he sounds the roof and it appears to be safe, notwithstanding the section of the Pennsylvania Mine Law which prohibits a miner from working where there is danger from loose roof or sides, until props are supplied. (Pennsylvania Supreme Court, Collins vs. Northern Anthracite Coal Co., 88 Atlantic Reporter. 75.)

Construction of Mining Leases—In construing a coal mining lease, its language should be interpreted most strongly against the grantor; and the intention of the parties is to be ascertained by reference to the entire instrument, and not to disjointed parts of it. Right to use the premises in all ways which are customary in conducting coal-mining operations is implied, in the absence of express provision to the contrary. Where adjoining tracts of land were leased to a company for the purpose of mining coal and manufacturing coke thereon, the company was entitled to construct buildings on the premises for future use of its employees, and, pending such use, could lease the buildings to another company without being required to account to the lessor for rents received on that account. (West Virginia Supreme Court of Appeals, Stonegap Colliery Co. vs. Kelly & Vickers, 79 Southeastern Reporter, 341.)

Mining Company's Liability Concerning Defective Track—In a suit by a coal miner for injury to him, sustained while handling a car on a gravity track in a mine, caused by the car jumping the track, it was improper for the court to take from the jury the question whether the mining company was negligent in failing to maintain the track in proper condition, if there was any evidence to sustain a finding of negligence, even though the weight of the evidence might seem to preponderate in favor of the company. The miner was not guilty of contributory negligence, barring recovery for the injury, merely because he knew the track was in a defective condition, unless a miner of ordinary prudence would have refused to continue work until the track should be repaired; he having received assurance that the repairs would be made promptly. (Kentucky Court of Appeals, Fusion vs. New Bell Jellico Coal Company, 159 Southwestern Reporter 619.)

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*Attorney at Law, St. Paul, Minn.

A Significant Resolution

At a meeting of the Conciliation Board held in Wilkes-Barre, the following resolution relative to the so called button strikes was adopted.

> Whereas, the testimony shows that continued strikes have occurred in violation of the award of the Anthracite Coal Strike Commission and the agreements subsequent thereto, and
>
> Whereas, new trouble has been caused by high-handed and arbitrary action on the part of certain committeemen in the forcible collection of union dues in violation of any rights given by the award or any subsequent agreement, and
>
> Whereas, this action has caused serious loss to the G. B. Markle Co. and loss of discipline in the operation of its mines;
>
> Therefore, be it resolved, that the company be directed to take such steps as are necessary to enforce proper discipline by the discharge from its services of the parties guilty of causing this trouble in open violation of the agreement to which they have subscribed; and
>
> Be it further resolved, that Hugh Gallagher, Patrick Sweeney and Michael Laputka be directed to appear before this board at the next meeting, to be held Nov. 17, 1913, to explain their alleged actions in violation of the agreement and the instructions given them at the meeting held Sept. 15, 1913.

This resolution was the outcome of the complaint of the G. B. Markle Co. that since their last case relative to button strikes, heard Sept. 15, there have been several similar strikes.

New Mining Legislation in Tennessee

At least two important mining bills have just been passed by the extra session of the legislature in Tennessee, September, 1913. The first of these entitled Chapter No. 24, Senate Bill 192, is:

> An act to require the operators of coal mines in this state to provide and keep suitable appliances, bandages, dressings and medicines for the first aid to the injured in said mines.

The second, entitled Chapter No. 38, Senate Bill No. 191, is:

> An act to provide for the organization and maintenance of a trained body of men for the preservation of lives and for rescue work in case of explosion, or other serious mine disasters, and to provide the conditions, requirements and regulations under which this organization may be formed and maintained.

The chief mine inspector, George E. Sylvester, has just sent out the following circular letter to all the mines in the state, drawing the attention of mine officials to the new legislation and its requirements:

> Nashville, Tenn., Oct. 18th, 1913.
>
> Dear Sir:
>
> I inclose herewith amendment to the mining laws, passed at the extra session of the legislature, September, 1913. Only two of the bills, namely, those pertaining to first aid and mine rescue are, strictly speaking, mining bills. The bill relative to a two-week pay-day, although general in its character, would apply in some cases to mines and consequently has been included for your information.
>
> The bill requiring the keeping of first-aid supplies, at mines, goes into effect at once. Many of the mines have already complied with these requirements, and I would suggest that those who have not done so give it immediate attention.
>
> The American Red Cross and Johnson & Johnson both have on the market "Industrial Cabinets" in a neat and convenient tin box, which sells for about $6 and meets the requirements of the law. Any suitable stretcher, whether obtained from these supply people or made at the mine, will serve the purpose.
>
> This department is very much interested in the matter of seeing these regulations carried out in all cases, and this will be a subject on which the district inspectors will report at each inspection.
>
> Mine-Rescue Bill: As will be seen there is nothing mandatory in this bill. It is recognized by the best mining men that few, if any, mines are entirely immune from the possibilities of a disastrous mine fire or an explosion.
>
> The value of the oxygen apparatus is also recognized in such an emergency. The maintenance of such apparatus must be considered along the line of insurance; and the object of this bill is that the state shall assist and coöperate with the mines in this matter, in order that an effective organization may be available in emergencies, and it is hoped that some of the larger mines or groups of mines will interest themselves in this matter.
>
> The bill has the strong approval of this department, and I should be glad to take the subject up in detail with all interested parties.
>
> Very truly yours,
> GEO. E. SYLVESTER,
> Chief Mine Inspector.

A third bill, entitled Chapter No. 29, House Bill No. 65, is of less importance, but applies alike to mines and other industries. It is:

An act to require all persons, corporations, companies, firms, or partnerships, to have two regular paydays each month.

Coal Mining Institute of W. Va.

Between 250 and 300 of the leading coal men of West Virginia will be in Charleston, on December 8-9-10. The occasion will be the semi-annual meeting of the West Virginia Coal Mining Institute. The members of the Institute will be addressed on the first day by Governor Hatfield.

Because of the subjects to be discussed and the persons discussing them, this will be one of the most interesting meetings of the Institute for several years.

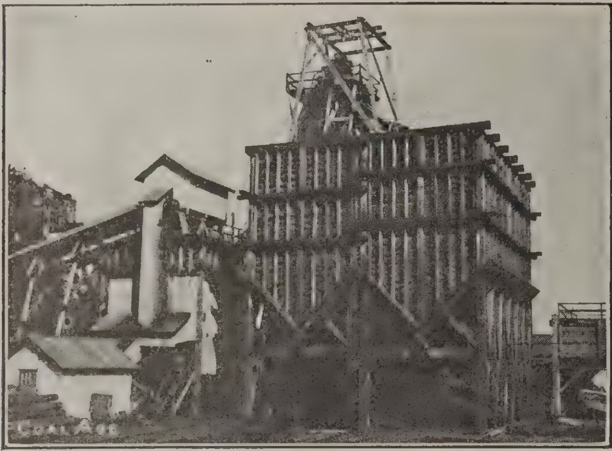
Chairman Lee Ott, of the Public Service Commission, will read a paper on the "Operation of the Workman's Compensation Law." "The Selling Price of Coal" will be discussed by R. A. Colter, of the C. G. Blake Coal & Coke Company of Cincinnati, and George F. Parker, of New York, will talk on "Public Sentiment."

The Rev. Thomas C. Johnson, of Charleston, has consented to deliver an address on the new Prohibition Law and its probable effect upon the miners of West Virginia, while former Governor Wm. A. MacCorkle will present to the Institute the result of his study of the "Effect of the Panama Canal on West Virginia Mining Operations."

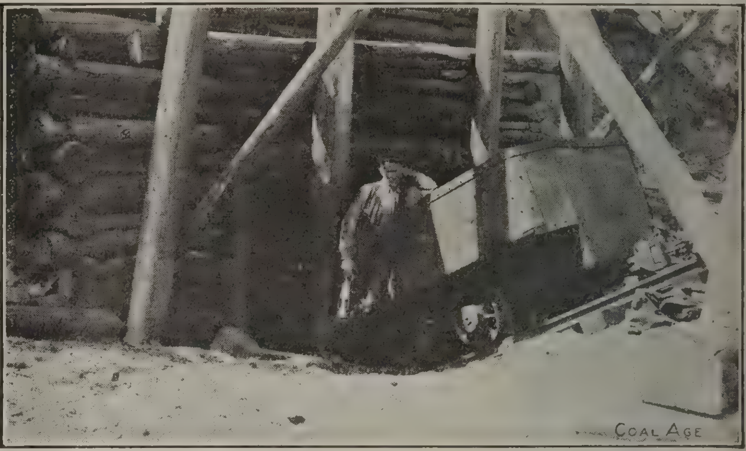
One of the foremost chemists of the country, Dr. L. C. Jones, of Syracuse, New York, will read a paper on "Chemistry of Coal as Applied to Coke Making and By-Product Ovens," while John G. Smythe, chief engineer of the Consolidation Coal Company of Fairmont, will read a paper on the use of the panel system in mining. Earl Henry, Chief of the Department of Mines, and John Laing, former Chief, will discuss the work of that department, while R. S. Ord, of Maybeury, will tell of the "Advancement of Mining Methods in West Virginia," and Frank Haas, of Fairmont, will read a paper on "General Mining Conditions."

Neil Robinson, of Charleston, is the President of the Institute, and Prof. E. N. Zern of Morgantown, is the Secretary and Treasurer. The Vice-Presidents are: George T. Watson, of Fairmont, John Laing, of Charleston, R. S. Ord, of Maybeury, J. F. Healy, of Charleston, and J. C. McKinley, of Wheeling. The members of the Executive Board are the officers and Hon. Lee Ott, of Charleston; Prof. Clement Ross Jones, of Morgantown; Daniel Howard, of Clarksburg; J. J. Lincoln, of Elkhorn; J. B. Hanford, of Morgantown, and Frank Haas, of Fairmont.

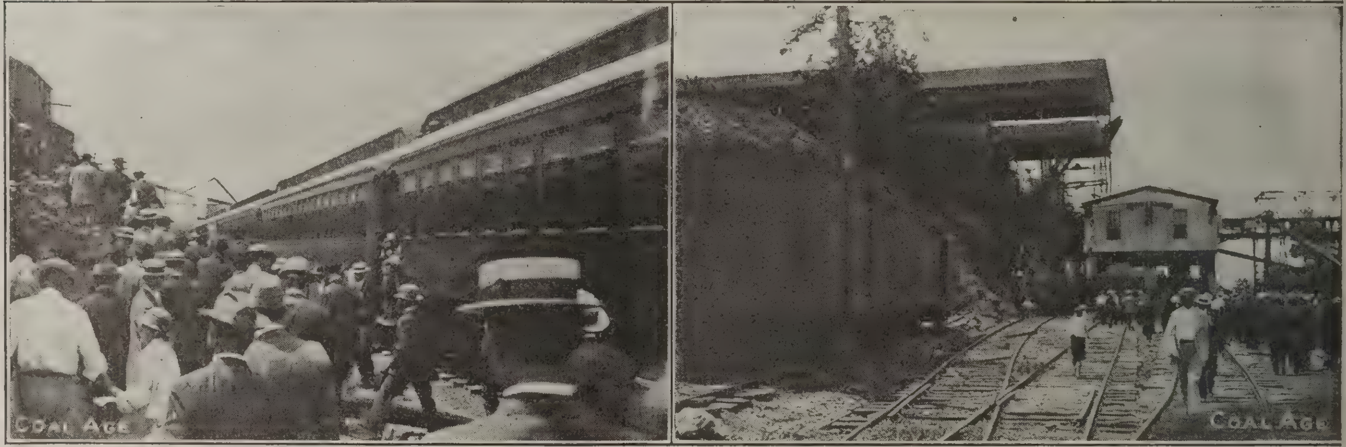
SNAP SHOTS IN COAL MINING



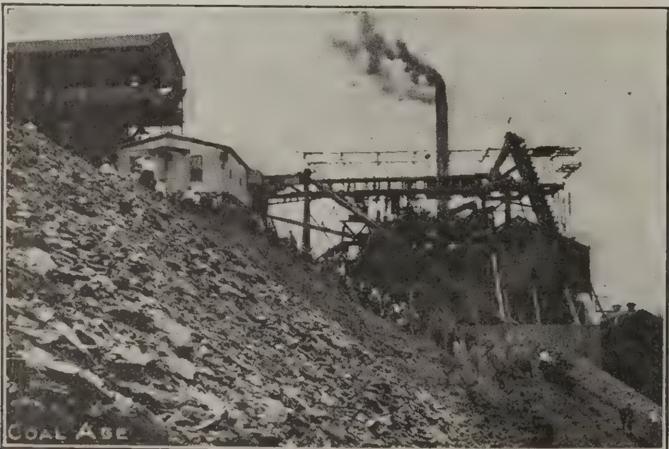
Washery and Bunkers of Western Fuel Co., at Nanaimo, B. C.



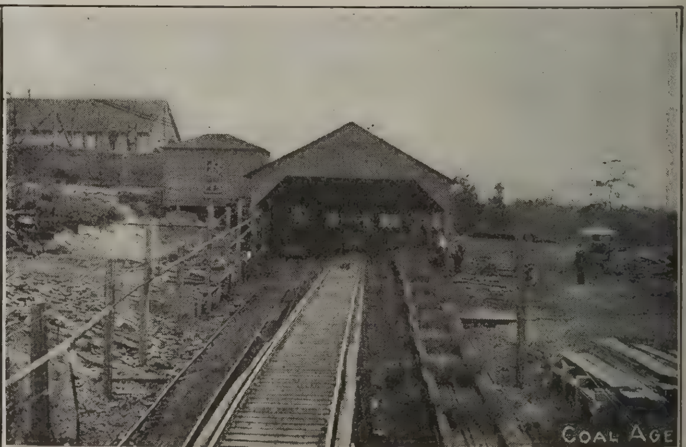
Mouth of Slope at New Coal Development, Coalmont, B. C.



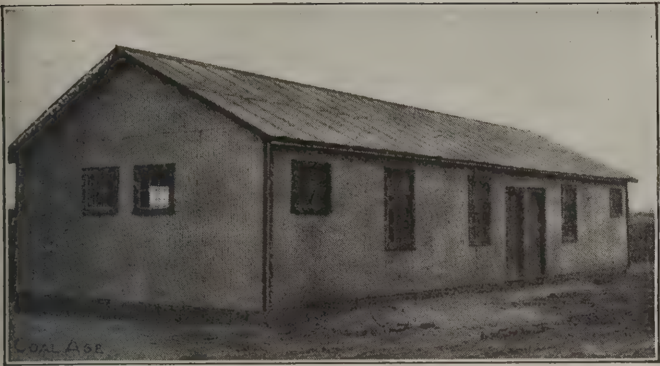
Members of Alabama Coal Operators' Association Alighting from Special Train to Inspect Plant of Roden Coal Co., at Marvel, Ala.



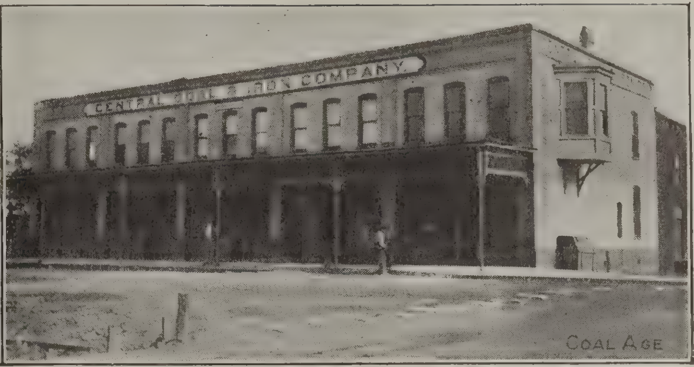
Alabama Operators Inspecting Washer and New Tipple Construction Work



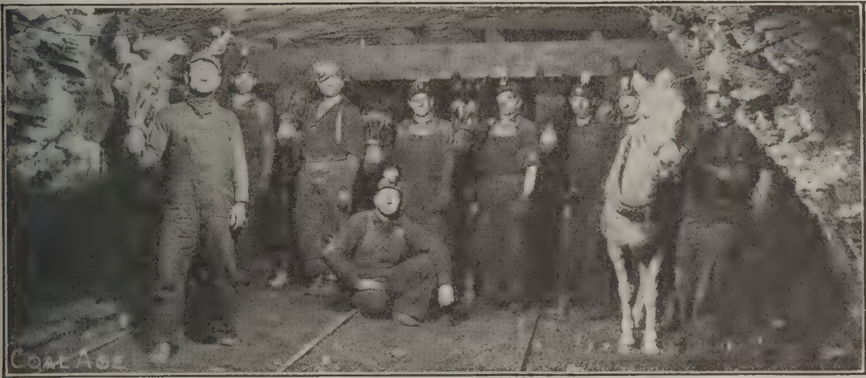
View of Roden Tipple, Showing Approach to Dump and Empties Descending



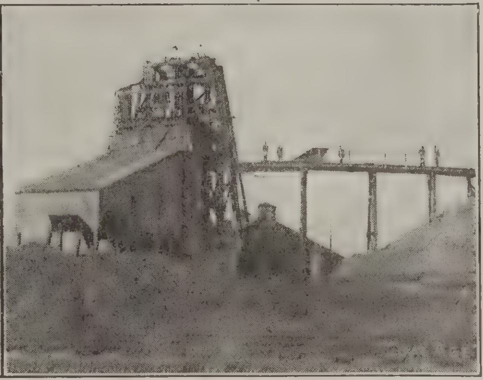
Miners' Bath House, Sturgis, Ky.



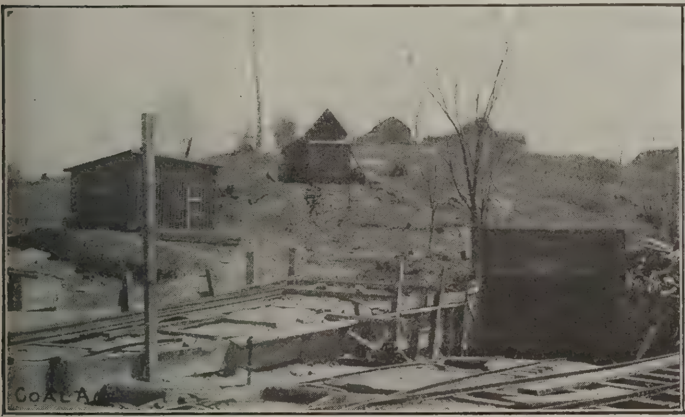
Store and Office, Central City, Ky.



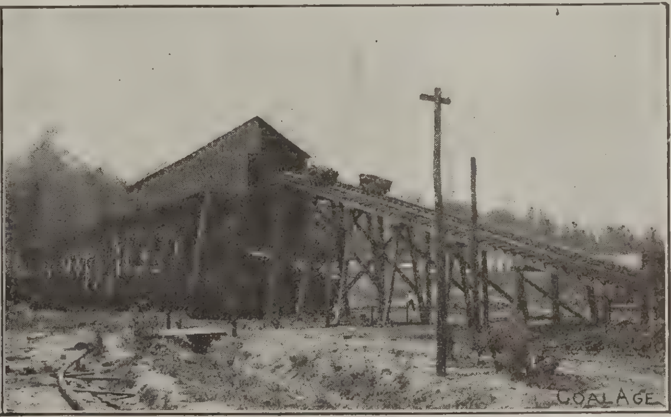
Drivers and Their Mules at No. 11 Mine, Pittsburg & Cherokee Coal Co., in Kansas



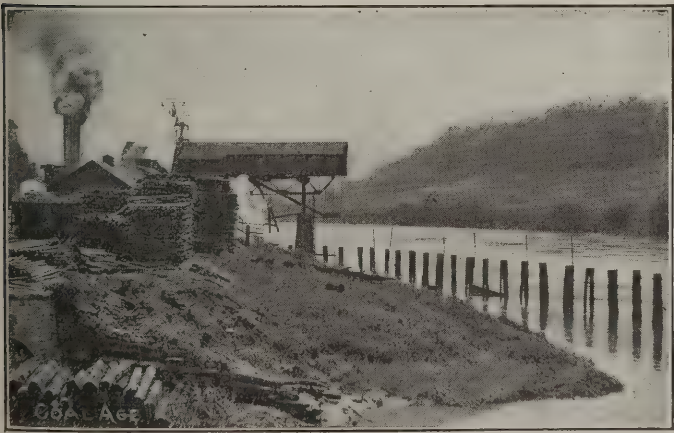
Mine No. 16 of Western Coal & Mining Co., Franklin, Kan.



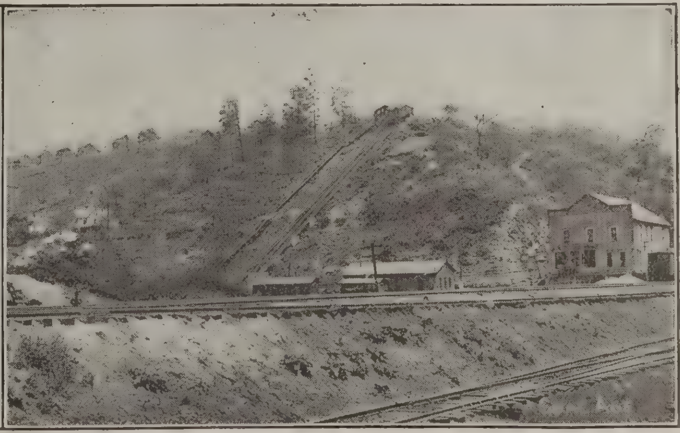
Highland Mine, Providence, Ky.



Kington Coal Co., White City, Ky.



H. C. Frick Coke Co. Tipple on Monongahela River, at Gates, Penn.



Frick Coke Co. Store at Gates. Incline on Left Carries Employees

A New Coal-Washing Table

The coal wasted, both in mining and preparation for market, has in recent years been the subject of much discussion by the public press, the Government and the coal-mining industry. The latter being the most vitally interested, has directed much effort to the perfection of ways and means for reducing this waste as far as possible. No expense has been spared to provide equipment that would save a few cents a ton provided the results obtained would justify the outlay.

Among the latest coal-saving devices to make its appearance is the Massco Coal Washing Table, placed on the market by The Mine & Smelter Supply Co., of Denver, New York, El Paso, and Salt Lake City. This firm having had long and varied experience in the reduction of metal-bearing ores, turned its attention to the problem of cleaning coal, since the basic principle underlying both processes is identical.

In metal-mining parlance this process is termed "concentration." It might with equal propriety be called "washing," which is the term generally used when applied to coal. The end sought is the same in both cases, since it is the segregation of the worthless matter from the valuable material. In ore washing this is the elimination of the gangue from the mineral, while in coal it is the separation of bone or slate, iron, sulphur, etc., from the purer fuel. This process is particularly desirable where coal is used for coking purposes in order to produce a coke with a low ash and sulphur content.

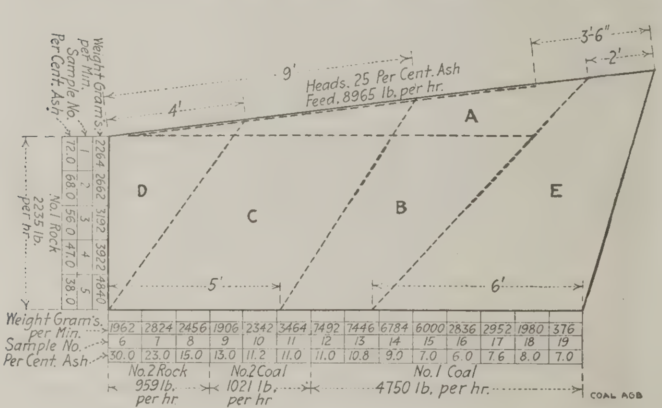


Chart Showing Result of Test

Heretofore, coal washeries have resorted to the various types of jigs for cleaning their product, and while this method accomplished the purpose on the coarser material, it was impossible to clean the fines, until the advent of this coal-washing table. This machine bids fair to displace jigs in washeries where coal is prepared for coking or is too fine for cleaning in this type of machine.

The percentage of saving effected is greater than on jigs besides producing a cleaner product. The reason for this is obvious; since the finer the material is broken the more complete is the physical separation of the coal from the foreign matter, and it only remains to segregate the good fuel from the dirt. This is the purpose for which this table was designed, and which it well accomplishes.

Difference in Specific Gravities Utilized

In this apparatus, as in other coal washing machines, advantage is taken of the difference in specific gravities between coal and the ash-producing foreign substances, the latter being the heavier. The table consists essentially of a linoleum covered, riffled deck about 7 ft. wide, and 16 ft. long, transversely inclined and reciprocated endwise by a head motion mechanism. The crushed coal previously mixed with about three times its volume of water is fed onto this deck through a feed-box at the upper corner.

The pulp, as the mixed coal and water is called, in its passage across the deck stratifies in accordance with the specific gravities of the different particles, the heaviest seeking the lower level between the riffles, while the coal, or lighter particles, remain on top to be washed off the side of the deck by the cross flow of water. The heavier, or high-ash particles, are guided and advanced to the end of the deck by the head motion mechanism, and discharged as waste. This separation is visible at all times while the table is in operation, and susceptible of exact adjustment and easy control of the operator. When properly adjusted, little attention is required, and one horsepower is ample to drive each table. The capacity has been found to be from 4 to 6 tons per hour on coal broken to pass a ¼-in. ring.

The accompanying line drawing shows the relative grades of coal and refuse discharged from one of these tables in use at a washery of the Stag Canon Fuel Co., at Dawson, N. M. The product of this machine is a high-grade coking slack and a superior blacksmithing coal.

Samples were taken every foot around the table, and the figures designate the relative quantities discharged with their ash content. Note that zones *B* and *E* discharge the highest grade coal, also the major portion of the product; while zone *C* is a somewhat lower grade and a lesser quantity. Zone *D* discharges practically all the waste or rock, as indicated by the high-ash content of the product. The coal used on this run was particularly difficult to wash, since the bone, coal and rock graded into each other without showing any distinct line of demarcation.

Reference to the tabulated results of the test shown below will reveal that from a table fed with material containing 25 per cent. ash, 82 per cent. of the total weight was recovered, containing 12.4 per cent. ash. While no sink and float test data are available, the 82 per cent. saving of the total would doubtless represent from 95 per cent. to 98 per cent. of the recoverable fuel.

RESULTS FROM COAL WASHING ON MASSCO COAL-WASHING TABLE, STAG CANON FUEL CO., DAWSON, N. M.

Product required for coke..........................12% ash and lower
Specific gravity of Coal 1.35....................Bone and ash 1.35 to 1.85
Dry weight of feed to table, per hr.................................8965 lb.
Assay of heads..25% ash
Product from table:
No. 1 Coal 53% of weight = 4651 lb. Average ash 9%
No. 2 Coal 11.3% of weight = 986 lb. Average ash 11.5%
No. 2 Rock 10.7% of weight = 938 lb. Average ash 22%
No. 1 Rock 25% of weight = 2390 lb. Average ash 52.7%
No. 1 and No. 2 Coal combined making product:
64.3% of weight = 5637 lb. Average ash 9.5%
No. 1 and No. 2 Coal and No. 2 Rock combined making product:
75% of weight = 6575 lb. Average ash 11.3%
No. 1 and No. 2 Coal and No. 2 Rock plus 641 lb. No. 1 Rock (Sample No. 5—38% ash) making product:
82% of weight = 7187 lb. Average ash 12.4%

It should be mentioned that the above material was too fine to be treated successfully in jigs, and prior to the installation of these tables represented a total loss. A run was also made upon dump material carrying 34.2 per cent. ash, and containing 46.5 per cent. of good coal running 11.1 per cent. ash. This was first screened and that which passed a ⅜-in. mesh was fed to the table at the rate of 7700 lb. per hr. The result of this test showed that 44.2 per cent. of the material fed to the table was recovered, containing 11.1 per cent. ash. This represented a recovery of 95 per cent. of the total amount of the commercially valuable content of the dump.

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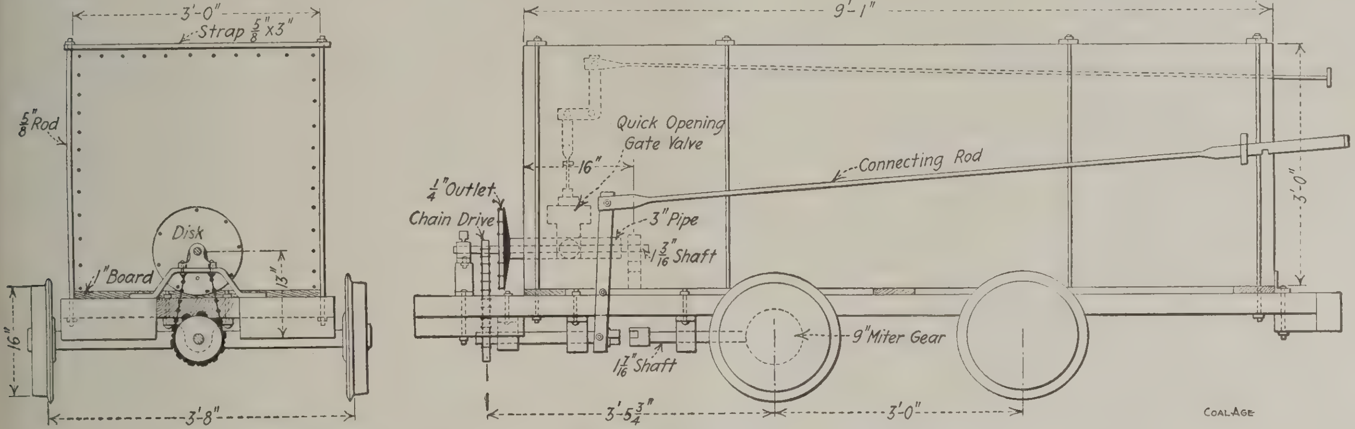
A Mine Sprinkler

The Boardman mine washer, illustrated herewith, is not an appliance for separating refuse from coal, but a device for attaching to a water-tank car whereby the air in a mine may be purified of dust, and the floor, roof and sides effectively sprinkled, the power for the discharge being provided by the motion of the car and thus being ultimately derived from the tractive means used.



A Sprinkler Which Throws a Fine Spray over Roof, Sides, Floor and Brattices

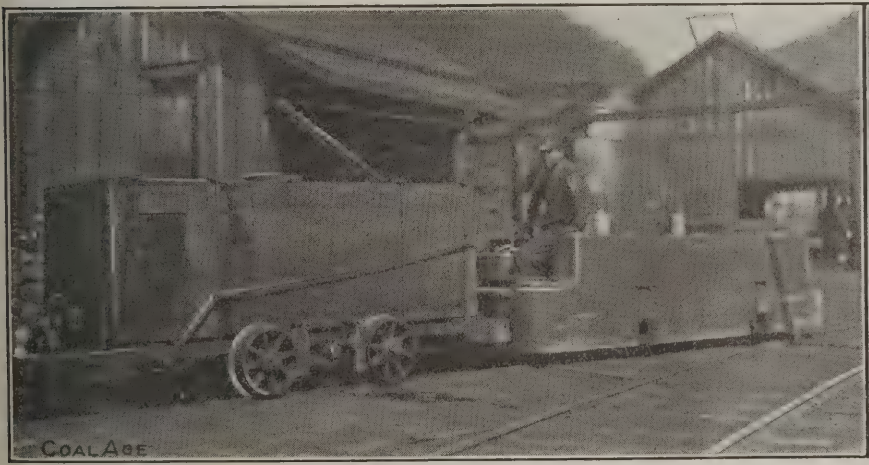


Fig. 1. The Mine Washer—At Rest

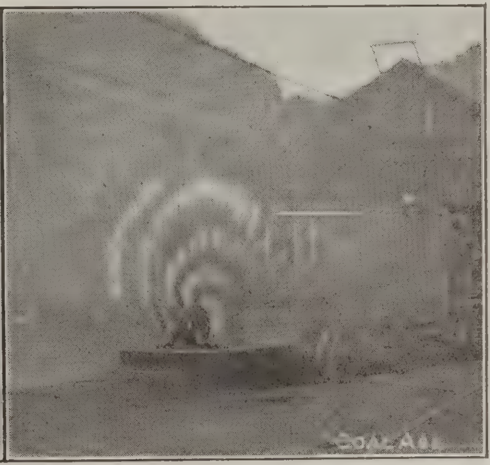


Fig. 2. Washer in Action

A 9-in. miter gear is provided on the rear axle of the car, this drives a shaft in the center of the underside of the tank. This shaft revolves a sprocket at the rear of the wagon and a chain passed round this sprocket actuates a bladed disk which, being fed with water, throws a continuous stream of atomized liquid in a circle, the radius of which, when its flow is unobstructed, is 25 ft.

The discharge of water can be regulated by a bell-crank from the front end of the car and, by a simple lever, the shaft connecting the rear axle with the spray disk, can be uncoupled.

Fig. 1 shows the tank car attached to a motor, but in many cases mules are used. When drawn by the latter power, the car can be taken into every part of the mine where a track is laid and to points where an explosion is likely to take place if the dust is not laid and well moistened.

Fig. 2 shows the tank car in motion and the fog it is throwing is the cause of the hazy appearance in the photo. A car which waters only the floor of a mine discharging its contents with but little force, in no sense atomizing it, may comply with the letter, but not with the spirit of the law, and protects neither the miner nor the operator. The mine washer is built by the Superior Supply Co., of Bluefield, W. Va.

⁂

A Record Production

The Truesdale Colliery of the D. L. & W. Coal Co. mined, prepared and shipped to market during October, 1913, 105,020.07 tons of coal, the total production for the month being 108,220.07 tons. This tonnage is a record production from one colliery for the anthracite field. This large output may be considered remarkable indeed when it is remembered that the first ton of coal prepared at this plant was shipped to market Nov. 15, 1905, a little less than eight years ago. The plant is operated electrically, the power being obtained from the Nanticoke central station, located near the Susquehanna River at Butzbach's Landing. The colliery is under the supervision of H. G. Davis, district superintendent; P. H. Devers, assistant district superintendent; Joseph L. Reynolds, outside foreman; W. E. Waters, William White and David M. Evans, inside foremen. The plant has a nine-hour day record of 5,729.07 tons.

A Mining Class in Alabama

Mine foreman William Crooks conducted a successful mining class of 12 members, last year, at the mines of the Pratt Consolidated Coal Co., Quinton, Ala. The membership represented different classes of mining men. Out of the eight members of the class who took the state examination at the close of the term, seven passed with credit.

The class this year has an enrollment of 18 men, among whom are two superintendents, one assistant foreman, one fireboss, a boss driver, bratticeman, trackman, timekeeper, shipping clerk, store manager. A noticeable feature is the absence of miners and mine laborers, while the interest shown by those engaged in the commercial end of the coal industry is commendable. An intimate knowledge of mining conditions and principles is always a benefit in all branches of the work—in the store, the office or the field.

Mr. Crooks this year is assisted by Supt. Hollis. The class and its teachers have the best wishes of Coal Age.

Company Store Limits Its Profit

A company store which supplies two coal camps a mile apart in territory tributary to the Virginian Ry. is the first mercantile establishment in recorded coal-mining history to make a horizontal reduction of 8 per cent. upon everything on its shelves because it was earning too big a profit. The president of the company has laid down the dictum that "if we can't make money on coal we had better quit." The store manager has been warned that he must keep inside a certain dead line of profits.

An English Syndicate in West Virginia

There are persistent rumors of a new, big consolidation in West Virginia, regarding which the *Boston News Bureau* has the following to say:

> Of interest to the security holders of New River Co. is the announcement from Richmond, Va., concerning the negotiations now in progress for the purchase by an English sydicate of important West Virginia soft-coal properties, including New River.
>
> The proposition is said to involve an investment of $30,000,000 by English capitalists headed by Peter D. Millory, of London. The negotiations on behalf of the mine owners have been carried on by an organization known as the West Virginia Syndicate, some of the members being: W. N. Page, of Ansted, W. Va., president, who was connected with the late H. H. Rogers in constructing the Virginian Ry.; Morgan Davis, Jr., of Scranton, Penn.; Judge Alden, of New York, and G. D. Penniman, of Baltimore, representing the Baltimore & Ohio.
>
> The properties to be acquired include nearly 100 collieries with an annual capacity of 8,000,000 to 10,000,000 tons of coal, and 550,000 acres of coal land. These plants are at present shipping annually about 4,000,000 tons and the English purchasers intend gradually to increase output to greatest possible capacity. The properties include many well known seams of coal and are estimated to contain at least 3,000,000,000 tons.
>
> The New River Co. represents an important unit in the plan, as a producer of over 1,000,000 tons per year and capacity of double this. It has outstanding $2,500,000 5% bonds, $6,737,400 6% preferred stock, $13,474,800 common, besides $600,000 of 6% notes. The company is in good position to trade because of the noteworthy improvement which has taken place in its affairs since the Boston interests ousted the Dixon management.

Electric Light versus Candle

The danger of using lights which are extinguished by gusts of wind from shots or by rapid currents of air used for ventilation or by falls of the user is illustrated by the following accident at Roundup, Mont.:

Gustave Delannoy, a coal miner, becoming confused in the darkness, after he had "spitted" a fuse preparatory to a blast in the Republic mine, wandered back into the room and practically on top of the charge a moment before it exploded. His body, fearfully mangled, was found several hours later. It is presumed that a gust of wind extinguished Delannoy's candle after he had lighted the fuse.

The Barroom Miners

By Berton Braley

Written especially for "Coal Age."

Says Dago Tony, "I tella you what,
I maka da bigga, da greata shot!
I getta da fifteen, da twenty ton,
Da boss he say, 'O you sonna-da-gun,
No other miner so good lak you'—
Datsa what he say, I tella you true!"
"G'wan," says Mike, as he gulps his beer,
"You quit yere tossin' the bull in here,
An' listen to ME—one day last spring,
I drills my holes an' I shoots 'em, bing!
An' seventeen cars was the coal I got,
Seventeen cars from a single shot."
Then the other fellows along the bar
Begins to talk of how good they are,
They boast of the wonderful shots they've made
And the strength and labor that they've displayed,
And the barkeep filled 'em up anew
As the night wore on and the stories grew,
And the tales grew long and the tales grew wide
And the more they boasted the more they lied,
Till one of the listeners goes outside;
He goes outside with a funny grin
And after a while he comes back in
With a pick and shovel and barrow too;
Well, the gang sings out as he heaves in view,
"Say, where did ye get them tools an' truck,
An' what are they here for, me laddie buck?"
"Simple enough," he says, says he,
"I've sat here harkin all night to ye,
With all the minin' ye've done in here,
An' I says to myself, I says, 'It's clear,
I gotta get busy, upon me soul,
An' shovel out some of this barroom coal.'
Ye've drilled an' shot it in grand old style,
So now I'll shovel it out awhile!"

Well, the gang looks sheepish when this is heard
An' they never utters a single word,
But drinks their beer an' wipes the foam
An' slips out quiet an' all goes home!

POWER DEPARTMENT

Machines for Continuous Current

By C. A. Tupper*

SYNOPSIS—Simple precautions to be observed in the installation and operation of this type of machines. This is the first of two articles upon this subject and deals exclusively with generators.

⁂

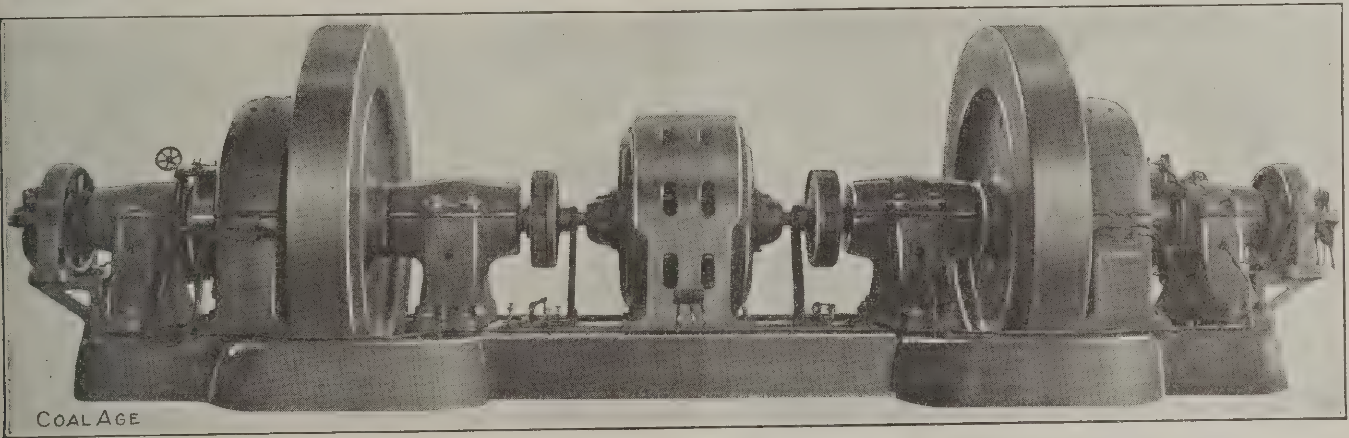
While the tendency to use alternating current for coal, coke and iron mining operations has narrowed the field of service for continuous- or "direct"-current machines, there are still many places in which these can be used to advantage, particularly for haulage or where variable speed is required, and the mine or mill superintendent who fails to give proper attention to aparatus of this class often finds himself in an awkward position. The following observations may, therefore, be of value from a practical operating standpoint.

The exact location of a generator is often arbitrarily fixed by that of apparatus already installed, but it is desirable to have the machine placed in a clean, dry and well ventilated power station away from combustible material, where plenty of light can be secured. The foundations should have enough body or mass to insure freedom from vibration. Provision should also be made for foundation bolts to hold sole plates or rails in position.

A good method of providing for these anchor bolts is to place each in a pipe at least 2 in. larger in diameter than the bolt and to arrange pockets in the foundation, so that access may be had to anchor-plate and bottom nuts. This will allow for adjustment. These bolts should be placed by templates made from blueprints of the machine furnished by the manufacturer.

If the machine has been exposed to a low temperature, it should not be unpacked in a warm room until it has had time to warm up to the temperature of the surrounding air, or it will "sweat." The machine will gather more or less dampness during shipment and it is advisable, before putting it in commission, to bake it out thoroughly. This can be accomplished either by external heat, or by heat produced in the windings themselves.

In the former case, the apparatus should be boxed in, and sufficient heat applied to raise the temperature to about 80 deg. C. (176 deg. F.). Where heat is to be produced in the windings themselves, in case of a compound machine, short circuit the armature through the series windings, placing a meter in the circuit, and gradually increase the speed until full load current is obtained. In case of a shunt machine, separate excitation of fields will be necessary, since the armature will not give sufficient electromotive force when short circuited, to excite the fields. If the machine cannot be operated at slow speed, resistance in addition to the regular rheostat will be required.



Continuous-Current Generators with Flywheels Driven by an Induction Motor

A shunt-wound generator should be run a short time at reduced speed without load, first having opened the field circuit. See that the oil in the gages is at proper level and that the rings are revolving and carrying oil. With all the field resistance in circuit, close the field switch. Gradually bring the machine up to speed and build up to normal voltage by cutting resistance out of the rheostat. Now note the operation of the machine and observe whether there is any tendency to force the armature out of its normal position. After getting the machine up to voltage and the brushes adjusted to their proper place, close the circuit breaker, then the main switch, and throw on the load. The voltage will drop as the load comes on, and the field will have to be adjusted to give proper voltage.

In case the generator does not build up to voltage when the field circuit is closed, as above explained, it will be found that either the machine has lost its residual magnetism, or that field coils are wrongly connected to the armature leads. In the former case, separately excite the fields from some other source of power for a few minutes. If, on reconnecting the fields, the generator does not build up, it is probable that the field coils are wrongly

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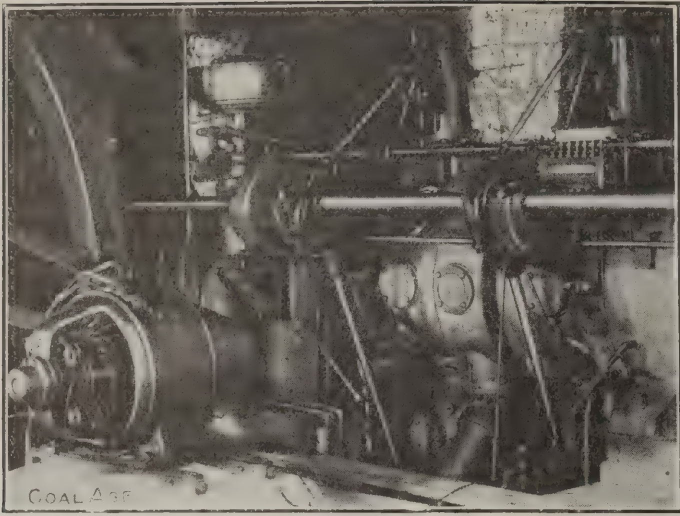
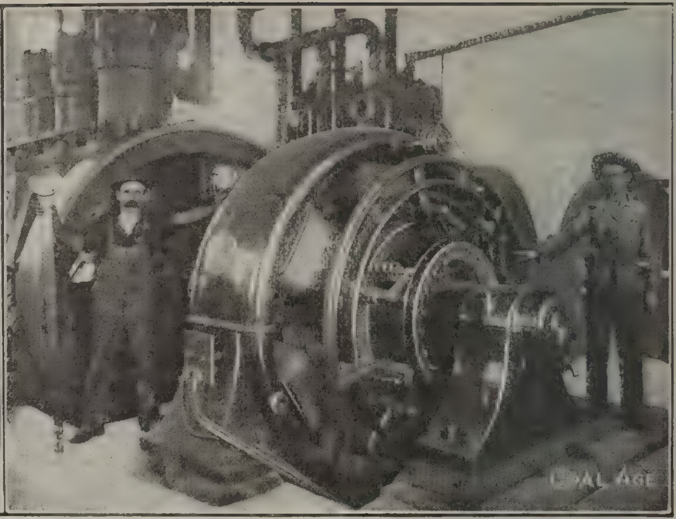
*Cleveland, Ohio.



D.C. Generator Belted to Large Gas Engine



D.C. Generator Driven by Diesel Coal-Tar Engine

connected to the armature. In this case reverse the armature leads.

Precautions for Compound-Wound Machines

Take the same precautions in starting as stated for shunt-wound generators. When running at full speed and normal voltage, throw on the load, closing the circuit-breaker first, followed by the main switch. Note particularly whether the voltage drops to any great extent as the load increases; if so, the series coils are opposing the shunt and should be reversed.

Series shunts are usually provided with compound-wound machines, and these should be adjusted to give the exact compounding effect required, with the machine operating under normal conditions.

For parallel operation of the direct-current generators, assume that machine *A* is loaded and that machine *B* is to be placed in parallel. Bring machine *B* up to equal voltage; and, first noting that its polarity is the same as that of *A*, close the main switch. Then cut resistance out of the field of *B*, raising its voltage slightly and causing it to take more load. Since the voltage of a shunt machine varies with the load, it will be necessary to adjust the fields of both *A* and *B* to make them divide the load, and give proper terminal voltage.

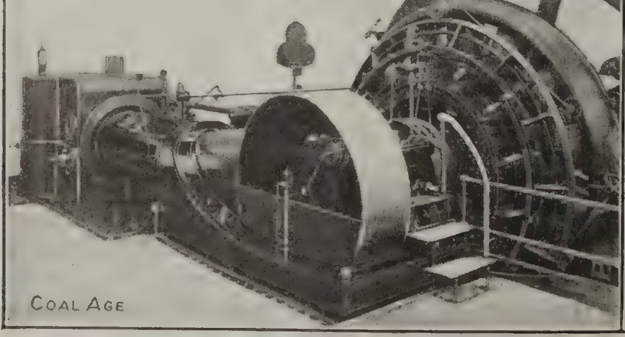
If the polarity of the machine, as connected with the switchboard, is opposite to that of busbars and it is desired to reverse this without changing cables, it can be accomplished by reversing the residual magnetism of the machine. When the residual magnetism is reversed, the machine will build up with opposite polarity. This may be accomplished as follows:

Remove all brushes from the holders and close the main switch for a few moments; then slowly open. By this means current will be forced through the fields from the busbars in a direction opposite from that when self-excited, and will reverse the residual magnetism. Again, this can be accomplished by removing the armature wire from the lower jaw of the main switch. The fields will then be excited in the same manner as above. This latter method is the more simple, and is to be recommended.

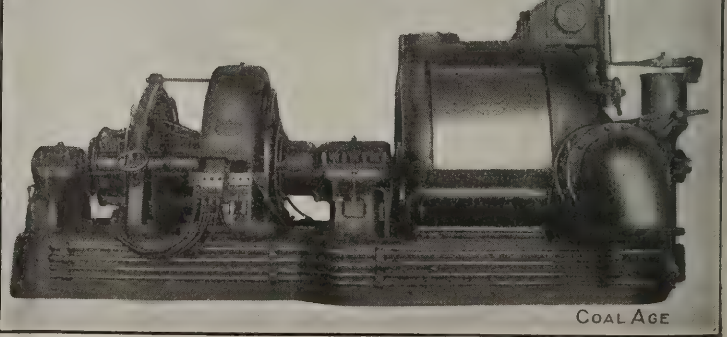
To take the load off machine *B*, gradually cut the resistance of the rheostat in circuit, thus shifting more load onto machine *A*. It will then be necessary to adjust the fields on machine *A* to bring the voltage back to normal. When the ammeter on machine *B* reads practically zero, trip its circuit-breaker and open the main switch. Cut all the resistance of the rheostat in circuit and shut down the generator.

Compound-Wound Machines in Parallel

The operation of compound-wound generators in parallel is slightly more complicated than that of shunt machines, since an additional connection between the machines is required. This connection is made at the beginning of the series winding; that is, where the armature cable is conected to the series coils, and is called



A D.C. Generator Coupled to a Corliss Engine



D.C. Generator Coupled to a Steam Turbine an equalizer main. In large central coal-mine power stations equalizer switches are placed near the machines on a special post, while in smaller plants a three-pole switch is provided on the switchboard. See that the equalizer mains are as short as possible, with plenty of cross-section, and never smaller than the armature mains.

As a first step toward operating two such machines in parallel, each should be operated under normal load, and its series shunt adjusted to give the compounding effect desired. If the machines are of the same size and make, they can be thrown together, and further slight adjustments made to their series shunts to make them properly divide the load. It might here be mentioned that the lead given the brushes somewhat changes the compounding effect of series windings. It is, therefore, necessary that the machines to be operated in parallel have their brushes set with approximately the same lead.

With machines of different size or make, it is necessary, in addition to the above, to obtain equal drop in voltage across the series winding and the cable connecting to the switchboard, when each machine is carrying its portion of the total load. In other words, the drop between equalizer main and busbar of the same polarity must be the same for each machine. If this is not the case, resistance must be added to the cable connecting the machine to its busbar.

In putting machine *B* in parallel with machine *A*, which is now loaded, bring *B* up to the same voltage and see that it has the same polarity as *A*. First close the equalizer switch, then the circuit breaker and finally the main switch. Gradually cut the resistance of rheostat *B* out of circuit, thus causing *B* to take more load. If the voltage is not at the proper point, adjust the fields of both *A* and *B* to obtain correct voltage.

If a single-pole circuit-breaker is used, see that it is placed in the main of opposite polarity from the equalizer side; that is, if the positive cable from the armature is connected to the series winding, then the circuit breaker must be placed in the negative main. The ammeter should be connected in the same lead as the circuit-breaker.

A necessary precedent to the successful starting and operation of direct-current generators is, of course, their careful installation; but the above has been given out of its proper order for the reason that, with these facts in mind, the following details will be better comprehended.

General Directions for Installing Machines

Few exact directions can be given for the erection of large direct-current generators, owing to the diversity of size and shape and the varying facilities for handling machines found at different coal mines or coking plants.

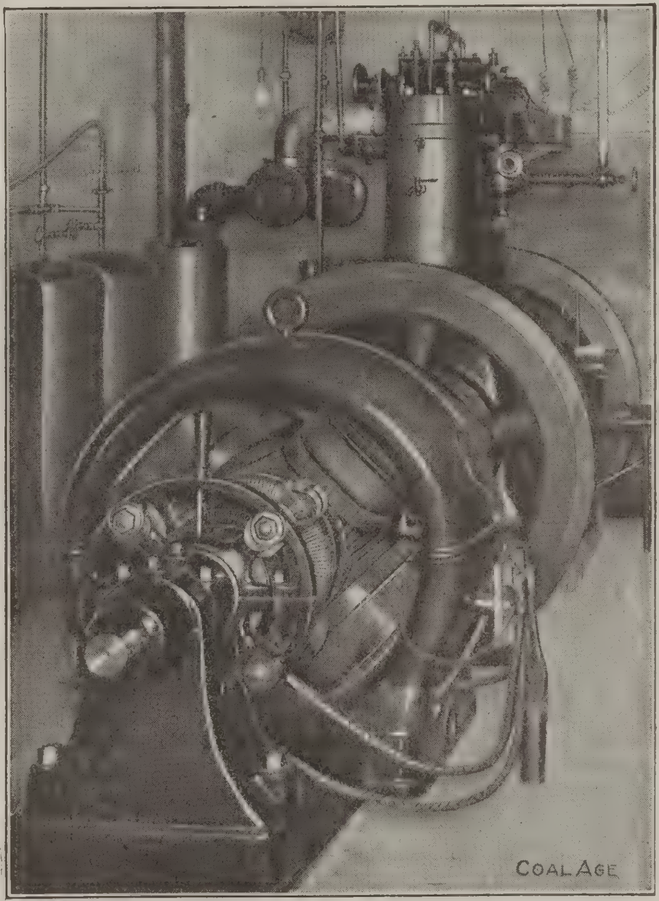
Most machines are shipped by the manufacturers with the field coils and poles assembled on the yoke. It is usual also, in order to facilitate shipping and handling, to have the yoke separated into two parts, and in the suggestions given below this will be assumed. The revolving armature, with its commutator, is always skidded separately, with suitable protection, and the other parts shipped as convenient.

A foundation having been prepared, as above indicated, and the machine received at the power house of the mine in complete condition for assembling, the following instructions apply to any standard make. Belted machines, adjustable on rails, will be first considered.

To start with, the rails should be temporarily placed and approximately leveled, then the base placed upon and bolted to them. Be extremely careful that the rails are wedged up, so that the weight of the base will be distributed evenly.

Then set the lower half of the field yoke in position, bolting it down and placing the dowel pins.

Next get the armature in position, being extremely careful not to scratch the bearing surfaces of the shaft, or in any way to bruise or injure commutator or windings. Handle the armature with a rope sling, protecting windings and commutator by a spreader. See that all oil wells and bearings are carefully cleaned, and all bearing surfaces covered with oil before placing the armature in its final position.



Continuous-Current Generator Connected to a Gas Engine

Set the top half of the field yoke in position, seeing that it is properly placed with relation to bottom half, and that all contact surfaces are clean.

Carefully level the machine and line up the driving pulley. If possible, turn the machine over in this condition with the belt not pulled up tight, and adjust while running, so that the belt runs to center of pulley and does not force the armature out of its central position, but leaves it free to oscillate in its bearings.

Tighten down the foundation bolts and grout in the rails. For this purpose a mixture of the following proportions may be used: One part portland cement with one part fine sand, mixed with sufficient water to obtain a thin consistency. Pour this under and around the rails, limiting the surface over which it spreads by a small clay dam. When the cement has partly set, remove all surplus and smooth up the joint under the rails.

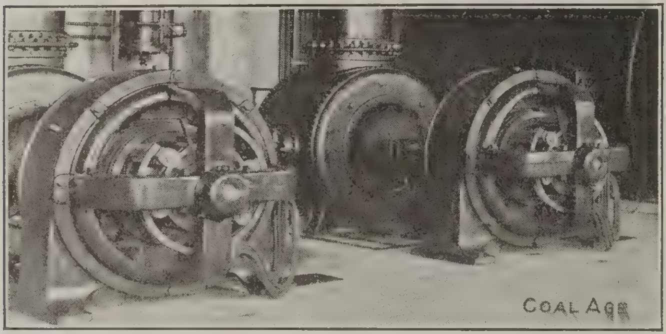
Setting Engine-Type Machines

Engine-type machines are, of course, not supplied with base or bearings, the engine shaft being extended to carry the armature, while the yoke is supported on the engine base, or on sole plates set on the engine foundations. Hence the following directions apply.

First set the sole plates temporarily in position, supporting them on iron wedges to allow for further adjustment.

Place the lower half of the yoke in position, inserting shims to a thickness of ¼ in., to allow for adjustment as the engine bearings wear down.

Locate the armature and the engine shaft in their bearings, observing the precautions in handling mentioned in connection with belted machines. In case the engine shaft has not been pressed into the armature spider, and it becomes necessary to do this work on the ground, an expert mechanic should be employed for the purpose.



D.C. Generators Direct Connected to Hydraulic Turbines

Place the top half of the yoke in position, cleaning all contact surfaces carefully. In aligning the yoke to the armature, see that the air gap is symmetrical at all points, and that the center of the laminated iron of the armature is in line with the center of the pole laminations. Failure to do this will put an undue strain on the shaft or give a side thrust. Leveling screws, when provided in the feet of the yoke, are a great help in aligning. Do not, however, leave the weight of the machine on any such screws, but insert shims. When the yoke has been bolted permanently in place, all leveling screws should stand free.

"Grout in" sole plates as previously explained. When the grout has set, tighten the foundation bolts and then carefully check over the alignment of the machine.

See that the series leads and clamping plates are carefully cleaned and securely bolted together, also that all contact surfaces of current-carrying members, such as armature-lead terminals, terminal plates, etc., are carefully cleaned and fitted together.

Concerning Brush-Holders and Rocker-Arms

Assemble the brush-holders on the rocker-arm and stagger them on one stud with respect to the holders on the next, in such a manner that the brushes will not follow the same path on the commutator. Set the brush-holders so that they clear the commutator, approximately ⅛ in. After the holders have been carefully set with the jig they should then be checked off to see if equal numbers of bars come between the different studs; if not, the distance from commutator to holders should be changed to obtain equal spacing of brushes. Holders should always be placed so that the commutator rotates against the brushes, tending to force them away from the holders.

The brushes should be carefully fitted to the commutator, first using coarse sand or garnet paper and finishing with fine sandpaper. While grinding in the brushes, hold the paper down on the commutator so as not to wear away the edge of the brush. Remove each brush from the holder and see that the entire surface of the brush is fitted to the commutator. Make sure that the finger presses squarely on the brush and does not have a tendency to push the brush out of line.

The finger should also give the proper amount of pressure on the brush; this can be easily adjusted by moving the tension spring on the holder. The proper amount of pressure can only be obtained by good judgment and careful attention to the special case in hand, as too little pressure will result in sparking, while too great pressure means excessive wear of the commutator and brushes.

See that the oil wells of the bearings are thoroughly cleaned and filled with a good grade of mineral oil to a level that will insure the rings carrying up the lubricant. Take care that oil-well covers are in place, so that dirt and foreign matter may be kept out of wells.

In all wiring at the power plant, as well as in a mine, special attention should be paid to the mechanical execution of the work. Careful and neat running, connecting, soldering and taping of conductors, securing and attaching of fittings are especially conducive to security and efficiency. Wire of an approved insulation must be used, and a cross-section sufficiently large for a liberal increase in load without injury to insulation should be provided.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

The Scranton District Mining Institute will hold its annual dinner in the Town Hall at Scranton on the evening of Nov. 29. It is reported that upward of 1200 banquet tickets have already been sold. J. H. Dague, of Scranton, is president.

An International Exposition on Safety and Sanitation will be held Dec. 11 to 20, at the Grand Central Palace, under the auspices of the American Museum of Safety. Dr. Tolman, of 29 West 39th St., New York City, is director general of the exposition.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

Illinois Mining Institute will hold its next regular meeting in East St. Louis, Nov. 22, beginning at 9:30 a.m.; two sessions will be held, morning and afternoon. All who are interested in mining are invited. Applications for membership can be had by writing the Secretary-Treasurer, Martin Bolt, 1526 So. College St., Springfield, Ill. Headquarters will be at the Illmo Hotel. Meetings will be held in the City Hall.

EDITORIALS

What a close study of conditions is able to do in increasing the efficiency of the individual worker is shown by the numerous reports published from time to time, and which reveal a great advance in the matter of scientific management. An eastern machine shop increased its output 25 per cent., in a single department, and lowered the cost of labor from 10 to 20 per cent., while at the same time the wages were increased 25 per cent. This is an example of what an intelligent study of conditions can do to increase industrial efficiency.

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Many coal operators are looking forward with apprehension to a possible war with Mexico. Even the Balkan wars caused a temporary exodus of laborers from various coal camps, and trouble such as would result from an invasion of Mexico would seriously hurt the coal industry, which at the present time is experiencing a shortage of labor in many fields. The coal mines of West Virginia, for instance, are badly in need of men, the operators there claiming that they could use from ten to fifteen thousand miners in jobs that will pay from $80 to $180 a month.

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Removal of Tariff on Coal

The new tariff places coal and coke on the free list. Anthracite was already free from all protection. The change, therefore, affects only our bituminous product. We do not apprehend that disaster, in a commercial sense, will come to any of our coal-producing companies because of the removal of tariff.

We need never fear that European coal owners will successfully enter our local markets. The only competition of a serious nature is that from Nova Scotia and British Columbia in Canada. The Nova Scotia mines are producing about 7,000,000 tons annually. The coal is similar to that mined in northern West Virginia. It is largely consumed in eastern Canada, and now practically controls the market offered by the St. Lawrence ports. However, some of this coal finds its way into New England, and with all tariff removed, it is probable American consumers along our North Atlantic coast will use more of the Canadian fuel.

The output of the Nova Scotia field, however, is limited, the area of the entire district is not as large as any one of the important fields in our Eastern States. Practically all of the American coal that now seeks a market in New England is superior to Nova Scotia fuel, so that, so far as quality is concerned, the advantage lies with the American operator. It is, therefore, purely a question of transportation rates, with most of the advantage now favoring the Canadian producer, offset by the greater desirability of American coal for fuel purposes.

In Montana and Wyoming the situation is slightly more serious. Coal in the Crow's Nest field of British Columbia is not only equal, but is superior in many ways to our Montana and Wyoming lignites. The British Columbia field is quite extensive and can provide a considerably larger output if a market can be found. There is no doubt but that Canadian coal will prove a strong competitor in our Northwestern States. We feel confident, however, that American operators can produce at a cost as low, or lower, than their competitors across the line, and we predict that whatever change in the markets occurs will be only temporary and certainly not fatal.

Of course, it would be easy for the owners of American coal mines, in those districts where Canadian competition is a fact, to follow the usual procedure and predict financial ruin as a consequence of placing coal on the free list. But such a course has not been pursued, and our operators are preparing to retain their markets through an exercise of superior commercial and technical sagacity.

If free trade in coal and coke is beneficial to the United States as a whole, it is certain to be ultimately helpful to the fuel industries, even though it may be temporarily disconcerting. Any business that must needs exist at a sacrifice of the common good has been built on an insecure foundation. It would be well if each man engaged in any one of our great American industries ceased to believe that he alone should be handed a life preserver, while everyone else is obliged to swim ashore unaided.

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Incorporating the Labor Trust

Secretary W. B. Wilson, speaking before the American Mining Congress, stated that he was opposed to the incorporation of labor unions. It was unreasonable, he said, to compel operators to run their mines by force of law when there was no profit obtainable or no market for their coal. That being the case, it would be wrong to incorporate the unions and make them liable for the abstention of men from work after an agreement had been signed.

But Mr. Wilson did not conceive that the *purpose* of a failure to comply with the agreement might, without injustice, receive juridical consideration. There is no crime committed when an operator decides to close his mines if his reason for his action is that the loss in operation is excessive and can no longer be sustained, or if individually he desires to sell his coal at a higher price and refuses to enter a sacrifice market, or if he can buy better coal elsewhere as cheaply or at less cost. He has always done this at his pleasure and nothing in the agreement abridges this right. But he has no warrant for shutting down his mines in order to compel the working man to accept any modification of the wage scale. He is bound by his agreement to pay the rates agreed whenever he operates his mine.

Similarly the working man has never been denied in America the right to hire himself to the highest bidder, to sell his labor where he will, to travel to other fields or to hunt a new job. These are his rights but when the men in a union stop work to make some coworker join the organization, or pay his dues, or wear the union button when the agreement clearly calls for an open shop, then we have the working man not seeking to maintain his right but endeavoring to violate an agreement to which he has signed his name directly or by proxy.

Of course, it is true that members of unions have repeatedly done this; the charge is not denied. We think it could have been *proved* to the satisfaction of the law courts, not once, but many times since the last anthracite agreement was signed. Suddenly 700 men apparently decide they cannot live on the wage paid them, for three or four days they all agree to hunt for other jobs in a town where no other jobs are obtainable and they do not move out to look for work elsewhere. At their meetings they declare the suspension is inaugurated to make certain men pay union dues. After a few days' idleness, those dues are paid and the men go back to work. Does any sane man, except perhaps a member of the President's cabinet, believe or pretend to believe that the 700 men quit work because they did not want to live on the wage agreement and so were looking for another job? Why, even a jury could not be made to believe that.

And if their purpose is to destroy the force of their signed agreement; then it is a pity they are not incorporated so that they can be sued. The working man should be as finical as his employer about making good his agreements and if he is not, the law should rectify his lack of moral responsibility. Occasionally, in some coal regions, the employer is disposed to break the agreement for his own personal advantage and it is a pity that, as the contract has merely a moral value, such an operator cannot be made financially responsible for such a violation of his plighted word.

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The Firedamp Whistle

Word comes from Germany that a new "firedamp whistle" has just been invented by Privy-Councilor Haber and Dr. Oeiser, as a result of the appeal of the Emperor, made a year ago, that an attempt should be made to discover some means of preventing mine catastrophes due to the explosion of firedamp.

The device just exhibited to the Kaiser and which has met with his approval consists of a metallic cylinder 10 in. long and 2½ in. in diameter, operated by means of an air pump. The sound of the whistle is said to be audible 300 ft. away. When blown in pure air, the whistle gives an even tone; but when blown in air charged with marsh gas, the tone is said to vary from a shrill tremolo to a jerky staccato, depending on the percentage of gas present.

It seems strange that this device should be described as something new. It appears to be a resurrection of the old Forbes gas indicator, invented by Prof. Forbes more than half a century ago, but found to be of no practical application as a means of detecting gas in mines. The principle of the device depends on the difference in the length of the sound waves, in air of different densities. But, since the density of the mine air may vary as the result of a number of causes other than the presence of gas, no reliance can be placed on the indications for gas, as given by the tone of the whistle.

The Forbes indicator differed from the present device, in that a tuning fork of 512 vibrations per second was fixed in the mouth of a brass tube 6 in. long and 3 in. in diameter. The tube was fitted with a tightly fitting movable piston, the position of which was indicated by the movement of a pointer on a scale graduated to indicate percentages of gas present in the air. The zero of the scale corresponded to that position of the piston that produced a maximum resonance of the tuning fork in pure air. When testing for gas, the piston had to be moved until the tuning fork gave the same maximum resonance, which varied with the density of the air, for a like position of the piston. In this device a thermometer was attached to the instrument to make the necessary correction for the temperature of the air, as this would vary the density and the tone of the fork. The idea has long been abandoned as useless in its adaptation to mining conditions.

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Passing of the Small Dealer

Compelling influences are slowly but surely revolutionizing the marketing of coal in the large consuming centers. The small independent unit, as in other lines of endeavor, is giving way to the large consolidation with its trained selling and technical experts, its unlimited tonnages and other accoutrements of enormous capital.

Marketing coal on a small scale is no longer an economically sound enterprise. Elaborate equipment involving costly machinery has effected such economies that dealers not equipped with modern facilities, find themselves at a serious disadvantage. Not only are they unable to effect an economical distribution of the product, but they are not prepared to meet the occasional heavy emergency demand.

The advent of the large hopper-bottom steel cars, or as they are commonly called, "battleships," may be taken as a typical example of the trend of conditions. The proportion of this kind of equipment is steadily increasing and it is only a question of a relatively short time when the "battleship" will have practically displaced the old-style gondola. The heavy additional expense of unloading these latter when the consignee had no trestles is too obvious to require comment.

In addition to this the net profit per ton is too small with the individual unit who handles but little to make the business lucrative. The large automobile truck with its capacity closely approaching that of the smaller railroad cars, is also becoming an important factor in the situation, while liability to loss due to bad debts or slow payment must be considered here, even more than in other lines of business.

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Safety First?

It has been rather pertinently suggested that the time-worn adage "Safety First" be supplemented by one of "Discipline First." The idea is one that will probably commend itself to many coal engineers. While revolutionary in character, it offers a more tangible basis for procedure and there are many who will, no doubt, believe that it is an attack at the real root of the trouble.

Of the total fatalities, both inside and outside of the mines, it is well known that nearly half of these are due to falls of various kinds. Is it not a fact that one of the most rigid rules at all mines is that timbering must be kept up to the face so that every place will be safe? It is clear, therefore, that we have a single case (and one which is responsible for half of our total fatalities) in which the trouble is either directly or indirectly a violation of rules.

SOCIOLOGICAL DEPARTMENT

The Cabin Creek Y. M. C. A., Decota, W. Va.

(Special Correspondence)

The coal-mining town of Decota, W. Va., is situated at the junction of two small streams that form together Cabin Creek proper. The village is about 16 miles from Cabin Creek Junction, at which point the creek empties into the Kanawha River. The steep and high hills on either side of the narrow valley of the creek and its branches contain several seams of coal of workable thickness. About a dozen years ago, coal operators began to work these extensive beds of fuel. At one time upwards of 20 different companies were located along the creek. A few years ago 11 of these corporations combined to form the Cabin Creek Consolidated Coal Co., and four others combined under the sales agency of the Carbon Fuel Co. This combination as will be easily seen effects a great economy of administration and operation. Probably no operating coal companies in the country are better organized for conducting the business along modern lines than the Carbon Fuel Co., with J. R. Thomas as president and C. A. Cabell as general manager, and the Cabin Creek Consolidated Coal Co. with M. T. Davis as president and Ira F. Davis as general manager. Their accounting system is a marvel of simplicity and accuracy.

Capitalizing Crime

From their early history these companies took an active interest in the welfare of their employees. At one time there was a tract of 37 acres of land adjoining theirs which belonged to a private party but was of little value as it contained no coal and was unproductive for tillage. However, it was a great revenue producer for the owners as it contained a saloon which did a business far more profitable than any coal mine. It was a poor day indeed that it did not do a business of $300, and on one occasion at least it took in $2160 in a single day.

The companies felt that this saloon was a menace and a liability to the community, so they bought the property for the sum of $42,000, a price unheard of for similar land anywhere in the state. On gaining possession the saloon was closed, and although the new owners were offered the sum of $700 per month for the saloon privilege, it is to their credit that the offer was flatly refused.

The saloon was surrounded by a tight board fence 7 ft. high and on paydays the inclosure would be filled with the forms of miners in a state of helpless intoxication. On recovery, if they had any cash left the process would be repeated. Gambling and fighting were the order of the day for those who were sober enough to participate in such exciting amusements. Often it was three or four days after payday before there were a sufficient number of men able to work to run the mines at anything like a normal capacity.

But the closing of the saloon was only half the battle. The railway trains brought in large quantities of liquor. The great need for a substitute for the saloon became more and more apparent. Men in such communities have more or less leisure time on their hands as there are often days when on account of a car shortage or other reason the mines are idle. With men of small resources under such circumstances the most natural use of this time is in dissipation unless there is some healthful form of amusement provided.

The Old Saloon Now a Y. M. C. A. and on the Right, the Hall for Moving Pictures

Residence of the Decota Secretary of the Young Men's Christian Association

Saloon Turned into an Amusement Hall

It was the belief of some of the officials that the average miner does not go to the saloon for the sake of dissipation but for the social features. This belief became a conviction on further study. After a careful survey of the whole situation it was decided to fit up a club house in the old saloon building and have it operated under the auspices of the Young Men's Christian Association. Before anything was done, however, the whole matter was submitted to the men with the idea that unless they really desired to have such an enterprise in their midst, the company would not supply it.

They were not asked to assume any financial responsibility for its inception, but if it was to their liking on completion they could have its privileges by paying a nominal sum per month. This removed any taint of paternalism that so many similar enterprises labor under, for the men under the leadership of the secretary had the complete control of the whole affair, and spent the income for new apparatus and equipment so that in a short time they had a complete outfit from tennis courts to a swimming pool.

At the beginning the company fitted up the plant with a reading room, shower bath, game room, a casino for the sale of soft drinks, candy and tobacco, also a hall for moving pictures.

Employees Support and Supply Money to Extend the Work

The success was immediate and the place was patronized better than anyone had even hoped. As a surplus of revenue accumulated, two bowling alleys were installed, a piano was procured, also a phonograph and several good records. Later an electric bath cabinet was secured and finally a large outdoor swimming pool was installed, and many other recreative features were added. All this was made possible by the fact that the company was not seeking to get revenue from the enterprise, but were investing their cash in it each month, and it is significant that for every dollar that the company has put into the plant the men have put in an equal amount or more, not as a direct contribution, but as a reinvestment of the surplus income. This gives the men a sense of a proprietary interest in the scheme and develops a sense of mutuality that is invaluable in successful welfare work. The fact that during the recent labor troubles in that region, it was a common sight to see the miners and the "Baldwin Guards" in the pool together shows how popular the place was.

Tennis Courts

Swimming Pool

Dues Are 25c. a Month

Most of the men who live within a mile of the building are glad to pay the nominal sum of 25c. per month for the membership privileges. This fee entitles them to free baths, the reading room, game room and general social privileges as well as a reduced rate for use of the pool tables and bowling alleys. Twice a week a moving-picture show is given, and it is the aim of the secretary to give pictures having an educational value, avoiding the lurid, unreal wild-west type. This machine has also been a great help in giving illustrated lectures on health, safety methods, travel and other topics of interest to the men and women. The miners seem to be more easily reached through the eye than the other senses, and this makes the pictures a powerful moral and educational agent.

Formerly there was little interest in church work taken by these people. Here again the stereopticon came to the rescue. Lectures with colored slides on the Holy Land, Great Men of the Bible, Life of Christ, and other kindred topics were given. Care was taken to avoid sectarianism or denominationalism in these discourses, but to set forth the great fundamentals of right living as exemplified in the lives of great leaders. The appreciation of this effort was shown by the growth of the Sunday school. There were three schools in the neighborhood with a mere handful of attendants. In a few months the attendance had increased to upward of 60 or 80 pupils in each school. It was the universal testimony of all that there had been a general growth toward better things all along the creek.

Decline of the Leading Industry

A single item will indicate one of the great changes that took place in the first three years. The express-company business in transporting distilled liquors decreased from an average of 223 gal. per month to less than 50 gal. in a like period, and the amount of beer brought in decreased about 20 per cent. This, of course, meant much less drunkenness, and with it went a large portion of the gambling which always goes with excessive use of liquor. The few who still drank and gambled did it on the sly as it lost its popularity in the light of the new agency for healthful amusement.

The value of the association was shown in the great strike which all hope is now a thing of the past. While the association takes no sides in a controversy between employer and employee, it sustains a position of mutuality and serves all who come to use what it offers. Several of the mines were able to operate continuously, while all others in the neighborhood were closed. The spirit of a desire to settle differences was more manifest here by both miners and operators than in any other part of the strike zone. Much less time was lost here than in other parts of the field. Some well informed men went so far as to say that if the operators had begun this work five years ago in the entire field, the strike would not have occurred.

DISCUSSION BY READERS

Collapsible Stoppings

Letter No. 9—In reference to the building of light collapsible stoppings that will be destroyed by a local explosion of gas or dust and thus prevent a general mine explosion, it is well to remember that the bituminous mine law of Pennsylvania requires that all stoppings shall be built of noncombustible material. We may ask the question: Why? The answer is plain: Because we must have at least two headings leading to the coal face. The purpose is to provide a continuous intake and return airway for the circulation of the air current. The breakthroughs between these two entries must be made at a given distance apart and closed by air-tight stoppings, except the last breakthrough at the head of the entry, which is left open to allow of the passage of the air current.

Now, would not the building of entry stoppings in such a manner that they would be blown out easily, seriously interfere with the circulation of air and fail to carry out the idea expressed in the mine law in respect to stoppings? If the stoppings are to be built thus light and collapsible, why should not the doors, also, be built in the same manner? What would be the result? The mine water gage would drop, the air would short-circuit and the working face would be made dangerous for work. There would be more danger of an explosion occurring and less chance for the men engaged in the workings to escape.

My plan is to always build entry stoppings 20 in. thick, using one part cement, three parts sand and five parts mine rubble. I sometimes use a 9-in. common red-brick stopping. In a 70-ft. area, I sometimes build a pilaster in the center of the stopping to increase its strength.

ROBT. W. LIGHTBURN.

Adelaide, Penn.

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Education and Training of Mining Men

I have been reading the letter of Mine Inspector John Rose, COAL AGE, Oct. 4, p. 509, relating to the practical training of miners by special instructors in the mines, as suggested by Inspector C. H. Nesbitt. I want to say again that, in my opinion, boys should be taken into the mines at an early age and taught how to do every kind of work, by going around with the men. They should know how to hang curtains or put up a brattice, lay tracks or drive a mule. They should be taught the use of the safety lamp and shown how to take it apart, clean it and put it together again, ready for use. The boy should learn this by observing the work being done. Then, when he is older he will be able to do the same work himself.

I differ with Mr. Rose, in his statement that many of the best practical men entered the mine after they were 21 years of age. I believe the results on record will not support this conclusion.

In regard to discipline in the mines, would say I have been bossing for the last 24 years, in different states, and never give a man an order that I do not expect him to obey. Mr. Rose states that many mine foremen who lack discipline, force and system, drift into the habit of telling miners to timber their working places and keep them safe, without expecting them to comply. Such a man is not fit to be a foreman. Of all men, the mine foreman must have discipline and require that his orders be carried out.

It is true that "upon the mine foreman devolves the responsibility for the coal output." A wise foreman, however, knows that he cannot put out the coal without men; and he will not endanger the lives of his miners for the sake of an extra car of coal. Knowing the danger of working under a loose top, a good foreman will compel the miner to set his timbers first, before loading the coal.

In closing, I want to say that the best mine foremen, in this country today, are the men who went into the mines when they were boys. We have many examples of this in the Scotch and English miners, now acting as mine foremen in our mines. Mr. Rose's suggestion that good common sense should be mixed with experience is true; but a man must know how to use both and enforce discipline. The miners soon come to understand the ways of a good foreman and will do what he orders. Such foremen draw a good class of miners around them and are respected by all.

SAMSON SMITH.

Mineral, Va.

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The Liquor Problem

From what has been said of the relation of liquor to mining, in previous issues of COAL AGE, the general reader would receive the impression that coal miners are, as a class, harder drinkers than other workmen. The respectable coal miner naturally resents this impression. I believe there are as many hard drinkers among glass blowers, clay workers, lumbermen, salesmen and men of other callings as among miners.

The social standing of the drinker makes a great difference. The head of a corporation or other official is merely "indisposed," while the laborer is "on a drunk." The club man is taken home in his cab, while the coal miner, who is so unfortunate as to drink to excess, is left to his own chances.

Men are very much the creatures of circumstance. A man placed in an isolated mining camp, deprived of clean amusements and opportunities for self-betterment, such as libraries, churches, schools, etc., and thrown into contact with the ever-present gambler and subjected to the influence of the saloon atmosphere—in fact, separated from all refining influences is almost sure to become either a "rip" or an "angel." The environment of a man exerts a tremendous influence in shaping his life and character, and it makes little difference whether he is a coal miner or engaged in some other calling.

One superintendent has suggested that the driving out of 15 families from a mining community improved the conditions in that place. It must be remembered, however, that such an improvement is only local. Nothing has been done in their removal, to alter the life and surroundings of those 15 families who are driven from one mining camp to another; and the greatest sufferers, in such cases, are the wives and children of the men addicted to the drink habit. While it may be necessary to make an example of some cases, more attention should be given generally to reforming the drinker, by removing from him, as far as possible, the temptation and opportunity to drink and surrounding him with a different atmosphere that will give him greater encouragement to live better.

The problem must be fought from a broader standpoint. The question must be studied in its widest aspects. Efforts must be made to remove the evil and put in its place what will tend to the uplift and betterment of the community. Create a desire for self-improvement, study and recreation. Ascertain what is most needed to effect a transformation. Many drink because liquor is within their reach; therefore, remove the saloon and discourage the liquor traffic, in every way possible. It is well to remember that a man should not be blamed too strongly if he is overcome by conditions for which we are all responsible. I want to repeat that the liquor problem is not limited to coal mining but affects all industries alike.

Geo. N. Lantz.

New Straitsville, Ohio.

Afterdamp

The principal gases resulting from mine fires are carbon monoxide, carbon dioxide and nitrogen. The relative quantities of these several gases will depend on the supply of fresh air to the fire. As the fresh-air supply is increased, the volume of carbon dioxide resulting will be greater, while that of carbon monoxide and nitrogen will be less; and *vice versa.*

The gases resulting from an explosion of firedamp are quite variable, depending on the composition of the firedamp mixture and the conditions affecting the circulation of air in the mine; also the condition of the mine workings with respect to dust and moisture. In a general way, the composition of afterdamp may be said to consist chiefly of carbon dioxide, carbon monoxide, nitrogen and water vapor, together with smaller amounts of nitrous oxide gas, unburned marsh gas and free hydrogen.

Fireboss.

Fairmont, W. Va.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

What the Wet-and-Dry-Bulb Hygrometer Indicates—The wet-and-dry-bulb hygrometer shows the difference between the readings of the two thermometers. The dry-bulb thermometer, of course, indicates the actual temperature of the air. The reading of the wet-bulb thermometer is lowered by the evaporation of the water from the little sack surrounding this bulb, and which is kept moist by the water drawn up through the wick from the vessel below.

The difference of temperature indicated by these two thermometers depends on the rapidity of the evaporation of the water from the wet bulb. The evaporation is more rapid in dry than in wet air; and the difference of reading is, thus, an index or measure of the degree of saturation of the air. When the air is fully saturated with moisture there is no evaporation from the wet bulb and the readings of the two thermometers are the same. The difference increases with the dryness of the air.

Relative Humidity of Air—As previously explained the relative humidity of air is expressed by the ratio of the actual vapor pressure in the air at the time, to the saturated vapor pressure. The following table gives the percentage of saturation or the hygrometric state of air for various differences of readings, at different temperatures.

DIFFERENCE BETWEEN DRY AND WET BULB.

Reading of Dry Bulb Ther	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	17.5	18°	18.5	19°	19.5	20°	20.5	21°
	RELATIVE HUMIDITY																								
65°	95	90	85	80	75	70	66	62	57	53	48	44	40	36	32	28	25	23	21	19	17	15	13	12	10
66°	95	90	85	80	76	71	66	62	58	53	49	45	41	37	33	29	26	24	22	20	18	17	15	13	11
67°	95	90	85	80	76	71	67	62	58	54	50	46	42	38	34	30	27	25	23	21	20	18	16	15	13
68°	95	90	85	81	76	72	67	63	59	55	51	47	43	39	35	31	28	26	24	23	21	19	17	16	14
69°	95	90	86	81	77	72	68	64	59	55	51	47	44	40	36	32	29	27	25	24	22	20	19	17	15
70°	95	90	86	81	77	72	68	64	60	56	52	48	44	40	37	33	30	28	26	25	23	21	20	18	17
71°	95	90	86	82	77	73	69	64	60	56	53	49	45	41	38	34	31	29	27	26	24	22	21	19	18
72°	95	91	86	82	78	73	69	65	61	57	53	49	46	42	39	35	32	30	28	27	25	23	22	20	19
73°	95	91	86	82	78	73	69	65	61	58	54	50	46	43	40	36	33	31	29	28	26	24	23	21	20
74°	95	91	86	82	78	74	70	66	62	58	54	51	47	44	40	37	34	32	30	29	27	25	24	22	21
75°	96	91	87	82	78	74	70	66	63	59	55	51	48	44	41	38	34	33	31	30	28	26	25	23	22
76°	96	91	87	83	78	74	70	67	63	59	55	52	48	45	42	38	35	34	32	30	29	27	26	24	23
77°	96	91	87	83	79	75	71	67	63	60	56	52	49	46	42	39	36	34	33	31	30	28	27	25	24

To use the table, find the observed temperature of the air, in the left-hand column, and the difference of the observed readings of the wet and dry-bulb thermometers, at the top of the table; the corresponding number in the table is the percentage of saturation which expresses the degree of humidity of the air. For example, if the dry-bulb temperature is 70 deg. and the wet bulb 64 deg. F. the difference of readings is 6 deg. and the corresponding humidity as taken from the above table is 72 per cent.

The Coal Age Pocket Book

Actual Vapor Pressure—The pressures given in the table below are the pressures the vapor exerts when the space it occupies is fully saturated; they are called the "saturated vapor pressures." When the weight of vapor in the air is not sufficient for saturation the vapor pressure will be eactly proportional to the degree of saturation. For example, if 50 per cent. of moisture is present or the air only half saturated, at, say 70° F., the "actual vapor pressure," as it is called, is one-half of the saturated vapor pressure of the table given later; or ½ × 0.3602 = 0.1801 lb. per sq.in.

To Calculate the Actual Vapor Pressure from the difference of the wet- and dry-bulb temperatures (t_d — t_w) and the barometric pressure (B), in inches of mercury, first find the saturated vapor pressure (P_w), in inches of mercury, corresponding to the wet-bulb temperature (t_w), from the table; and substitute this and the given values in the formula

$$\textit{Actual vapor pressure at temperature } t_d = P_w - \frac{B}{30}\left(\frac{t_d - t_w}{88}\right)$$

Example—Find the actual vapor pressure when the dry bulb reads 60° and the wet bulb 54° F., the barometric pressure being B = 30 in., and the saturated vapor pressure for the wet-bulb temperature (54° F.) being 0.4178 in. of mercury.

Solution—

$$p = 0.4178 - \frac{30}{30}\left(\frac{60 - 54}{88}\right) = 0.3497 \textit{ in. of mercury}$$

Since the saturated vapor pressure (see table) for the dry-bulb temperature (60° F.) is 0.5183 in., the relative humidity in the above example is

$$H = \frac{p}{P_d} \times 100 = \frac{0.3497 \times 100}{0.5183} = 67.4 \textit{ per cent.}$$

The Dew Point—What is called the "dew point," in hygrometry, is the temperature below which the moisture contained in the air begins to be deposited. For example, the weight of moisture, in grains per cubic foot, contained in the air, in the above example is (1 lb. = 7000 grs.)

$$w = 7000 \times 0.6235 \frac{0.674 \times 0.2545}{0.37\,(460 + 60)} = 3.9 \textit{ grs. per cu.ft.}$$

The temperature at which this weight of moisture will fully saturate a cubic foot of air is the dew point, because the slightest fall of temperature below that point will cause a deposition of moisture from the air.

The dew-point temperature is ascertained, in any given case, by first calculating the actual vapor pressure of the moisture in the air, as in the above example; and then, by referring to the table of saturated vapor pressures, find the temperature corresponding to that vapor pressure. This is true, because, as previously stated, the actual vapor pressure, at any given time, is equal to the saturated vapor pressure for the dew-point temperature. Thus, the actual vapor pressure for dry bulb 60° and wet bulb 54° was found to be 0.3497, which corresponds to a saturated vapor pressure or dew point of 49 deg.

INQUIRIES OF GENERAL INTEREST

Working Coal under Sandstone Cover

We are working a seam of lignite coal that varies from 6 to 12 ft. in thickness. The seam has an average pitch of about 3 per cent. A portion of the mine has reached the boundary line and the work of drawing back the pillars will soon be commenced. At the present time, the workings are largely standing on pillars.

Immediately overlying the coal is a sandstone that varies in thickness from 90 to 140 ft. The entire overburden varies from 100 to 400 ft. Underlying the coal is 12 in. of a hard fireclay that forms the floor of the seam. This is underlaid with 12 in. of a soft fireclay, beneath which is a hard rock varying from 1 to 2 ft. in thickness. The rooms are driven up the pitch and are 21 ft. wide with 30-ft. pillars between them, the rooms being driven on 51-ft. centers. The rooms are broken off the entry 10 ft. wide for a distance of 25 ft. and then widened out to the full width. Crosscuts are driven in the rooms every 70 ft. and are 10 ft. wide, leaving a pillar 60x30 ft. The rooms are usually driven 350 ft. in length, leaving a 60-ft. barrier pillar between the faces of the rooms and the air course of the next pair of entries.

Much difficulty has been experienced by the heaving of the bottom where the weight was too heavy on the pillars. The sandstone roof crumbles and falls from 6 to 10 ft. above the coal and, to avoid this trouble, there is generally left from 2 to 4 ft. of roof coal when driving up the room.

I would like to have the readers of Coal Age offer any suggestions in regard to the working of this seam, with particular reference to the breaking of the thick sandstone, so that the largest possible amount of coal can be realized in drawing back the pillars. Any information based on experience will be greatly appreciated.

W. N. Anderson.

Colorado Springs, Colo.

A Similar Inquiry from West Virginia

If you consider it of sufficient interest will you kindly ask the readers of Coal Age to discuss, from a practical standpoint, the best method of robbing a 7- to 8-ft. seam of coal, overlaid with a hard sandstone that is free from surface breaks. The seam is underlaid with a comparatively soft stratum that has a strong tendency to heave. The cover varies from 400 to 1000 ft. in thickness. The mine is worked on the panel system.

I would very much appreciate any practical suggestions in regard to the width of rooms and pillars, and the method to be employed for drawing back the pillars that will insure a maximum recovery of the coal, with the use of a minimum amount of timber.

West Virginia Engineer.

Stotesbury, W. Va.

[The foregoing inquiries, coming as they do at the same time, and asking for the discussion of practically like conditions in the mining of coal, show the great importance attaching to this subject. The two inquiries come from widely separated points and describe conditions that depend for successful working on practically the same essential feature, namely, the proper control of a strong roof pressure due to a hard sandstone rock and a heavy overburden.

We hope that these inquiries will bring forth a hearty response from men who have dealt successfully with similar conditions. Let there be a good discussion, accompanied by sufficient illustrations to make clear the methods suggested.—Ed.]

⁂

A Crossover Problem

At the request of a correspondent, we give below a diagram of a double crossover switch or "diamond," and shall be glad to have those interested in such problems send us their solutions to the same. We will publish the best, shortest and simplest of the solutions sent us and announce the name only, of the author of the second-best solution.

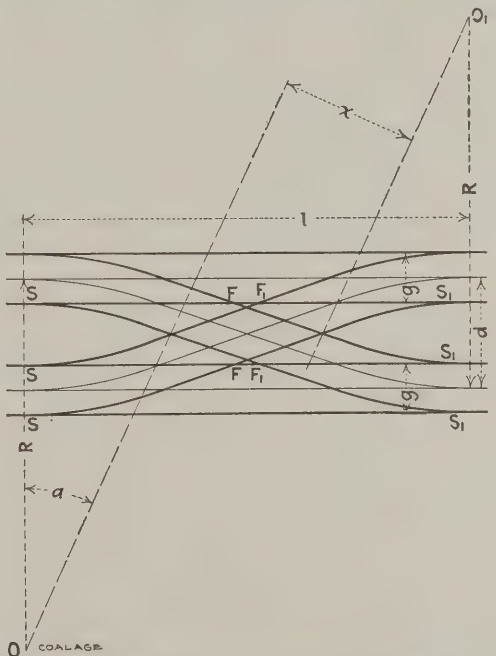


Diagram of a Diamond Or Double Crossover Switch

The problem is as follows: Given, the entire length (l) of crossover, from point of switch to point of switch; the distance (d) between track centers, the gage (g) of the tracks, and the radius (R) of the curves, all the curves having the same radius; it is required to find the frog distance $S\ F$ or $S_1\ F_1$; the length (x) of the straight rails at the center of each crossover; the length and radius of curve, for each rail in each switch; the length of lead rail and the frog angle.

The best solution of this problem will be published in our issue of Dec. 20. The second-best solution will be announced by name only. The problem is an interesting one in mine engineering.

The Government's Classification of Coal

The classification of coal into various grades such as bituminous, semi-bituminous, lignite, etc., is arbitrary and unsatisfactory. It is, however, in common use in the United States, and in the absence of anything better, it is published by the U. S. Geological Survey. The classes generally used in this country are as follows: Anthracite, semi-anthracite, semi-bituminous, bituminous, sub-bituminous and lignite.

Anthracite coal is generally well known, but in a systematic classification it is usually defined as a hard coal, having a fuel ratio (fixed carbon divided by volatile matter) of not less than 10. Most of this coal comes from the anthracite fields of eastern Pennsylvania, but small areas are known in some of the Western states where the coal has been changd to anthracite by the heat and pressure of masses of igneous rock.

Semi-anthracite coal has a fuel ratio ranging from 6 to 10. There is only a small amount of this coal in the United States, found in local basins or in close proximity to igneous rock. Semi-bituminous coal is of great commercial importance, but is not widely distributed. Its fuel ratio ranges from 3 to 6. It is the best steam coal in the country, and some of it can be utilized in the manufacture of coke. The centers of production are the Pocahontas and New River fields of Virginia and West Virginia, the Georges Creek field of Maryland, the Clearfield region of Pennsylvania, and the west end of the Arkansas field in the vicinity of Fort Smith. Although areas containing coal of this grade have been found in Washington and Colorado, the amount in these fields is small.

Bituminous coal is the most important grade in the country, and includes most of the deposits east of the Rocky Mountains. In the Western states there are large areas of bituminous coal such as the Trinidad-Raton field of Colorado and New Mexico, the Grand Hogback field of Colorado, the Book Cliffs field of Utah, the Rock Springs, Kemmerer and Black Hills fields of Wyoming, the Great Falls field of Montana and many districts in Washington. This grade furnishes most of the coking coal of the country, and is largely sold for steam raising and domestic use.

The term sub-bituminous has been adopted by the Geological Survey for what has generally been called black lignite. The latter term is objectionable for the reason that the coal is not lignitic in the sense of being woody, and the use of the term seems to imply that the fuel is little better than the brown woody lignite of North Dakota, whereas many of the coals of this class closely approach the lowest grade of bituminous.

It is extremely difficult to separate this class from the one below and the one above. It is generally distinguished from the lignite by its color and freedom from apparent woody texture, and from bituminous coal by the slacking which it undergoes when exposed to the weather, as the latter is an important difference in commercial use, it has been adopted by the Geological Survey as a criterion for the separation of sub-bituminous and bituminous coal.

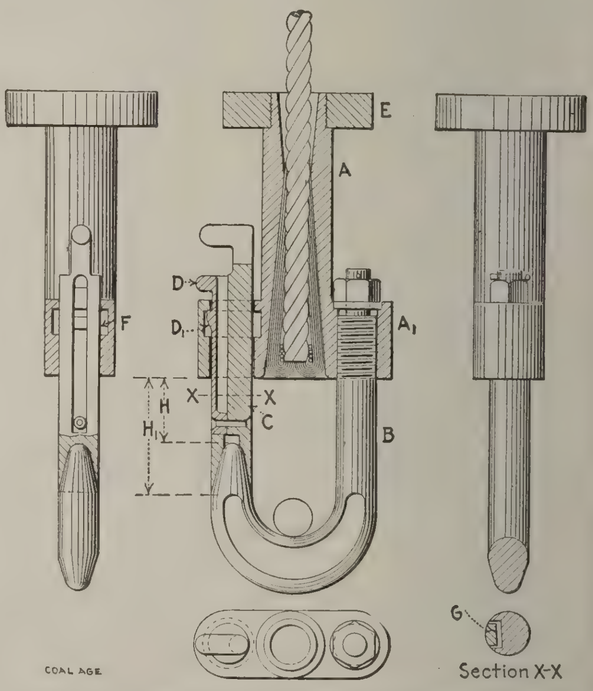
Sub-bituminous coal is found in most of the Western fields, being well known around Boulder and Denver and in northern parts of Colorado, Gallup, New Mexico, Hanna, Douglas, Sheridan and the Big Horn Basin of Wyoming, Red Lodge and Musselshell, Montana, and in many of the districts of Washington and Oregon.

As used by the Geological Survey the term lignite is restricted to the coals which are distinctly brown, and generally woody. They are intermediate in quality between peet and sub-bituminous coal. Lignite is abundant in the North, in eastern Montana and North Dakota and in the southwest corner of South Dakota. In the South it is present in all of the Gulf states, but has been developed commercially only in Texas.

⁂

Safety Hook for Sinking Buckets

A new safety hook for sinking buckets in connection with a cable clamp has been devised by an engineer at the Myslowitz colliery, in the North Kattowitz mining district of Germany and has been used there with good success. It is described in the "Zeitschrift für das Berg- Hütten- und Salinenwesen." It consists of the following principal parts: (1) The cable sleeve *A* with flange A_1 forged from the same piece; (2) the bucket hook *B*; (3) the lock bolt *C*; (4) the lock spring *D* welded on lug D_1; (5) the flange *E*.



Detail Construction of the Safety Hook

The cable clamp is bored out conically for receiving and fastening the rope. In the flange A_1 are held the bucket hook *B* and the lock bolt *C* which together form a closed shackle, the hook *B* being screwed into the flange A_1 and further secured with a keyed jam nut,, while the lock bolt *C* is loosely passed through its hole in the flange.

The lock bolt *C* is made of an iron bar cut or forged away at the upper part and is formed at the top as a handle for easy manipulation. At the lower end it is bored out conically to receive the point of the bucket hook. It is provided lengthwise with the groove *G* in which is set and riveted the lock spring *D*. The safety hook is closed in the illustrated position and, by the lock spring *D*, upon which the lug D_1 engaging in the cavity *F*, prevents self release of the lock bolt *C* and thus an

COAL AND COKE NEWS

Washington, D. C.

In view of the apparent delay with reference to the Keating resolution directing an investigation into the Colorado coal strike, Mr. Keating, on the 7th inst., made an attempt to get the resolution directly before the House of Representatives and secure action thereon, possibly by having it referred to a special committee. The resolution was introduced several days ago and referred to the House Committee on Rules, which has taken no action. Mr. Keating explained that the committee had no quorum, and he wanted his resolution referred to the Committee on Labor.

The motion precipitated a debate in which several members joined to discuss the merits of authorizing Congressional investigations into such matters when there exists a competent bureau in the administrative branch of the government for doing this work. Representative Page, of North Carolina, said that he believed that the Industrial Relations Commission which was authorized by the last Congress had the power to investigate the Colorado labor difficulties.

Representatives Mann and Mondell, of the Republican side, criticized the resolution, because it created a committee specially for the purpose of this one investigation. Mr. Mann said that the Bureau of Corporations in the Department of Commerce had the authority to investigate the matter, and Mr. Mondell said that the labor difficulties should be looked into by the Department of Labor.

Mr. Keating replied to the effect that the Department of Labor had considered the matter, but had found itself unable to proceed with an investigation. Mr. Mondell thereupon asserted that if the Democrats had voted for a sufficient appropriation for the department this handicap would not be apparent. No definite result has yet been arrived at in the matter.

Rates Must Not Be Increased

The St. Louis, Rocky Mountain & Southern and other railroads will not be permitted to increase the New Mexico coal rates according to a decision of the Interstate Commerce Commission announced on Nov. 4. The Rocky Mountain line attempted to cancel all through rates with the Rock Island road, thereby advancing the rates to Kansas City, St. Joseph, Omaha, Lincoln, Atchison, Wichita and other points.

It was discovered in this connection that the advance in rates was the result of the desire of the Rocky Mountain to receive greater divisions of the through rates. The commission ruled that differences between carriers over divisions in rates are not sufficient reason for advancing rates, and the roads were ordered to maintain in existence for two years from Nov. 1 the present rates.

The Red Ash Coal Co., of Ashley, Penn., has petitioned the commission for through rates and joint rates on anthracite coal from the collieries and washeries on the line of the Central Railroad of New Jersey to points on the Lehigh Valley west of Sayre to Buffalo, for transshipment by water and reshipment by rail to Suspension Bridge, for reshipment by rail, and to points west. The Lehigh Valley and other railroads were named defendants.

Senator Reed's amendment to the interstate commerce act proposing to make natural-gas pipe lines common carriers within the meaning of the law has been approved by the Senate without a recorded vote. The act now makes pipe lines transporting oil common carriers, whereas the amendment would add to that classification pipe lines transporting natural gas and submit such pipe lines to the regulation of the Interstate Commerce Commission.

The bill was adopted by the Senate on Nov. 3 with but little debate. Senator Reed took up most of the time given over to the discussion of the proposition in explaining its intent. The bill now goes to the House for its approval.

HARRISBURG, PENN.

An extra session of the legislature is being suggested as the only means of solving the question that now confronts the state since the defeat of the $50,000,000 road loan.

It seems that Governor Tener has no alternative but to call an extra session for the purpose of arriving at some definite understanding of the most important question confronting Pennsylvania at the present time.

Unless the second proposed amendment to the construction which was voted upon at the same time as the $50,000,000 road loan, is adopted, which will not be definitely known until the official count is made by the state department, such new acts as the "female labor law," etc., cannot be passed by the legislature, therefore it is contended that they are unconstitutional.

Article 3, Section 7 of the constitution provides that the general assembly shall not pass any local or special law regulating "labor, trade, mining, or manufacturing," until this section is repealed.

Labor unions were specially interested in this amendment, but in their effort to defeat the road loan, they have probably defeated the second amendment also. Following the cue of the state grange, the miners' union in the hard-coal region went on record against the loan. Their attitude was popular in the coal regions, and every hard-coal county, excepting possibly Luzerne voted down the road loan and their pet amendment with it.

Governor Tener within a few days will appoint the first state economy and efficiency commission, provided for by the last legislature to introduce modern methods in the various departments of the state government, and to see if the letter of the law creating the various departments is being lived up to.

Concerning the "Check-Off"

That the independent coal operators and the United Mine Workers may come closer together and that they will allow the "checkoff" is indicated by the attitude of the Clearview Coal Co., which operates a colliery at North Scranton, agreeing to allow the check-off. This is the first company to grant the check-off, but the union officials ultimately hope to have other independent operators grant their request, which in time they think will be followed by the big coal companies of the anthracite region.

Under the agreement made by the Clearview people, the dues will be deducted from the earnings of the men and will then be turned over to the properly authorized officer of the local union. On the part of the union it is agreed that there will be no strikes. All the men engaged in and around the colliery must be members of the union.

In granting the check-off it was stipulated and agreed that the men will have to sign off and deposit with the company authority to deduct their dues and waivers that will protect the company legally.

The plan is expected by both parties to the agreement to result in increased production for the company and in uninterrupted work for the men.

PENNSYLVANIA
Anthracite

Pittston—A fatal accident recently occurred in No. 9 colliery of the Pennsylvania Coal Co. when a premature blast instantly killed two men and seriously injured three others. Samuel Haddon, a prominent rock contractor and Thomas Williams were the men killed. They had prepared a blast, and shortly after dinner as is the usual custom the battery was applied. It failing to set the blast off, Haddon and Williams went to the face of the tunnel to learn the trouble, the switch on the battery being turned off. Just as they reached the blast the heavy charge exploded. The mine officials are at a loss to explain how the explosion occurred after the battery had been shut off.

Mahanoy City—Mahanoy Creek broke into the workings of the Draper colliery, flooding the mine and causing considerable damage. About 200,000 gal. an hour are being pumped from the mine, in spite of this the water has crept 35 ft. up the slope. The course of the creek is being changed

Nanticoke, Penn.—The Truesdale colliery of the Delaware, Lackawanna & Western R.R. Co. has produced more coal in the last year than any ordinary colliery in the anthracite field. A new record was set for the month of October, 105,020 tons being produced and shipped. Including retail sales the output for the month was 108,220 tons.

Two men were killed instantly and two others narrowly escaped death in the shaft of the Auchincloss colliery of the Lackawanna Coal Co. recently, when a concrete block weighing several hundred pounds fell part way down the shaft and crashed through the cage on which they were standing. The men were engaged in repairing a beam in the shaft, below the surface level, and the concrete was part of the water line used to carry away drippings from the side walls and prevent their trickling to the bottom, it became loosened within a few minutes from the time it was inspected as the men went down the shaft.

Bituminous

Indiana—The Manor Real Estate & Trust Co. recently obtained the holdings of the Greenwich Coal & Coke Co., a tract of something more than 27,000 acres in Greene and Buffington Townships paying approximately $4,000,000. It is expected that the Cherrytree & Dixonville R.R. will be extended to the new coal field and will be the coal carrier.

New Castle—Attorney B. H. Akens recently delivered a deed to John K. Bell, of Pittsburgh, for 800 acres of coal land in Washington County, formerly owned by the Washington County Coal Co., now bankrupt. The purchase price was $165,0000.

Washington—An injunction was recently granted by the court upon the petition of the Reliance Coal Co., of Centerville, against five miners. This litigation has grown out of the trouble at the Reliance Coal Co. property over the determination of the company to operate nonunion. The defendants are restrained from interfering with the employees of the said company or its property.

Independence—Two farms at this place have been sold in the last few days. Both are large farms, the Dodds containing 202 acres and the Brown farm upward of 250 acres. The coal under the Brown farm was sold sometime ago to the Meadow Lands Coal Co. The Dodds farm contains a good tract of timber largely locust. The coal was reserved.

WEST VIRGINIA

Wellsburg—The strike situation at the La Belle and Gilchrist mines near here remains about unchanged. No attempt has been made to bring in strike breakers. The strikers demand a working day of eight hours, a check weighman and recognition of the union. The operators are willing to concede the first two propositions, but refuse to recognize the miners' organization.

Charleston—In order to keep in closer touch with the accidents that occur in and around the mines of the state, the Department of Mines has sent out circular letters asking the coal operators in the state in making their reports of accidents to the mine inspectors to make duplicate copies, sending one directly to the office of the Department of Mines, and another to the inspector as heretofore. The Department of Mines is called upon almost daily for information concerning accidents, and in the future it is desired to be able to give this information promptly.

Bluefield—A new company styling itself the Sandy Ridge Coal & Coke Co. was recently organized here. This firm proposes to develop about 175 acres in Russel County, Va., which carries five commercial beds of coal above water level. This property lies on a branch of the Norfolk & Western R.R.

TENNESSEE

Chattanooga—It is reported that financial backing has been assured for the Cumberland Colliery Co., which will shortly erect near Chattanooga coke ovens and a byproduct plant representing an investment of $1,500,000. It is understood that the plant will be located either in Lookout Valley or upon Moccasin Bend.

KENTUCKY

Louisville—The Wilhoit Coal Co., which has been operating mines in the Harlan district of eastern Kentucky, has been adjudged bankrupt in the District Court of Louisville on the petition of three creditors, the Standard Oil Co., the Swann-Abram Hat Co. and the Keuffel & Esser Co. It is understood that Roy Wilhoit, president of the company, has a personal claim covering most of the company's property. Mr. Wilhoit stated after the adjudication that the status of the company will in no way affect his other interests, one of the principal of which is the Cumberland Coal Corporation, which controls a large acreage of valuable coal land in the Harlan field.

Middlesboro—The recently announced purchase by the Kentucky Utilities Co., of the Asher electric power plant, which has been operated by the Southern Mining Co., has excited much interest among operators in that section, who appreciate the possibility of using electricity for all power requirements in their mines at an early date. It has been announced from the company's offices at Lexington that it will extend lines into the territory west and south of Middlesboro, as far as the Clear Fork district, for the benefit of coal operations; and it has been reported also that an electric interurban line will ultimately be established by the company, terminating at Jellico on the south and Middlesboro on the north. At the present time, the mines of the Bell and Bath County field will be served.

OHIO

Columbus—The Ohio Mining Commission took up the greater part of the week ending Nov. 8 with hearing arguments from the miners' side of the question, of the method to be used in paying for coal mined in the state. John Moore, William Green and others, of the United Mine Workers of America, appeared before the commission to argue the justice of paying on the mine-run basis. The week begining Nov. 10 will be given over to hearing arguments from the operators.

Martins Ferry—Ground has been broken by the Morgan Coal Co., of Bellaire, for a new mine located between Bannock and Fairpoint, Ohio. Arthur Morgan, of the Edgehill Mine, of Bellaire, is the owner of the new operation, which is located on the C. L. & W. division of the B. & O.

Congo—Mine No. 301 of the Sunday Creek Co. was set on fire recently by a short-circuit in the electrical equipment. The mine is connected with Mine No. 302 across the creek and steps were taken at once to seal up the mine to prevent the fire from spreading to No. 302. This has been accomplished. Mine No. 301 will remain sealed up until it burns itself out. The extent of the damage cannot be ascertained.

INDIANA

Petersburg—The Bicknell Coal Co., Bicknell, Ind., has leased 1100 acres of coal lands lying east of the city and will take options on several hundred adjoining acres. The shaft is to be completed within a year and the coal to be taken up within five years. The price paid for the coal is $35 an acre, with extra compensation for ground for tipple and yards.

Jeffersonville—More than half of the advance tows, with coal from Pittsburgh, were delayed by falling water in the Ohio and are tied up between this city and Cincinnati. Most of the coal that got through to this point went on to Memphis and New Orleans.

ILLINOIS

Worden—A suit for $8000 has been filed by P. K. Fornash against the Kerens-Donnewald Coal Co. It is alleged that the mine ventilation was poor and the air made the complainant ill so that he has been unable to work for several months.

Edwardsville—Before a board of arbitration here, working under the Illinois Workmen's Compensation Act, James Fry, of Worden, was awarded $3500 from the Kerens-Donnewald Coal Co. Fry was injured Nov. 22, 1912, when a prop in the mine struck him on the head. The wound appeared slight at first, but a month later he was stricken with paralysis and it was then discovered his skull had been fractured. He asked for a settlement under the Compensation Act.

Marion—Complete practical arrangements have been made for the connection at Du Quoin with the Southern Traction Co. of the Electric Traction Lines, extending westward from Harrisburg in Saline County from the coal fields east of here and continuing on to Johnson City and across Franklin County to Du Quoin. This will give the coal-producing counties of Saline, Williamson and Franklin an electrically operated outlet into St. Louis.

O'Fallon—Illinois coal-hoisting records are believed to have been broken on Nov. 7, when the Nigger Hollow Mine No. 2 hoisted 4400 tons of coal in 7¼ hours. The previous record was held by a mine at Benld, Ill., which hoistel 4356 tons in 8 hours.

FOREIGN NEWS

Statistics for 1912 as to coal consumption are beginning to be made public by Latin American governments. Argentina imported 3,707,956 tons of coal, practically all of which came from the United Kingdom. Small shipments only were received from the United States. Mexico, which supplies a considerable part of its needs from its own mines, imported 290,264 tons from the United States, 47,165 tons from Canada and 38,370 tons from the United Kingdom. On the other hand Mexico exported 50,770 tons to the United States. This movement was entirely to Texas points in the immediate vicinity of some of the Mexican mines. Of the total imports of Porto Rico, the United States secured 42,986 tons. British shipments totaled 4327 tons. Of the imports for the Dominican Republic, the United States furnished 8635 tons, as compared with 1674 tons from Great Britain and 1407 tons from other countries.

Tegucigalpa, Honduras—A concession has been given to American interests for the exploitation of coal in the departments of Yoro, Atlantida and Colon. The concessionaire is allowed free importation of tools and machinery and material to carry on the work. Ten per cent. of the gross coal mined goes to the government in return for the concession.

Vancouver Island, B. C.—There is little change in the position at the mines of the Canadian Collieries (Dunsmuir), Ltd. The production at the company's Cumberland mines, for the month of October was 51,296 tons as compared with 52,187 tons in September. At the company's Extension colliery production continues between 200 and 300 tons a day, haulage facilities for a larger quantity still being unavailable.

The Pacific Coast Coal Mines, Ltd., operating at South Wellington, is arranging to increase its output from 200 to 300 tons a day. All coal being produced comes from No. 2 mine. Conditions in No. 1 mine since the miners stopped work six months ago became unfavorable for production, but a dozen men have lately been employed in putting the mine in shape to allow of an early resumption of coal mining.

PUBLICATIONS RECEIVED

Proceedings Mine Inspectors' Institute of U. S. A. Ninety-six pages, 6x9 in.; unillustrated. Copies have been sent to all mine inspectors in the United States and Canada. Inspectors not receiving a copy should write J. T. Beard, editor-in-chief of the Institute, 505 Pearl St., New York.

RECENT COAL AND COKE PATENTS

Gas Producer. J. A. Herrick, New York, N. Y. 1,075,566. Oct. 14, 1913. Filed July 10, 1911. Serial No. 637,615.

Heating Furnace—A. Glass, Wheeling, W. Va. 1,074,258. Sept. 30, 1913. Filed Feb. 8, 1912. Serial No. 676,466.

Feeding Device for Furnaces. J. Harrington, Riverside, Ill. 1,075,352. Oct. 14, 1913. Filed Mar. 7, 1912. Serial No. 682,139.

Steam Superheater. C. S. Hooper and R. C. Stevens, Erie, Penn. 1,074,792. Oct. 7, 1913. Filed May 11, 1912. Serial No. 696,574.

Steam Superheater. P. Thomsen, Cassel Wilhelmshoke. Germany. 1,074,300. Sept. 30, 1913. Filed Oct. 29, 1912. Serial No. 728,371.

Underfeed Stoker. W. C. A. Henry, assignor to the B. T. U. Co., Pittsburgh, Penn. 1,074,118. Sept. 30, 1913. Filed Apr. 15, 1912. Serial No. 690,762.

Soft-Coal Burner. P. P. Cooley, assignor to Culter & Proctor Stove Co., Peoria, Ill. 1,075,335. Oct. 14, 1913. Filed Nov. 18, 1910. Serial No. 593,066.

Mine Car Wheel—H. A. Holzer, assignor to United Iron Works Co., Springfield, Mo. 1,074,363. Sept. 30, 1913. Filed July 16, 1912. Serial No. 709,646

Fuel Economizer. E. B. Freeman, Dedham, Mass., assignor to B. F. Sturtevant Co., Boston, Mass. 1,074,855. Oct. 7, 1913. Filed Nov. 25, 1908. Serial No. 464,464.

Coal-Leveling Machine for Bee-Hive Ovens. J. H. Huhn, assignor to Covington Machine Co., a corporation of Virginia. 1,074,119. Sept. 30, 1913. Filed Feb. 6, 1911. Serial No. 606,827.

PERSONALS

R. T. Stewart, for some time mine manager for the Corbin Coal and Coke Co. in southeast Kootenay, British Columbia, has left that province for Brazeau, Alberta.

E. J. Quealy has returned to his home at Kemmerer, Wyo., accompanied by M. S. Kemmerer, of Mauch Chunk, Penn., who is interested in Mr. Quealy's Wyoming operations.

C. C. Johnston, who has been editor and manager of the "Coal Mining Review and Industrial Index," of Columbus, Ohio, for seven years, has severed his connection with the paper.

Nick J. Boylan, connected with the Pittsburgh Coal Co., for 12 years, has entered the employ of Pickands, Mather & Co., in their coal department. Mr. Boylan is one of the best known coal men on the lakes.

President T. H. Watkins, of the Pennsylvania Coal & Coke Corporation sailed for England this week accompanied by his son, C. L. Watkins, president of the Watkins Coal Co. They expect to be gone about a month.

Heinrich J. Freyn, formerly consulting engineer of the gas-engine department of the Allis-Chalmers Manufacturing Co., of Milwaukee, has recently joined the H. Koppers Co., of Chicago, in the capacity of third vice-president.

George Watkins Evans, consulting coal-mining engineer, of Seattle, has completed the examination of the Matanuska coal field of Alaska for the United States Navy. Mr. Evans will soon resume his private practice in Seattle.

Kingdon Gould, president of the Consolidated Coal Co. of St. Louis, and interested in the other Gould coal properties, has just finished a trip of inspection of the Gould mines in the states of Arkansas, Oklahoma, Kansas, Missouri and Illinois.

W. R. Riggleman has been appointed district mine inspector of District No. 1 of West Virginia, succeeding Carl F. Schoew, resigned. Mr. Riggleman has been connected with the Davis Coal Co. at Thomas as mine foreman, and is a well known coal man.

N. M. Rice, on Nov. 15, becomes purchasing agent of all the Frisco Lines, with headquarters in St. Louis. Mr. Rice will assume the duties of the fuel agent in the purchase of all fuels. He comes to the Frisco from the Santa Fé, where he was store keeper.

Robert V. Rex, Superintendent, of Continental No. 2, of the H. C. Frick Coke Co., has been appointed superintendent at Leisenring No. 3 to succeed A. R. Miller who resigned. Mr. Rex will be succeeded at Continental No. 2 by Samuel Brown, of the Standard plant of the H. C. Frick Coke Co.

Amos Godfrey, who has had charge of the British Columbia Anthracite Co.'s field operations in the Groundhog coal basin, in the northern part of Skeena district, has returned to Vancouver, B. C. Two seams of good coal, one of 7 ft. and the other of 4 ft. 6 in., are stated to have been opened by last season's prospecting work.

D. B. Dowling, of the Geological Survey of Canada, who has done much geological field work in the eastern part of the Rocky Mountains in Alberta, especially in connection with the extensive coal measures, recently left Ottawa for the vicinity of Okotoks, some 30 miles south of Calgary, where it was lately reported oil had been found.

Ben W. Robinson, who recently resigned as general manager of the Victoria Coal Co., at Earlington, Ky., has removed to Equality, Ill. He becomes president and general manager of a company which has been organized to open and equip a new operation in that field. A new mine, which will tap a hitherto untouched body of coal, is to be opened.

John Mitchell, former president of the United Mine Workers of America, will resign his office with the American Federation of Labor, with which he has been connected for 15 years. Mr. Mitchell made this announcement at a banquet in his honor at Butte, Mont. He said that his withdrawal was voluntary and would be formally made at the meeting of the Federation in Seattle.

Oscar W. Schell, division superintendent for the Delaware & Hudson Co., since the death of E. R. Peckens, whom he succeeded eleven years ago, has tendered his resignation to the company. The company tried to have him reconsider his determination to quit, but he refused as he has something better in view. Charles Considine, an outside foreman at Providence, near Scranton, has been appointed to succeed Mr. Schell.

OBITUARY

Joseph J. Jones, district superintendent of the Lehigh Valley Coal Co., died recently at his home, 388 North River St., Wilkes-Barre, Penn., following a weeks illness. He was aged 63 years, and was one of the mining experts of the Wyoming Valley. Mr. Jones had been foreman at the Dorrance, Prospect, Parsons, Midvale and Oakwood collieries for more than thirty years.

CONSTRUCTION NEWS

Forksville, Penn.—A coal breaker having a capacity of 400 tons daily is being constructed at this place.

Poland, Penn.—A contract has just been awarded A. K. Jenkins & Co. for the erection of a large coal tipple and bin for the Poland Coal Co.

Houston, Tex.—The Southwestern Steel Development Co. has consummated arrangements insuring the construction of an extensive plant to include iron furnaces, steel mills, coke ovens, etc., at Texas City.

Roanoke, Va.—Orders have just been placed for the materials necessary for the construction of 1000 all steel hopper cars at the Roanoke shops of the Norfolk & Western, and work will be begun as soon as other orders that precede this have been completed.

Sturgis, Ky.—Allen & Garcia, of Chicago, are installing at the West Kentucky Coal Co.'s mine No. 9, the largest shaker screens in western Kentucky. The screens have a greater capacity than any which have been set up in that part of the state. Work will shortly be completed on the screens and the other equipment being installed at the mine, and shipments will begin at an early date.

Philadelphia, Penn.—Coal exports from this port during the month of October were exceptionally heavy. They totaled 104,591 tons of bituminous coal and 5891 tons of anthracite. In October 1912, there were shipped from here 78,512 tons of bituminous and 7666 tons of anthracite. Last month's gain was 25,019 tons in the bituminous trade and a loss of 1775 tons of anthracite. In September the shipments aggregated 82,963 tons of bituminous and 6148 tons of hard coal.

Uniontown, Penn.—A new coal concern to be known as the Strange Creek Coal and Coke Co., is being formed to operate 4000 acres of Strange Creek, West Virginia coal, owned principally by Fayette County people. The officers of the company are all Uniontown men. A committee of seven was appointed to secure a charter from the state of West Virginia and proceed immediately to complete the incorporation. The coal land comprising this tract has railroad frontage on the Mead and Spear R.R., also the Coal and Coke R.R., while the Baltimore & Ohio has a branch within two miles of the property.

Cairnbrook, Penn.—The Pennsylvania R.R. spur to Cairnbrook, the coal town of the Loyalhanna Coal and Coke Co., has been completed, and the work of loading several thousand tons of coal that was stored while the headings were being driven is progressing rapidly. The spur to the Cairnbrook mines is being extended to the Dark Shade Creek to a new opening that is being made about a half mile away by the Wilmore Coal Co. From the new Berwind-White holdings the spur leads to holdings of the Logan Coal Co., where a new opening is being made. The "B" and "C" seams in all of these operations are being worked. The Berwind-White and Consolidation Coal Co. own lands on different sides of the Shade Creek, near Central City, and as a result of operations that are contemplated there much interest has been manifest in real estate circles recently.

NEW INCORPORATIONS

Clarksburg, W. Va.—The Templeton Coal Co. has been incorporated with a capital stock of $25,000, to develop coal mines.

Gadsden, Ala.—The Little River Mining Co. has been incorporated with a capital stock of $4000, to develop coal mines near Gadsden.

Wilburton, Okla.—The Howard Bros. Coal & Mining Co. has been organized with a capital stock of $1000. The incorporators are: John, William and Richard Howard, of Wiburton.

Oklahoma City, Okla.—The Carson Mining Co. has been organized with a capital stock of $25,000. The incorporators are: John Hart, L. M. Owen, and D. F. Peyton, of Oklahoma City.

Cleveland, Ohio—The National Peat Co., of Cleveland, Ohio, was recently granted a charter under the laws of Delaware, with a capital stock of $500,000. Robert O. Bartolomew, of Cleveland, was chief incorporator.

Nelsonville, Ohio—The Clifton Coal Co., of Nelsonville, Ohio, has been incorporated with a capital stock of $10,000, to mine and deal in coal. The incorporators are George W. McKee, Wilbur McKee, A. B. Ailes, Julius Fisher and George W. Lowery.

Sutton, Ky.—The Funk Coal Co. has been organized for the purpose of mining coal. The capital stock is $25,000, and the incorporators are: H. H. Funk, Belle Musick, of Toler, Ky.; A. J. Younce, of Sutton; Thomas West and J. R. Barbour, of Williamson, W. Va.

Columbus, Ohio—The Northern Mining & Fuel Co., of Columbus, Ohio, has been incorporated with a capital stock of $10,000, to mine and deal in coal. The incorporators are H. B. Halliday, A. T. Seymour, Lowry F. Sater, C. E. Richards and E. T. Bunker.

Camden, N. J.—The Coisa Portland Cement Co. has been organized with a capital of $160,000. The objects of the incorporation are to mine, quarry and sell limestone, shale, coal and all kinds of minerals. The incorporators are John D. Stevenson, 3d, William J. Montgomery, and H. B. Martin.

INDUSTRIAL NOTES

Martins Ferry, Ohio—The Beech Flat Coal Co. has recently installed a large steam shovel for stripping the overburden from its coal.

Uniontown, Penn.—The Mt. Hope Coal Co., of Uniontown, has sold its plant and holdings, consisting of 185 acres of coal and 150 coke ovens at Lynn Station, to the People's Coal Co., of Pittsburgh.

Columbus, Ohio—Suit has been filed by the Gibson-Spence Coal Co., of Columbus, Ohio, against the Clarion Coal Co. for a receiver. The Gibson-Spence Co. claims to be holder of two notes amounting to $1177.

Wellsburg, W. Va.—The Bowman coal property was recently sold by the Wellsburg, Bethany & Washington R.R. Co. to Guido Bros. The mine is a new one and is located at the foot of Buchannan's Hill on Bethany Pike.

Pomeroy, Ohio—The Dixie Salt Works and coal properties at Mason, W. Va., was sold at receiver's sale at Pomeroy recently by Referee E. R. Titus to George Schlaegel, for $30,650, Mr. Schlaegel represents the Pomeroy Products Co., which was formed for taking over the Dixie properties.

Washington, D. C.—The coal exportation of continental United States for 1913 will probably approximate $100,000,000 in value according to figures of the Bureau of Foreign & Domestic Commerce. This puts the United States in the third place among the coal exporting countries of the world, being exceeded only by the United Kingdom and Germany.

Columbus, Ohio—The Kanawha & Michigan Ry.'s joint ownership by the Lake Shore and Chesapeake & Ohio must cease, according to a decision handed down, Nov. 11, in the United States Circuit Court. The opinion was in the suit of the Government against the companies for alleged monopoly of coal carrying facilities from the Hocking coal regions.

Columbus, Ohio—The Ohio Utilities Commission is watching with zealous eyes the recent advances in the price of coal in Ohio with a view to bringing proceedings against the operators in case it can be proven that there is a coal monopoly in the Buckeye State. To that end investigators have been sent out by the commission to ascertain the facts in the matter.

Operators in Ohio are not in the least freightened over the prospects of prosecution as they claim there is no semblance of a combination among the various operators of the state. They say the price of coal depends absolutely on the car supply and the demand for all grades and is not an arbitrary matter.

Another thing being investigated by the commission is charges of favoritism in the distribution of cars. It is claimed by some operators that more cars are furnished for interstate traffic than for traffic within the boundaries of Ohio.

Pittsburgh, Penn.—In approximately 100 years since coal mining began in the United States the country has produced 9,275,000,000 tons, of which Pennsylvania has mined 4,913,000,000 or 53%. No other one state has mined as much as 1,000,000,000 tons, Illinois being the nearest with 903,900,000 tons. Furthermore, the production of Pennsylvania for the last four years which stands at 935,500,000 exceeds the total production of Illinois since coal mining began in that state in 1833.

COAL TRADE REVIEWS

GENERAL REVIEW

Fall in temperature causes a rush for hard coal; trade active and few concessions to be had. Bituminous weak in spots, particularly in Coastwise business. Consumers showing a lack of interest and some price cutting is noted. Operators making a determined effort to hold the market. Effects of the heavy weather in the Central States.

An unexpected storm of almost mid-winter severity has started a rush of small buyers into the hard-coal market and created a note of urgency in the situation. The improvement is apparent in both wholesale and retail. Concessions on the regular company circular are still to be obtained on certain grades, notably egg size, but as a rule the demand is heavy all along the line and there are even rumors that some companies have already been forced to draw upon reserve stocks. Lake shipping is relatively light.

Bituminous continues to show a weakening tendency although firm in spots. The Atlantic Coastwise business particularly, has fallen off heavily, and supplies are beginning to accumulate at the principal loading piers. The trade is conspicuous for the lack of interest in spot business and indications are that there will be a light demand for several weeks to come. Large tonnages are available and some price cutting is noted where it is found necessary to move coal promptly. Supplies at tide are larger and prices are being maintained only because of the fact that most of the production is well covered by contracts. Inquiries are only scattering but in the face of all these adverse conditions, operators are making a determined effort to hold the market in hopes that it will swing back to its former activity as seems probable under the change in weather conditions. The New York market has as yet failed to show any specific weakness although there is a slowing down which will probably continue until the first of the year.

The heavy storm in the Pittsburgh district created a sharp rush for domestic coal on which premiums were already in effect so that some fancy prices were obtained for prompt tonnages; on the other hand manufacturing demand is restricted, while lake shipping is slowing down, due to the lack of vessels as a result of the slow movement of ore. The heavy weather on the Lakes resulting in the loss of a number of vessels, has demoralized shipping temporarily and will tend to retard the last rush of coal to the Northwest.

The domestic trade in Ohio is active, the demand for all grades continuing heavy and prices showing a strong upward tendency. The car supply is still a ruling factor in the situation there and this has been further aggravated by the severe weather. The movement at Hampton Roads is about normal in all directions and there is a good supply of vessels. There is a fair accumulation at the piers but some shippers are still having difficulty in getting sufficient tonnage; coastwise business is mostly to New England. The Southern market is easier, the rise in the river having relieved the tension on Northern coals.

Prices in the Middle West are generally strong but fluctuate considerably. The recent touch of real winter stimulated the market perceptibly and checked the tendency to ease off. Operations continue heavy, any delay being due to poor car service rather than lack of orders. The situation locally looks encouraging.

BOSTON, MASS.

Dull market for Hampton Roads coals. Rumors regarding English syndicate in New River and probable labor troubles. Demand promises to be light for weeks to come. Georges Creek output likely to be curtailed for the present, and Pennsylvania grades show weak tendencies. Anthracite a shade easier on account of mild weather.

Bituminous—There are only a few relieving phases in the generally dull situation on Pocahontas and New River at tide. Some of the agencies have moderate business in prospect and are therefore quoting $2.90 f.o.b. for delivery 30 and 60 days hence, but most of the shippers are eager for such orders as can be had at the season basis of $2.85. There is, however, a notable lack of demand for spot coal, and supplies are beginning to accumulate at all the loading piers.

There is a good deal of talk regarding the rumored optioning of various West Virginia properties, principally in New River, by an English syndicate, but so far nothing tangible has been given out. If there is basis for the story and the deal should be carried out it would undoubtedly mean a reduced supply of Hampton Roads coals for New England. Any foreign purchasers would be sure to divert larger tonnages for export and such a development would work an important change with respect to this market.

Some apprehension over labor troubles in the spring in the same districts is being felt now and then. A determined effort seems likely to be made next season to organize both the Pocahontas and New River fields. This aspect of the situation will be watched with increasing interest as the season advances.

Spot coal for inland delivery continues rather a drug on the market. Prices are still off and there is a conspicuous lack of interest all over the territory. The storm on the 8th and 9th will doubtless shorten up shipments from West Virginia for a few days but from present indications the demand is going to be light for several weeks to come. Georges Creek shares in the situation on Pocahontas and New River. There are large tonnages available at all the distributing points, but since most of this grade is placed on a contract basis there has been no wavering in price. November, however, will probably show a materially lessened output.

The better grades from the Pennsylvania districts are on an easier price range than a week ago. At the same time, operators are trying to hold quotations in the hope that the market will swing back. There is little inquiry here and many are looking for a decided break. There is no apparent change in the dull outlook for the cheaper grades; f.o.b. New York there is a dearth of business outside of the bunker trade. All-rail coal is quiet, with only scattering inquiry. Consumers are well-stocked and requests to defer deliveries are far more frequent than orders.

Anthracite—The situation continues strong, although stove size does not seem in quite the short supply that was looked for. The mild weather has had some effect on the market and premiums this week f.o.b. New York have not been so general; 25c. is being paid in instances where a large proportion of stove is required, but egg and chestnut with individual shippers are barely holding to the circular. Barge rates out of New York are still at 65@70c. and the trade east of Cape Cod is therefore looking largely to Philadelphia for current supplies. Tows are moving more regularly and quite a fleet has sailed the past week from the Delaware for Eastern points. Ten days more will see the end of shipments up the rivers.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.00@1.55	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.25@2.80	2.50@2.90	2.92@3.02	
New York*	2.55@3.10	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.75@3.88
Providence†				3.77@3.83

*F.o.b. †On cars.

NEW YORK

Hard coal active with indications that some sizes will shortly be out of the market; colder weather started a rush in retail. Soft coal in strong demand, but with an uncertain future. A tendency to slow down.

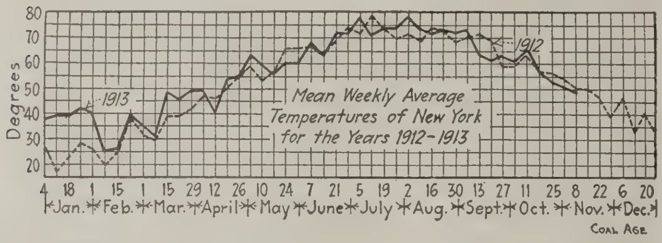
Anthracite—The local market on hard coal is strong all along the line with the possible exception of egg size. This grade continues to be difficult to move and many subterfuges are resorted to to dispose of it. The demand for stove exceeds the supply; a continuation of the prevailing cold snap will see stove coal entirely out of the market shortly. In the steam grades, business is good on all sizes, there being a tendency toward higher prices on pea coal.

The fall in temperature the early part of the current week had a notably stimulating effect upon the retail end of the business. Buying opened up freely, and the demand is insistent. The water movement out of New York Harbor is about normal. The car shortage in the mining regions has improved materially and now just about meets requirements, although not entirely satisfactory yet.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$4.95	
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.40@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.75@2.20
Barley	1.75	1.75	1.70	1.50@1.70

Bituminous—The recent storms have steadied up the soft-coal market and had a tendency to check the downward trend, but there is still a note of hesitancy and many think that the trade will continue slow during the balance of the year. It is a notable fact, however, that conditions locally maintain a generally better tone than at most of the other large distributing centers. The advent of winter weather, the slowing down of the movement and the possibility of a strike next April are the favorable conditions in the market against which is the serious contraction in general business and industrial activity, and the release of the large tonnages now going into the Lake business. The outlook rests entirely on the developments along these lines, and from present indications may go either way, the balance probably being slightly in favor of the producers at the moment.



The high volatiles are the heaviest and the most difficult to move, the better grades still being rather scarce and firm. The labor supply is better, the colder weather driving more men from outside vocations into the mines. Cars are generally in good supply on both the Pennsylvania and New York Central, but the situation on the B. & O. has been tight. More than the normal supplies are reported at tidewater, but the demand continues good and prices are being firmly held. We continue New York quotations on the same basis as last week as follows:

West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

BALTIMORE, MD.

Bituminous demand fallen off heavily and market weakening. Some price cutting to move coal promptly. Supplies at tide much larger. Car movement better.

Mild weather has depressed the anthracite trade here for the past week or ten days. There was a brief period of activity with the close of October, and while business is not dead by any means, it is not as brisk as many had expected. The soft-coal trade is struggling with a falling market. Demand has fallen off greatly, the steel and cement industries have cut off shipments on contracts, and the movement of coal to the Northwest has been curtailed.

The better-grade coals, which until 10 days or so ago had held firm, are now notably weaker. The high-grade Pennsylvania steam coals that had recently sold up to $1.45 and $1.50 are now to be had around $1.30 and $1.35. The lower-grade West Virginias are bringing about a dollar, which is also the prevailing price for slack. Three-quarter gas is offering as low as $1.05, which is a big reduction from the figures obtained during the height of the Lake season.

There is more coal at tide here the past week than for some time past, due to an exceptionally free car movement, and some sacrificing was done in a few cases. The movement over the piers on export was rather light, and the up-coast shipments on contract coals were only moderate.

PHILADELPHIA, PENN.

Anthracite trade continues to show improvement, with activity more marked as the season advances. All sizes but egg moving well. Bituminous trade lacks tone, but prices well maintained.

The past week has seen considerable improvement in the anthracite coal trade, both from a retail as well as wholesale standpoint. The demand for chestnut size has increased to such an extent, that it is understood the large operating companies have started to work on their storage piles, and with the inception of real winter weather, it is confidently expected that the lethargy in egg, which is about the only size that is dragging at present, will show marked improvement. One still hears of concessions, however, in egg, chestnut and pea sizes, in some cases as much as 35c. in the egg, and dealers claim that they can secure all they want at less than circular. There is no disposition, however, on the part of the large companies to meet this situation, circular prices still being maintained, their strength lying in the fact that orders for stove coal, which is far behind the market, must be accompanied by orders for the other sizes, and in this way, the production is being well taken care of.

Pea coal is beginning to feel the result of the winter consumption. This is particularly true of Philadelphia and vicinity, where large quantities of this size are used. The one- and two-ton lots are commencing to be heard now, which, after all, constitutes, in a large measure, the bulk of the business, and practically marks the beginning of the active season. Production is on about a parity with last year, with the usual crop of petty differences in the various mining regions. This has a tendency to reduce the output when it is needed the most, which is probably an effectual argument, from a miner's standpoint.

There seems to be a tendency to softness in the bituminous trade. It is claimed that the labor situation has about adjusted itself, resulting in an increased output, and as a consequence, while prices remain about the same, there is a more urgent quest for orders. They are not coming as easily as has been the case for months past, and salesmen are sent out with instructions to get business. It is slowly approaching its natural level.

BUFFALO, N. Y.

Market quiet. Movement on contracts the best feature. Serious break may occur unless more seasonable weather develops. Coke weak. Lake shipping of anthracite active.

Bituminous—The market is weak, but shippers will not make any price concessions, for they do not believe the business could be stimulated in that way. The consumer is indifferent to the market. One operator reports that an increased supply of cars has added to the weakness of the situation; he is able to run his mines at full capacity, although that is largely because a great part of his output is sold on contract. There was recently much regret because so much coal was contracted, but if anything pulls the market through now it will be this very feature. Some sellers wonder why the trade now is less than in June and July; the reason is that many industries reduce operations at this time, and if the weather does not create a demand, it must necessarily be slack. It is generally agreed that a snow storm would firm the market quickly.

The jobber and consumer anticipate a break in the market, while the producer fears the same, and looks to the weather as the one element in the trade that is most likely to prevent it. Prices are, therefore, weak at former figures, $2.90 for Pittsburgh select lump, $2.80 for three-quarter, $2.65 for mine-run and $2.25 for slack, the latter still being much firmer and scarcer than sizes. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Coke—The market has shown additional weakness during the week, and all grades have been offered at reduced prices. Prices rule at $4.70 for 72-hr. Connellsville foundry, $4.20 for 48-hr. high-sulphur furnace, and $3.60 for stock coke.

Anthracite—There is little activity in anthracite except for lake shipment. After Dec. 1 the small amount shipped will have to pay an increased insurance rate and quite likely a higher freight. In spite of the need of more anthracite in the Northwestern trade, shippers were able to load only 124,000 tons into vessels during the week. The local demand for anthracite is light.

PITTSBURGH, PENN.

Pittsburgh district visited by great wind and snow storm, crippling telegraph lines and railroads. Manufacturing demand for coal slightly decreased. Pressure to maintain lake shipments. Connellsville coke quiet and slightly lower.

Bituminous—Last Sunday the Pittsburgh district was visited by a wind and snowstorm, which would be noteworthy at any time in winter, while as making the first snowfall of the season over a foot it was altogether exceptional. A sharp increase in the demand for domestic coal resulted in a market which was already showing premiums, and some fancy prices were paid for a limited tonnage. The manufacturing demand for coal has decreased a trifle further, as the iron and steel industry is steadily slowing down. Lake shipments have been temporarily much reduced as the first cold snap, even if a mild one, always ties up the railroads more or less, and when telegraphic communication is practically suspended, not much can be expected from the railroads in moving freight. A further incentive is furnished to prolong the Lake shipping season to the end of the month, but a difficulty is experienced in finding vessel room, as the ore shippers have greatly curtailed operations, October ore shipments showing a decrease from last year, while only a little is to be moved this month, and some shippers are already through. We continue to quote prices for short contracts and for prompt, subject to premiums for small lots of domestic, as follows: Slack, $1@1.10; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The sale of 10,000 tons of furnace coke at $1.90 a trifle over a fortnight ago, which sale marked the break of the Producers' Coke Co. from its $2.50 price, is shown now to have fixed the maximum of the market. Several lots of November and November-December coke have been sold at that figure, and last week a sale of 15,000 tons of standard furnace coke was made at $1.85. This price can easily be done on prompt lots, but there is no further demand. As to contract, there is no negotiation whatever, but it develops that some time ago, when the majority of operators were holding strongly for $2.50, a contract was made at $2.25 for the first half of 1914. In the absence of bids and offers this might technically be held to constitute a normal market. Foundry coke has weakened in sympathy with furnace coke. We now quote: Prompt furnace, $1.85; contract, nominal, $2.25; prompt foundry, $1.65@1.75; contract foundry, $1.65@1.75 per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 1 at 375,230 tons, a decrease of 10,440 tons, and shipments at 356,522 tons, a decrease of 32,522 tons.

COLUMBUS, OHIO

Unusual strength, the chief characteristic of the local trade. All grades are in good demand and the car supply is getting worse. Prices are firm and inclined to advance. Lake trade is still active.

Market conditions in Ohio are ruling firm in every respect and the tendency is upwards. The demand for all grades remains steady and no stocks are sold below the circular. Car shortage is still the chief factor in the trade. The supply is about one-half normal and in some cases the percentage is even lower than that. In the Hocking Valley field it has required considerable work on the part of railroads to furnish 50 per cent. while in Eastern Ohio and Pomeroy Bend the percentage is lower. The strictly domestic fields have suffered with the remainder of the producing sections of the state.

The domestic trade is probably the strongest point in the market. Dealers in Ohio and adjoining states are trying to accumulate a surplus to be on the safe side when the rush incidental to colder weather comes. As a result they have placed larger orders and are insisting upon immediate delivery. Delay in delivering runs from a few days to several weeks. One of the chief causes for the car shortage is the lack of motive power on the part of railroads. Retail stocks are only fair in this section and domestic orders are coming in well.

Lake trade is still a factor in the situation although it is not long until the close of navigation. The dockmen of the Northwest want as large a tonnage as possible rushed through, to prevent a large all-rail movement. As a result, every effort is being made to secure a good lake movement which is shown by the records of the loading machines at the docks of the lower lake ports.

Steam business is holding up well. Manufacturing establishments while not consuming a larger tonnage are placing more orders so as to guard against a fuel famine. As a result stocks are growing gradually larger. Railroads are using quite a large tonnage in their freight movement.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$2.00 @ 1.90	....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch...........	1.85 @ 1.75	$1.50 @ 1.40	2.00 @ 1.90	1.85 @ 1.75
Nut...............	1.30 @ 1.20	....	1.75 @ 1.65	1.40 @ 1.35
Mine-run..........	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack..	0.90 @ 0.85	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack........	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.75 @ 0.70

DETROIT, MICH.

Car supply worse than was anticipated. Situation hinging on this feature. Domestic coals quiet due to unseasonable weather.

Bituminous—As was anticipated, the car supply has at last become the controlling feature in the situation here. Conditions are even worse now than was expected and shippers are being taxed to the limit to meet their contracts. Reports from some districts place the car supply as low as 20%.

There are very few cars of free coal on track here. Prices are firm on all grades, with the exception of certain sizes of Hocking, which have shown signs of weakness. West Virginia nut and slack are quoted at 90c., with mine-run, both for spot and contract, at $1.15. There is very little new business being done in domestic coal, due to the unseasonable weather recently. Conditions have improved in this respect, however, and prices are showing a rising tendency.

The market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$2.00	....	....	$2.75	$2.50
Egg...........	1.65	....	2.00	....	....	2.75	2.50
Nut...........	1.50	....	1.65	....	....	....	....
Steam lump....	1.50	....	....	....	....	....	....
¾-in. lump......	1.35	$1.35	1.35	$1.35	$1.35	....	....
Mine-run.......	1.25	1.15	1.15	1.15	1.15	1.50	....
Slack..........	0.90	0.95	0.65	0.90	0.90	....	....

Anthracite—Shipments are coming in better than was anticipated, and the supply of stove coal is greater, although there are now indications of a surplus.

Coke—Connellsville coke has taken a sharp slump in the local market. Foundry coke is being quoted at $2.50, f.o.b. ovens, while Semet Solvay and gas house remain unchanged.

HAMPTON ROADS

Movement during week only about fair. Piers well supplied with bunker tonnage. Prices stationary, although demand is heavy.

The movement of coal from Hampton Roads piers during the past week has only been about normal. There has been a good supply of bunker vessels and also some large cargoes moving from tidewater but no extra heavy shipment. Foreign shipments have gone to Canal Zone, Kingston, Havana, Cienfuegos and Rio de Janeiro. Practically all of the coal moving coastwise has gone to the New England market, about the largest percentage being consigned to Boston and Providence. The coal moving both coastwise and foreign has been principally Pocahontas and New River.

Prices have changed but little during the week, remaining about the same as they have been for the past ten days or more. There is a fair accumulation of coal at tidewater piers, although a number of the shippers are short and have had difficulty in getting sufficient coal forward to take care of contracted tonnage on hand.

LOUISVILLE, KY.

Colder weather has had a reviving influence on the trade. Heavy river shipments relieving the shortage in this department. Price advance anticipated.

The car shortage and the Election holiday of last week affected production to such an extent that the fear of an oversupply has been eliminated for the time being. Colder weather has also had its effect upon the situation, and the market is notably stronger. The rather backward season, up to the recent cold snap, was having a depressing effect upon the outlook. Heavy rains in the upper Ohio Valley have opened up river transportation and large tonnages are now en route for this district. The companies handling river coal have been so hard pressed that they have occasionally been compelled to resort to the local rail products.

The heavy demand for eastern Kentucky coal in the North still continues, and will no doubt increase as the season advances. The only uncertain factor in this trade is the limited supply of gondola equipment, which is the kind most commonly required. The new "battleship" cannot usually be applied on this business. An advance in quotations effective Nov. 15 is being discussed; $2.50 f.o.b. mines will probably be the new price on block coal, with the lower grades ranging down at the customary differential. At the moment, orders are plentiful at $2.35, at which figure the dealers claim they are unable to make any profit because of the low-priced contracts they have with consumers.

The over-supply of screenings in this market seems to have been eliminated at last. Colder weather has caused the heating plants generally to come into action, so that there is a large healthy consumption at the moment. The western Kentucky market is more active than for some time, and the steam grades are particularly strong.

BIRMINGHAM, ALA.

Steam coal shows slight improvement. Due to cold weather, domestic is also in a more healthy demand. Blacksmith normal and furnace and foundry coke quiet. Pig iron more active. Car supply still short of requirements.

The steam coal market shows a slight improvement over last week, though it could not be called in a good condition. The demand is slightly better, with prices about the same. Following in the wake of a cold snap, domestic coal shows quite an improvement, with a large increase in the demand. While some of the higher grades have been sold up for some time, the lower grades have suffered for want of orders, but the cold weather is bringing out the inquiries for it.

Blacksmith coal is moving satisfactorily, the demand gradually increasing from week to week. Very little is doing in either furnace or foundry coke, but the prices are holding up. Pig iron is more active, and while the sales are not large, the price is holding $11.50 2Foundry being the basis.

The car supply is still short of the requirements, especially on the Southern Railway and no great improvement is looked for in the near future.

NEW ORLEANS, LA.

Falling off in shipping affects coal consumption decidedly. Exports to Latin America increase. Cane mills are requiring more coal this year.

Compared with this week last year, coal consumption took a decided slump, due to the difference in the harbor demand. Owing to the slowness with which the cotton crop is being marketed, there is little activity in shipping. High ocean freight rates have practically stopped the lumber movement. Domestic demand is good. Exports to Latin America have been much heavier, while the cane mills are laying in large supplies in anticipation of one of the longest grinding seasons in many years.

Much of the tension evidenced in the local market has been relieved by the unusually early rise in the Ohio, which assures relief to the fast dwindling stocks held by the Northern companies.

In order to be assured that everything is being done to make this port the principal coaling supply station for the Panama Canal and Latin America in general, the Association of Commerce is investigating conditions. Owing to the very unusual circumstances existent here, none of the local interests are in a position to gage future action. The whole situation hinges on the possibility of bringing Alabama coal to this port by water.

INDIANAPOLIS

Expectation of mild weather in Indiana and perhaps lower prices not realized. Mines are running full time except when interrupted by car shortage, which is not serious. Prices hold steady.

It was expected the continuance of mild weather would have a distinct effect on the coal industry of Indiana, in volume of trade if not in weakening prices. It has not done so, however, and the recent taste of real winter put an end, at least temporarily, to those misgivings. Operations at the mines have kept up well, most of them being on full schedule; delays are due entirely to the car situation and not a lack of orders. However, less is being said about car shortage. It is still a factor, especially with the Big Four, but operators have long been used to that and plan their business methods accordingly.

A street-car strike in this city for eight days, during which no cars moved and which stopped interurban traffic at the city limits had a paralyzing effect on business generally. This included the largest consumers of coal, the power houses of the city and interurban lines. Prices hold steady at the mines and retailers of the city let the first of the month go by without changing their quotations, which remain at the basis fixed Sept. 20.

CHICAGO

Prices for steam coal higher. Drop in domestic ranging from 10c. to 25c. a ton. Car supply still inadequate. Western coals a trifle weak, Springfield producers cutting some prices as much as 10c. a ton.

Additional strength in prices for steam coal and a decline in quotations for domestic are the leading features in the Chicago market. It may be said, in addition, that the general business outlook is causing operators considerable worry.

There has been a drop in domestic coal prices ranging between 10c. and 25c. a ton, while an advance of from 5c. to 10c. a ton has been noted in the steam grades. Although idle coal cars are increasing in number, the car supply remains unsatisfactory, due chiefly to a lack of expeditious car movement. Western coals are somewhat weak, Springfield operators cutting prices in some instances as much as 10c. a ton. Springfield domestic lump is selling in Chicago at from $1.60 to $1.65 with the country price remaining at the circular figure of $1.75. Domestic sizes from the Franklin County field are selling at from $2 to $2.25. Operators who are oversold are adhering to the $2.25 quotation, while others whose orders are not so plentiful are shading.

The price for Carterville lump, egg and No. 1 washed remains at $2, the mines, warmer weather, apparently, having failed to influence the operators in that region. Dealers in Hocking coal are still complaining about insufficient service by the rail carriers. Prices, however, remain unchanged with comparatively little of this fuel coming all-rail to the Chicago market. Smokeless lump and egg are stronger and the price for mine-run a trifle easier; the general figure for the latter is $1.40, the mines, although some sales have been reported at $1.50. Lump and egg are quoted in Chicago at $2.25, the mines. In the country districts sales are made on the basis of $2.50.

The movement in furnace and foundry coke is fair, but spot sales are small in volume. On account of weather conditions there has been a decrease in the movement of byproduct coke. The market for screenings is improving.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.12@1.22	

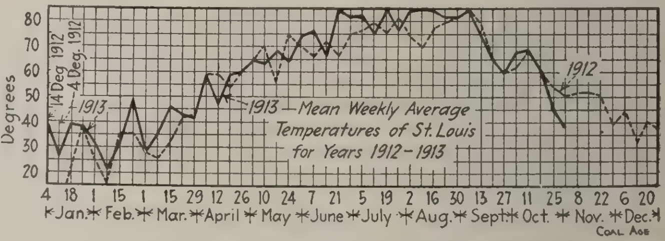
Quotations on Harrisburg coal are: Domestic lump and egg, $3.05; steam lump, $2.65@2.80; mine-run, $2.40@2.55; screenings, $1.55@1.80; No. 1, nut, $1.75@1.80; No. 2 nut, $2.55@2.80. Carterville prices are: Lump, egg and No. 1 washed, $3.05; No. 2, washed, $2.65.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byproduct, egg and stove, $4.90@5; byproduct, nut, $4.95@5.10; gas house, $4.95@5.

ST. LOUIS, MO.

Car supply conditions improving and plenty of domestic coal. Weather conditions keep prices irregular. Steam sizes looking up.

Irregular weather has kept the market in a somewhat uncertain condition. For one or two days last week prices were inclined upward but they would drop back again. Indications the early part of the week were that the market would be likely to stiffen up some, although if the car supply for the next week is as good as it was last week there will be plenty of coal. All of the railroads did better the past week than they have for some time.



Steam coal has picked up some, especially from the Carterville field, and screenings are easily bringing from 50 to 60c. Standard screenings, however, are floating along from 15 to 25c. The standard market is still too low to be profitable for operators, although Carterville is doing exceptionally well. On foreign coals everything is quiet.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.05@1.15
3-in. lump	....	....	$1.50	....
6-in. lump	$1.75 @ 2.00	....	1.60	1.35@1.50
Lump and egg	1.85 @ 2.15	No quotat'n	....	....
No. 1 nut	1.60 @ 1.75	....	....	....
Screenings	0.40 @ 0.50	....	....	0.10@0.20
Mine-run	1.10 @ 1.20	....	....	....
No. 1 washed nut	1.85 @ 2.00	....	1.40	....
No. 2 washed nut	1.50 @ 1.65	....	1.60	....
No. 3 washed nut	1.15 @ 1.20	....	....	....
No. 4 washed nut	1.00 @ 1.10	....	....	....
No. 5 washed nut	0.50 @ 0 60	....	....	....

KANSAS CITY, MO.

Market steadying up under the influence of more seasonable weather conditions. Inadequate gas supply a factor in the situation.

The market has been weakening somewhat under a steady stretch of warm weather, but is now showing signs of stiffening as the weather conditions become more favorable. The Indian summer has given way to more seasonable weather, and prospects are for better conditions the remainder of the year. The warm weather resulted in no changes in quotations, but operators were inclined to concede something in order to keep their output moving. Others took advantage of the lull in order to pile up stocks in anticipation of a higher market a little later.

Cold weather has had a settling effect and all lines are now moving briskly. Kansas nut, which has been weak, has braced up well, while block coal, also showing little life, responded immediately to the cold wave. Should the weather continue cold, the expected advance of 25c. will go into effect around Thanksgiving. Inquiries are coming from all sections of Kansas and Missouri, because of the unsatisfactory natural gas situation.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for October and the first ten months, of the years 1912-13, in long tons:

	October		10 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading....	1,232,367	1,434,923	10,736,917	18.64	10,385,395	20.17
Lehigh Valley.......	1,162,850	1,217,297	10,834,778	18.80	9,505,104	18.46
Cent. R.R. N. J.....	906,525	938,297	7,701,931	13.37	6,769,128	13.14
Del. Lack. & West..	895,252	970,139	8,253,236	14.32	7,325,085	14.22
Del. & Hudson......	625,049	589,717	5,928,124	10.29	5,126,694	9.95
Pennsylvania.......	593,800	547,061	5,204,132	9.03	4,495,080	8.73
Erie...............	709,400	756,452	6,828,702	11.85	6,059,536	11.77
Ont. & Western.....	212,951	211,435	2,132,259	3.70	1,834,518	3.56
Total.........	6,338,194	6,665,321	57,620,079	100.00	51,500,540	100.00

Stocks at Tide on Oct. 31 were 603,223 tons as compared with 577,805 tons on Sept. 30.

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to Oct. 1 were 2,110,934 tons as compared with 1,321,452 tons for the same period last year.

Bituminous Shipments for the same periods were 12,610,557 for the current year as compared with 9,544,129 in 1912, making gross of 14,721,491 for 1913 and 10,865,581 in 1912.

NORFOLK & WESTERN

The following is a statement of the tonnage shipped over this road during September, 1913, and for the nine months ending Sept. 30, as compared with corresponding periods of 1912 in short tons:

Coal	1912	1913	1912	1913
Tidewater, foreign.......	68,672	107,814	1,094,529	1,236,387
Tidewater, coastwise.....	331,489	295,402	2,768,700	2,892,968
Domestic...............	1,528,376	1,706,260	13,245,863	13,805,544
Coke				
Tidewater, foreign.......	....	....	52,762	27,189
Domestic...............	113,035	121,451	1,014,174	1,153,761
Total..............	2,041,572	2,230,927	18,176,028	19,115,859

COAL FREIGHT DECISIONS

I. C. C. No. 4652—Lebanon (Kentucky) Commercial Club vs. Louisville & Nashville R.R. Co., et al.

Local rates for the transportation of bituminous coal in carloads from mines located on the Louisville & Nashville R.R. in Virginia and Tennessee to Louisville, Ky., are less than to Lebanon, Ky., an intermediate local point 67 miles nearer to the mines than is Louisville, and vary according to the grade of the coal, while the rates to Lebanon are not so varied; **Held:**

That as the rates to Louisville are influenced largely by the movement of bituminous coal by the Ohio River and by competing rail carriers, the lower and varied rates to that point have not been shown to be unjustly discriminatory as against Lebanon.—**Opinion No. 2432.**

FOREIGN MARKETS

GREAT BRITAIN

Oct. 31—The demand for practically all classes of large and small coals continues active and admiralty list coals particularly are difficult to secure for early positions. Tonnage is being delayed by stormy weather but the docks are fairly well supplied with ready vessels. Outputs are improving somewhat, although still below normal. Quotations are approximately as follows:

Best Welsh steam......	$4.80@4.92	Best Monmouthshires..	$3.96@4.08
Best seconds..........	4.56@4.68	Seconds..............	3.72@3.90
Seconds...............	4.32@4.44	Best Cardiff smalls	2.52@2.64
Best dry coals.........	4.32@4.56	Seconds..............	2.34@2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

AUSTRIA

Coal exports for the first half of the current year amounted to 2,307,998 tons as compared with 2,218,602 for the same period last year. Exports to the United States for the same periods were, 42,229 and 46,474 respectively; to Canada 15,256 against 17,520 in 1912 and to the Philippines 18,692 and 43,189 respectively.

SPANISH IMPORTS

Coal imports into Spain for the eight months to Aug. 31 of the current year were 1,818,354 metric tons, compared with 1,486,111 tons for the same period last year. Coke imports for this period of the current year were 239,507 tons as compared with 242,355 tons for the same period last year.

Martinique (French West Indies)—Total coal imports into this port in 1912 amounted to 392,628 tons of which the United States furnished 376,734 tons.

Australia—A notable feature of Newcastle trade last year was the large increase in the quantity of coal exported to places beyond the State, the total being 5,030,308 tons, valued at $12,739,006 in 1912 as compared with 4,061,780 tons, valued at $10,301,981 in 1911.

In the foreign markets a slump may occur at any time, to the loss of the shippers; even where contracts have been entered into, the increase in freights may destroy the profits. That was the case in respect to the coal sent to some foreign markets during the last six or eight months. Freight rose to such a figure that even coal of a good quality realized only 75c. or $1 a ton after all charges were met. At these figures the companies lost on every ton handled.

Among foreign consumers of Newcastle coal Chile easily stands first and during 1912 took a very large quantity. Coal was also placed in other markets, and a fair quantity went to the East. However, in the latter field freights are a big handicap, as Japanese vessels are able to take coal to Manila, Singapore, and other Indian ports and get return cargo. Until rates are more favorable, the prospects are not good for placing a great quantity of coal in the Eastern markets.

Exports to the United States fell of sharply to 129,252 tons in 1912 as compared with 203,128 tons during 1911.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Nov. 8:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products...........	..	..	80	87	80
American Coal Products Pref........	..	..	105	109½	102
Colorado Fuel & Iron..............	29⅝	27⅜	27⅜	41½	24½
Colorado Fuel & Iron Pref..........	....	....	155	155	150
Consolidation Coal of Maryland......	....	....	102½	102½	102½
Lehigh Valley Coal Sales...........	225	210	215	....	....
Island Creek Coal Com.............	48⅛	47	47½	53½	47
Island Creek Coal Pref.............	84	83½	83½	85	80
Pittsburgh Coal..................	20	20	20	24⅜	14½
Pittsburgh Coal Pref..............	89¾	89⅛	89⅛	95	73
Pond Creek......................	18¾	18	18	23¾	16½
Reading.........................	161¼	158⅝	159	171	151⅜
Reading 1st Pref..................	84	84	84	92½	82½
Reading 2nd Pref..................	86	85	85	95	84
Virginia Iron, Coal & Coke.........	42¼	40⅛	40⅛	54	37

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s.........	93	95	93½	93½	93½	99⅛
Colo. F. & I. gen. 6s............	104	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.........	78	80¼	79¾	Oct. '13	77½	85
Cons. Ind. Coal Me. 1st 5s.........	78	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s.........	..	88⅝	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s........	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s.......	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s........	..	86	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s......	78	79½	78	Oct. '13	73	80½
Tenn. Coal gen. 5s...............	..	98½	97¾	Oct. '13	97¾	103
Birm. Div. 1st consol. 6s.........	100⅞	101½	100⅞	Oct. '13	100⅝	103
Tenn. Div. 1st g 6s..............	100⅞	102½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s..........	..	..	103	July '13	103	103
Utah Fuel 1st g 5s................	..	..	..	.....	..	..
Victor Fuel 1st s f 5s.............	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s........	92½	94	93	Oct. '13	92	98

No important dividends were announced during the week.

FINANCIAL DEPARTMENT

Nova Scotia Steel & Coal Co.

President Robert E. Harris reports for the year 1912 as follows:

Results—The depression in the United States also depressed the price of and restricted the market for our ore in that country. Another difficulty was the great coal strike in Great Britain, during the spring of 1912, which closed down for several months a large proportion of the blast furnaces of that country, with the result that our market there for Wabana ore was practically cut off for the balance of the year.

In view of these adverse conditions, we may congratulate ourselves upon the fact that our profits were as large as they were, namely, $1,000,610 [contrasting with $1,019,392 in 1911], while, after paying our usual dividends of 8% on the preferred and 6% on the common shares, we carried $452,601 to profit and loss, which is only $56,000 less than in 1911.

Additions—During 1912 we made further large expenditures [aggregating $1,279,569] in improving our plant and developing our resources. We contemplate further expenditures along the current year in opening up a new colliery at Sydney Mines, further developments at Wabana and some improvements and additions to plant, which would give a further increase in outputs and from which we are warranted in expenditure made on capital account in 1912 and the contemplated expenditure of the present year, we have since the beginning of this present year disposed of $2,000,000 treasury debenture stock.

Eight Years' Record—In March, 1905, the board elected me as president. A comparison of some figures for 1904 may prove interesting.

1. Capital, etc.	Stock, Bonds, etc.	Profits	Employees	Wages	Per Man
1904	$9,859,800	$501,337	3,449	$1,609,754	$467
1912	14,000,000	1,000,609	5,600	3,192,498	570
Increase	42%	100%	62%	100%	22%
2. Output (in Tons)	Ore Mined	Coal Mined	Pig Iron	Ingots	Forged, etc
1904	246,022	476,521	31,567	30,000	25,958
1912	533,000	841,528	68,784	77,940	71,284
Increase	116%	76%	118%	160%	175%

[Royalty paid in 1912 to Govt. of Nova Scotia on coal mined, $76,128.]

Output of Calendar Years (in Tons).

	Coal	Wab. Ore	Coke	Pig Iron	Steel Ing.	Steel Bill.	Bars, etc.
1912	841,528	555,000	85,334	68,784	77,940	71,284	(?)
1911	780,468	521,011	97,580	84,497	83,718	78,004	(?)
1910	847,176	532,058	90,360	65,484	73,019	59,244	50,915
1909	809,341	460,387	87,816	58,676	64,240	52,931	45,090

RESULTS FOR CALENDAR YEARS

	1912	1911	1910	1909
Profits for the year	$1,000,610	$1,019,392	$1,140,504	$799,978
Government bounties *a*	....	....	....	107,971
Total profits	$1,000,610	$1,019,392	$1,140,504	$907,949
Balance brought forward	508,545	500,603	336,807	1,219,221
Deduct 20% stock div. Declared Dec. 1909	....	....	....	1,000,000
Total available	$1,509,155	$1,519,995	$1,477,311	$1,127,170
Deduct				
Interest on bonds, etc.	$352,311	$291,169	$248,000	$247,837
Int. on debenture stock	60,000	60,000	60,000	30,000
Depreciation; renewals	92,196	96,124	79,371	77,669
Div. on pref. stock (8%)	82,400	82,400	82,400	82,400
Div. on common stock	(6) 360,000	(6) 360,000	(4½) 270,000	(1) 60,000
Disc., etc., on bds. issued	....	....	218,103	*b*184,453
Improvements and betterments	61,010	73,881		52,174
Sinking fund and misc.	48,637	47,876	18,834	55,830
Total	$1,056,554	$1,011,450	$976,708	$790,363
Surplus carried forward	$452,601	$508,545	$500,603	$336,807

a Under the Act of April 27, 1907 the Government bounties expire in 1910.
b Commissions and premiums on converting bond issues written off.

BALANCE SHEET DECEMBER 31

Assets—	1912	1911	1910	1909
Property and mines	$15,670,624	$14,489,286	$13,490,554	$12,582,191
Inventories	1,714,184	1,338,128	1,245,682	1,124,259
Ledger accounts and bills rec.	907,485	590,543	606,857	662,280
Cash	328,594	397,289	498,788	207,029
Total	$18,620,877	$16,815,247	$15,841,881	$14,585,759
Liabilities—				
Preferred stock	$1,030,000	$1,030,000	$1,030,000	$1,030,000
Common stock	6,000,000	6,000,000	6,000,000	6,000,000
Bonds	5,946,809	4,933,900	4,960,000	3,500,000
Sinking fund	53,556	26,101	....	607,459
Debenture stock	1,000,000	1,000,000	1,000,000	1,000,000
General reserve	750,000	750,000	750,000	750,000
Bills payable	490,000	775,000	....	....
Pay-rolls and accounts not due	534,020	440,691	304,597	193,551
Funds at cred. East. Car Co., Ltd.	971,599	....	....	....
Coupons (January)	148,670	123,347	124,000	87,500
Coupons not presented	1,529	1,540	843	....
Deb. stock int. Jan. 1	30,000	30,000	30,000	30,000
Div. on pref. Jan. 15	20,600	20,600	20,600	20,600
Div. on common Jan. 15	90,000	90,000	75,000	60,000
Res've for depr., etc.	1,029,270	1,023,332	994,624	924,562
Insurance funds	72,223	62,191	51,614	45,280
Profit and loss	452,601	508,545	500,603	336,807
Total	$18,620,877	$16,815,247	$15,841,881	$14,585,759

⁂

Pocahontas Coal & Coke Co.

The 17th annual report of the N. & W. Ry. embodies the following, re the Pocahontas Coal & Coke:

The production of coal during the year from lands leased to mining companies by the Pocahontas Coal & Coke Co., aggregated 12,244,736 net tons, an increase of 954,697 tons or 8.46% over the preceding year. About 91,139 tons were consumed at the mines and 1,171,887 tons were converted into coke. From these lands, your company received for shipment 9,953,252 net tons of revenue coal, 725,765 tons of revenue coke and 1,004,424 tons of coal for its fuel supply. From other lands on your Company's lines, it received for shipment 10,535,786 net tons of revenue coal, 842,283 tons of revenue coke and 1,722,895 tons of coal for its fuel supply.

The sinking fund, provided for in the Pocahontas Coal & Coke Co.'s Purchase Money First Mortgage, dated Dec. 2, 1901, amounted in the calendar year 1912 to $266,627.06. Through this and other sums paid to the Trustee under the terms of the mortgage, bonds aggregating $302,000 were purchased and canceled. From the beginning of its operation in 1906 to date, the sinking fund has received from royalties on coal mined the sum of $1,425,798.71 and from sales of lands the sum of $124,800.52, a total of $1,550,599.23; by means of which there have been purchased and retired bonds to the aggregate amount of $1,716,000, reducing the outstanding bonds to $18,284,000, and leaving a cash balance of $847.48 in the sinking fund.

The income of the Pocahontas Coal & Coke Co., after providing for the mortgage sinking fund, was insufficient for the payment of the interest on its mortgage bonds. The deficiency was advanced by your company and the Pennsylvania Lines West of Pittsburgh, your company's share, two-thirds, or $92,999, being charged to income.

The work of unifying the company's properties, completing its titles and surveying, monumenting and mapping its lands has made further substantial progress. Your company has advanced to the Pocahontas Coal & Coke Co. for these purposes the further sum of $20,000, making a total to date of $1,292,000 charged in your company's accounts as advances to that company for property expenditures.

⁂

Colorado Fuel & Iron Co.—The additions made during last year's operations brought the gross working capital of this company up to $19,130,000, which is equal to more than half of the entire outstanding capital stock. In spite of the encouraging progress the company has been making, however, it must be remembered that the $14,000,000 five per cent. 10-year convertible debentures owned by the Colorado Industrial Co. matured in August, 1911, and are now overdue.

Susquehanna Coal Co.—In view of the fact that this company paid its first dividends last year, it would seem that the Pennsylvania R.R. would have ample cause for wishing to dispose of such an unprofitable investment. The disbursements amounted to only $85,472 or 4% on the $2,136,800 stock all of which is owned by the railroad company. In 1908 and 1909 interest payments amounting to $360,000 or about 6% on the investment were made each year. This fell off to $240,000 in 1910, but increased again to $300,000 in the two succeeding years.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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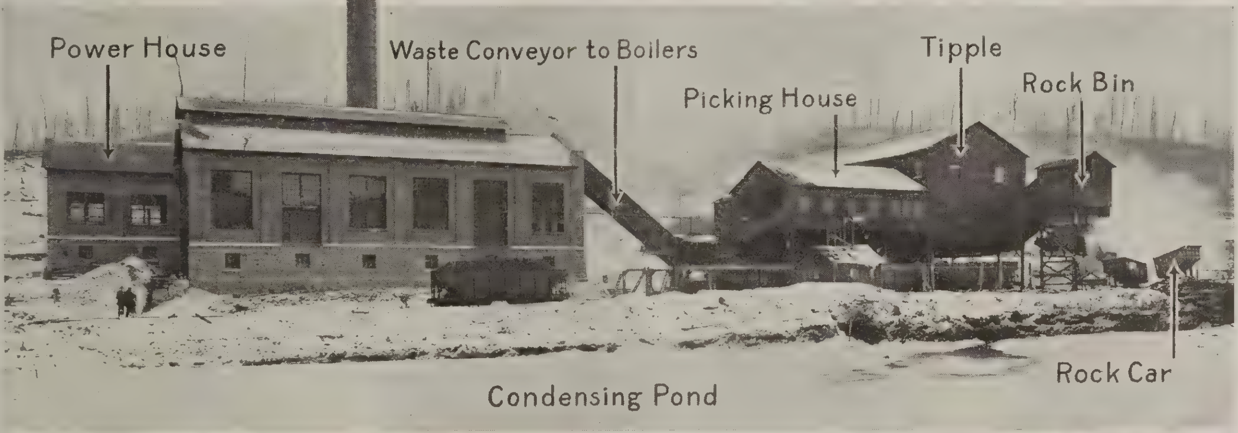

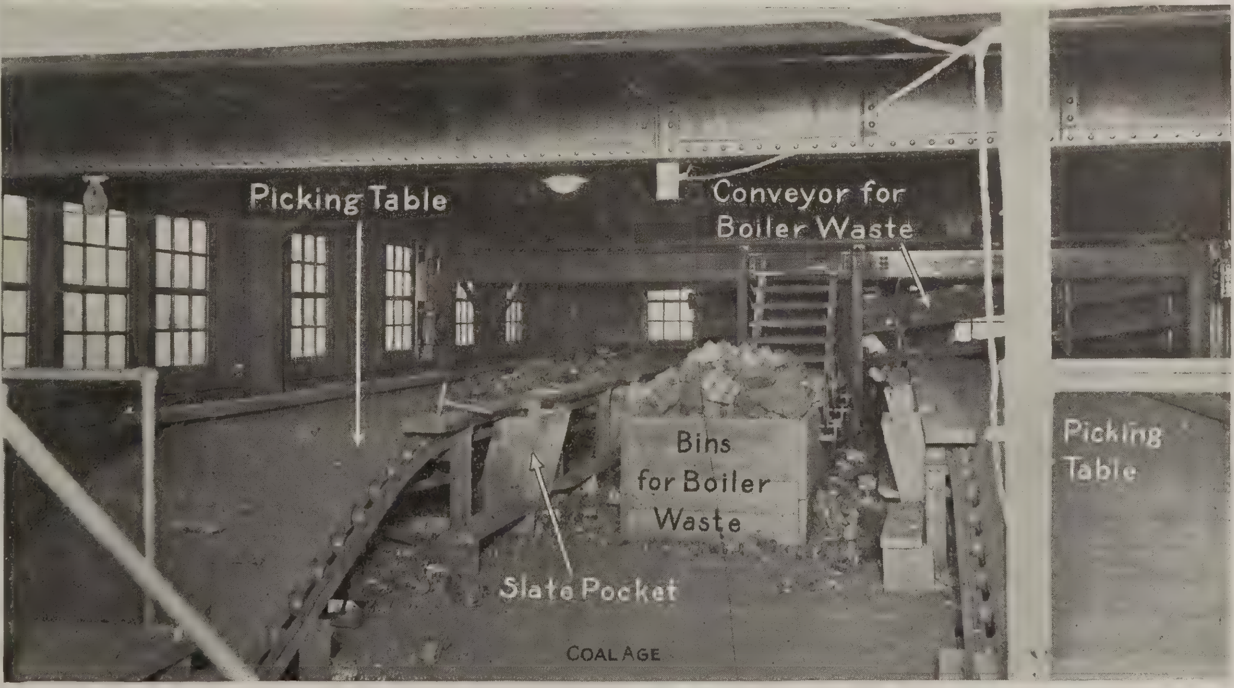

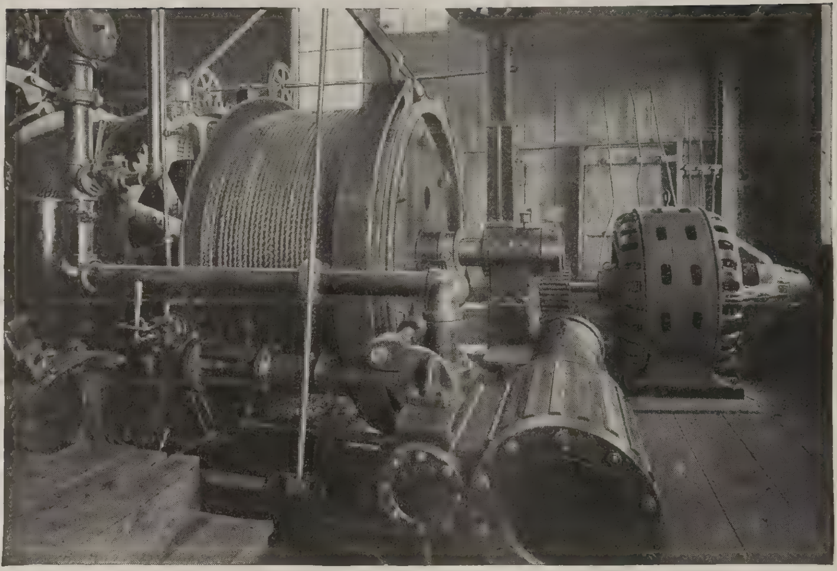

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COAL AGE

FLOYD W. PARSONS, *Editor.*

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None sent free regularly, no returns from news companies, no back numbers

The Weekly Ad-Talk Page

The Market Place

HERE'S Adventure, here's Romance,
Here's the Proof that men advance;
Here is Progress, here is Change,
Here are wonders new and strange,
Proffered right before your eyes
By the men who advertise!

Can't you see them? Can't you sense
Spirit of a day intense,
Glory of a glowing time,
Marvel of an age sublime—
In these pages crowded with
Things that once were but a myth,
Now presented to your view
As a goodly dream—come true!

If we've conquered land and sea
With our vast machinery,
If we probe the depths and dare
Highest reaches of the air,
If, by dint of steel and steam
We are winning to our dream—
HERE the reason why is seen
Fate must bow unto our will,
Puncher, hoist, conveyor, screen
Pump and fan and lamp and drill—
As they help us get our coal,
So they help us win our goal.

Not a steamer plows the deep
Not a train through space is hurled,
Not an engine shaft is whirled,
Not an aeroplane may sweep
Battling with the vagrant breeze
High above the humdrum world,
But acknowledges a debt
To the power of the coal,
Which these tools go down and get
From the blackness of the hole.

Therefore we can truly say,
HERE'S the glory of Today,
HERE is Progress, HERE is Change,
HERE is all the wondrous range
Of the miracles of man
For your seeking eyes to scan;
Here's the magic of the ages
—In the Advertising Pages.

COAL AGE

Vol. 4 NEW YORK, NOVEMBER 22, 1913 No. 21

The District Superintendent

By Berton Braley

Written expressly for Coal Age

I

He is the boss of the outfit,
He is the Chief, the Nob,
The Heap Big Noise of all the boys,
The Lad with the Heavy Job,
The Owner's the upper millstone
And the men in the mine the nether,
And the supe, I ween, is in between,
And they're grinding him fine, together!

II

For the owners howl for profits
And the miners howl for pay,
And both sides whoop at the poor old Supe,
He catches it either way;
He's always in boiling water,
His life is never tame,
Whatever goes wrong it's the same old song
—He's certain to get the blame!

III

When dividends sag a little,
When work gets a trifle slack,
The working crew and the owners too
Just jump on the Super's back;
If the timbers crack in a runway,
Or a mule should get the croup,
Or, the lights go out you hear this shout,
"Oh send for the District Supe!"

IV

He always sleeps with his boots on,
He's never off shift at all,
For he's got to leap from his hard-earned sleep
Whenever he gets the call,
And if there is "hell a poppin' "
From cave-in or damp or fire,
He leads the fight by day or night
With a courage that may not tire.

V

He's boss of the hoist and breaker,
Of entry and room and shaft,
By study and fret and toil and sweat
He's mastered the mining craft,
He carries a load of worries,
His job is a damn hard berth,
He goes the route—and his pay's about
A quarter of what he's worth!

IDEAS AND SUGGESTIONS

Mine Accidents and Their Relation to Management

By Ralph D. Brown*

The industrial and labor problems become more complicated every day, bringing before us more forcibly the question of the inter-dependence of man. Every person, whether he be laborer or captain of industry, owes his fellow workers all possible diligence in the prevention of accidents. This is his social duty. The extensive "Safety First" movement is without force unless it is backed by scientific coöperation of employer and employee.

The enthusiasm of first-aid meets which have been frequently held in various coal-mine camps is induced more by the love of popular approval and rivalry than by any sense of duty. If rivalry is to be appealed to, why not have a contest with a prize for the miner who kept his working place in the safest condition without unnecessary cost, or a prize for the organized rescue party that could reproduce ventilation in a trial district under conditions similar to those met with in mine explosions or fires?

Perhaps the cheering spectators, consisting of appreciative mothers and sisters could not be provided, but the same publicity might be procured in another way. It is not our intention to detract from the value of first aid, but simply to point out that the results of negligence and ignorance should not be given prominence over the study of the cause and the prevention of accidents.

Cost of Accidents

Disregarding the human or ethical side of the question, what is its economical value? In order to apply our arguments in as practical a manner as possible, let us assume a bituminous mine in operation in the Illinois field, producing 2000 tons of coal per eight-hour shift. With this idea in view, the information in accompanying table was taken from the Illinois Coal Report for 1912.

TABLE OF ACCIDENTS IN ILLINOIS MINES—1912

Mine	Tons Mined 1912	Men Employed	Accidents	
			Fatal	Injured
O'Gara No. 4	244,900	292	1	5
Wasson Coal Company	259,421	258	2	7
W. P. Rend Coal Company	267,441	295	3	5
Franklin Coal & Coke Co.	212,112	308	1	3
Big Muddy Coal & Iron Co.	216,445	245	0	3
Southern Coal & Mining Co.	331,987	285	1	5
Peabody Coal Company No.				
Peabody Coal Co., No. 14	366,937	390	1	4
Black Diamond Coal Co.	311,600	282	1	0
Bunsen Coal Co., No. 3	297,588	296	1	4
Clark Coal Co., Empire No. 2	253,414	280	1	2
LaSalle County Coal & Coke Co.	205,737	443	1	7
Superior Coal Co., No. 1	673,717	562	2	6
Average Mine	295,107	328	1¼	4¼

A representative mine was chosen for each district in order to obtain a fair average, and only those accidents where the injured was absent from work more than 30 days were included.

From this data we may assume that the average per year is one man killed and four seriously injured, for every three hundred men employed. Computing then the average time required for the injured to return to work, we find it is near sixty days. We will say that eight weeks is a fair figure. In case the operator chose to accept the protection of the Workman's Compensation Law of Illinois, it is possible to obtain an estimated value of the actual monetary loss for the average mine which was assumed before. One death claim at $3500 and four serious injuries requiring an absence of eight weeks' duration each, at $12.50 per week, would amount to $3900. Add to this claims for twelve nonserious injuries and numerous minor claims, and we have a total near $5500, which is a conservative estimate.

As a check on the above calculation, let us employ another method. A large protective insurance company operating in this field assumed all risk up to $5000 per individual at the rate of 2¼ per cent. of the total payroll. The average mine assumed with a yearly tonnage of 295,107, and an average labor cost of 75c. per ton, would give us $221,330 for the payroll of the working days. Add to this $20,000 for the idle days' cost and we have a yearly payroll of $241,330. Adopting the rate of 2¼ per cent. for insurance, we find that the protection for this mine will cost $5428. The comparison between this figure and the one obtained previously, indicates that we are near a fair value. There are also other items that really enter into an insurance cost, such as the hazard of a serious explosion in a large producing mine, or the loss of time due to a portion of the mine being closed on account of local fires, etc.

More Efficient Supervision Desirable

There can be no doubt but that a large portion of this insurance cost may be reduced by efficient management. Each mine may have its own peculiar problems, but general principles will apply everywhere. Much has been written in regard to more efficient management of factories, but little has been written that applies to mining. The management of a large coal mine is entirely different from that of a factory for the followng reasons: 1. The labor is more highly organized. 2. The labor is more inaccessible to supervision. 3. The product requires little technical skill from the miner. 4. The negligence of one may jeopardize the lives of all.

To obtain results in a mine, many bosses are required to personally oversee the various labors being performed. It is easy to shirk in the dark recesses of the mine, and it is also easy to break the state laws, which are made for the protection of the miner. The act may be through ignorance, or it may be done maliciously, but it is not so liable to happen if a boss is known to be constantly near. Why not apply some of the $5500 yearly expense in a practical way by hiring additional bosses as assistants to the mine manager? Let each assistant have his own special district for which he alone is responsible. The state records show that about 46 per cent. of all accidents are caused by falls of slate, rock or coal, and it is this class of injuries that can be reduced at least one-half if efficient supervision is provided. Other classes may also be reduced materially, but here the cause of the accidents can be anticipated.

---

*O'Gara Coal Co., Harrisburg, Ill.

EACH COMPANY SHOULD EMPLOY AN ASSISTANT MINE MANAGER

If the mine is provided with an assistant mine manager in charge of districts working 50 men or less, the following duties of managements which are ordinarily impossible in the rush of getting out coal, could be more readily carried out:

1. Visit every working place or workman at least once every two hours.
2. Instruct miners and timbermen as to the exact location and manner of setting all timbers.
3. Personally order and inspect the delivery of all timber and track material for each working place.
4. Permit no material to be lost in the abandoned works. In some mines this item alone will pay the salaries of all assistant mine managers.
5. Allow no shot to be fired until the drilled hole and the prepared cartridge have been inspected.
6. Provide a good air current and maintain full pillar width in all working places.
7. Pay especial attention to all day men who may be doing shift work, due to the fact that their working places were unavailable at that time from falls of rock or other causes.
8. Maintain discipline and justice at all times.
9. In case a large percentage of the labor is foreign, at least one of the assistant bosses should be able to give instruction in the miner's native tongue. Accidents due to ignorance could be much reduced if a full explanation of the law and its application was made to all concerned. This is especially true in the case of gaseous mines where the safety of all is in the hands of each employee.

A SET OF GENERAL RULES NOT POSSIBLE

It is useless to lay down fast rules to cover every case, for each mine is a special problem. In some instances the labor question is predominate, in others, the physical character of the operation is the principal problem to be solved. Consequently, no special organization can produce the best results in all localities. There is one rule, however, that applies to all, and that is, that we insist that all company men comply with the law in every particular, and that no disobedience of the law be permitted, regardless of the cost or the question of the justice of the statute. The time to fight an adverse law is before it is passed, and not after. If the company complies with the law, it is much easier to maintain discipline among the men, and discipline is preëminently necessary.

THREE IMPORTANT ISSUES

In conclusion, we desire to point out three important issues in the safety-first movement, that will need to be more fully developed before this movement can be greatly successful:

1. Strict obedience to the law.
2. Better educational supervision.
3. Coöperation of the U. M. W. of A.

The third issue has received little attention to date, but is absolutely essential for a satisfactory solution of the problem of scientific prevention of accidents.

Education Is Not the Only Requisite in Mine Superintendence

By CHARLTON DIXON*

There have been several articles published in COAL AGE recently, advocating the acquirement of more knowledge, profounder study and greater mental development generally for mine officials, which is commendable. The same advice might be given to the important men of other vocations with equal applicability; in fact, to everyone.

But after having been employed in a capacity which brought me in contact with a large number of mine superintendents and foremen, many of whom it was my duty to report on, I am convinced the desideratum is not a lack of knowledge so much as energy in applying the information already acquired.

With few exceptions, they were intelligent men, readers of general literature, but particularly that pertaining to their calling. One was a fair botanist, several were musicians, another was a preacher, a couple were quondam teachers and a few had been educated as engineers. In spite of such abundant education, mules were wading through seas of mud, motors traveling over submerged track, doing work particularly adapted to submarines. roads were in bad condition, rooms being lost for want of proper timbering, entries going awry, animals overworked, motors loafing on account of side tracks being too far back from the face, ventilation was poor, inspectors were dissatisfied and men were growling. The cause was not due to dearth of knowledge, but rather the failure of these officials to concentrate their education and apply it in a practical way.

A MINE SUPERINTENDENT MUST BE ON THE FIRING LINE

The above conditions were nearly always attributable to the superintendent's propensity to avoid the inconveniences of the firing line. In other words, inspection trips through the mines were only made when they could no longer be avoided. In order to maintain his interest in a mine, the superintendent must spend much time underground, so as to keep thoroughly posted on all that is being done. If such a policy is not followed, deterioration sets in, bringing a train of trouble in its wake; this takes the spirit out of the superintendent and foremen, filling them with regrets and future fears. The result is a wild form of paralysis of the managing faculties, often culminating in dismissal of the superintendent, the position being given to someone of less wisdom but more energy.

The combination of thorough knowledge with indefatigable physical activity is necessary to success in many vocations, but particularly so in the managing of a coal mine. It cannot be done by proxy. The work to be done efficiently must be constantly under personal surveillance. Yet many superintendents visit the inside but once a week, a few go under once a month, others only when they have to. It is a fact, therefore, that for every dollar lost by want of knowledge in mine officials, three are lost through lack of energy and application.

⁂

The Béthune Mining Co., of France, in 1904, began experimenting with reinforced concrete as a material for lining the entries, which were walled with 20 in. of ferro-concrete, supporting rolled joists which carried the roof. The experiment was so successful that the work was extended until several miles of roadway are now lined with reinforced concrete.

---

*Pittsburgh, Penn.

Pillar-Drawing Methods in Fairmont Region

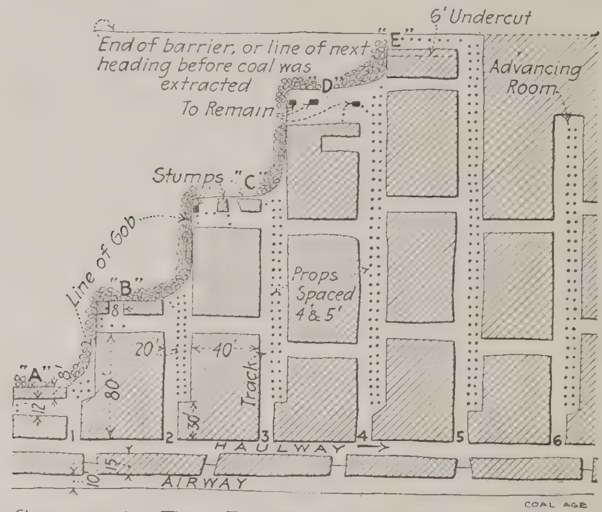
By A. W. Hesse.[*]

SYNOPSIS—The method of extraction of pillars in the Fairmont field results in a loss of about 2 per cent. of the coal, in pillars so small that they crush readily when the weight falls on them. At the same time the men are protected as far as possible from roof falls.

⁂

The method of mining coal in the Fairmont region has been already briefly described,[†] but how to keep a pillar line just right, when robbing is in progress, requires more detailed explanation than was given in that article.

All practical mining men know that the weight, which falls on the pillars when robbing commences, must be relieved by breaking the overlying strata covering the territory from which the pillars have just been extracted. Failure to do this means, of course, that the remaining stumps and ribs must carry this weight, frequently causing the coal to squeeze, and making its extraction difficult and dangerous, if the coal is recovered at all.



Sketch 1. The Fairmont Method of Pillar Drawing

Splitting Pillar Is Bad Policy

It has always been the policy of the Consolidation Coal Co. to discourage the splitting of pillars, except when all other methods were proved or considered out of the question. Such splitting usually results in the loss of one wing when the pillar is large, and frequently the loss of both followed by a squeeze over the remaining pillars if the rooms have been driven up the full length.

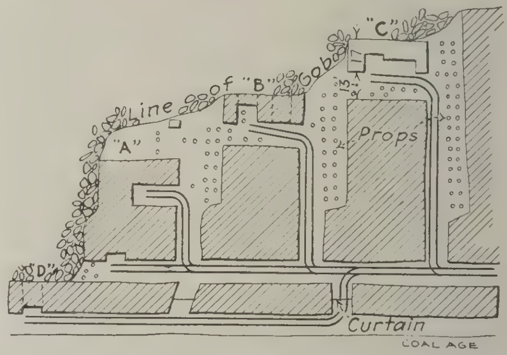
The ideal situation is to have the rooms driven up just in time to be able to return at once with the pillar. However, this is not so frequently attained as it is advocated.

The realization of this uncertainty has caused gradual widening between room centers. This gives the miner one, in fact two or three, opportunities of recovering his stumps without endangering his life or the loss of the rear pillars. If the rooms or several rooms contain falls, he may lay his track up a clear room, traverse the stumps of the rooms above, and reach the rear end of the last pillar and extract it without much fear of being cut off on the rear. He may also clean part of one room, split a stump, and thus reach the rear stump. This has been done even while the weight was causing considerable anxiety. The width of the pillars averaged 40 feet.

Where Crosscuts Are Not Favorable

Sketch No. 1 shows a series of working places on a room heading, of which five are pillars and one an advancing room. You will note at *A* a crosscut driven through the large pillar about 8 ft. back from the end. The driving of this roadway is the first step, the idea being not to expose a large block of coal to the advancing weight for too long a period of time.

The next step is shown at *B* and consists in cutting back through the 8-ft. stump to the gob, leaving to the left a square stump about 8 ft. through. This stump is then trimmed down to a size consistent with safety, usually about 3 ft., as shown at *C*.



Sketch 2. Modification of System near Original Crosscuts

Another crosscut is made in the remaining block of coal to the right, shown at *B*, leaving two stumps, as shown at *C*. The stump to the left is first trimmed down, then the track laid straight up the room and the remaining stump drawn. The finished operation usually leaves the condition as shown at *D*.

Quite frequently the drawing of the props will cause a cave at this point, but usually the next crosscut is driven before the fall occurs. At *E* where the last crosscut was driven and a barrier is left to protect the next heading, a cut or two across the rear end of the last stump gives the miner much machine coal.

Where Crosscuts Make Slab Too Thick

On Sketch No. 2 is shown a condition at *C*, which may occur due to a previously driven crosscut. This stump is 17 ft. thick, but still too thin to permit another crosscut to be driven through it. Therefore a slab is taken out for a width of 28 ft. before a cut-through is made to the rear as heretofore shown. This condition necessarily requires more timbering, which, if neglected, might cause considerable trouble, because a fall might prevent the complete recovery of the remaining coal of this stump.

If this system is consistently followed there is little doubt but that the recovery will be large, though a "slip-od" foreman will ruin a mine in a short time if he s not give it the attention it deserves day after day. e work requires considerable attention and often makes cost per ton high, especially if roof conditions are r much water has to be drained and slate-handling ilities are unfavorable. It frequently reaches that ximum value where the function, recovery, becomes re important than the real object of mining coal, king a profit.

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[*] Assistant chief engineer, Consolidation Coal Co., Fairmont, W. Va.

[†] "Coal Age," Nov. 11, 1911.

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Friction Rail Brake

The friction rail brake is a device for restraining the tion of railroad cars under tipples. The grade is ar-nged so as to assure forward motion at all times under vity and the necessary restraint is obtained by use of friction rail brake.

Usually a third rail is spiked in the center of the track, ighing from 40 lb. to 110 lb., no fishplates being used the joints. On this rail the brake or clamp travels car-ng a hook to which is attached a chain by which the is "tethered." Motion is permitted or restrained by raising or lowering, respectively, of a lever formed at short-arm end into an eccentric from which the clutch-g power of the shoe on the rail is obtained. It is also ed with a ratchet arrangement which works automati-ly when the clutch is applied rendering any sudden accidental releasing of the brake impossible.

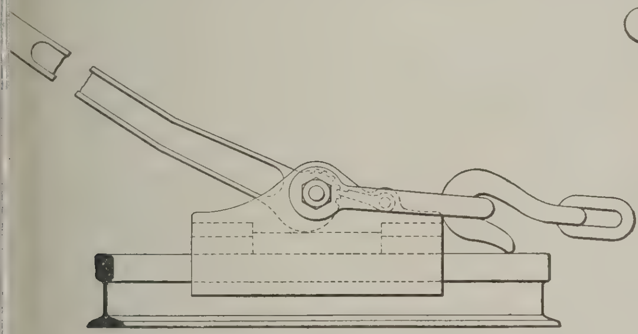

Fig. 1. Car Brake Working on Third Rail

The action of the clutch upon the rail is so positive that will stop a loaded car in motion, dead still at the will the man handling the lever and will break a ¾-in. in before slipping if the load is sufficiently heavy.

When the lever is thrown over toward the hook the entric is entirely released and the brake block can be rried or pushed back on the rail ready for another car.

Another form of brake is made suitable for use on an linary track in connection with patented fishplates. th types of rail brakes are made by the Miller Supply ., of Huntingdon, W. Va. These retarders are more iable than car brakes on a damp day or a steep grade.

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New Development of American Mining Congress

The Committee on Ways and Means of the American ning Congress, W. T. Griffith, chairman, reported at recent Philadelphia session as follows and the sug-stions were accepted by the unanimous vote of the mem-rs:

The Committee on Ways and Means recommend that an ditional class of members, to be known as subscribing members, be created in this congress, which shall consist of corporations only and who shall have no right to vote; that the portion of funds to be raised from any state may be apportioned by the Ways and Means Committee for that state among all the mining corporations in the state in approximately such proportion as the value of the mining products of any corporation bears to the value of the total mining products of the state; that these subscribing members, in consideration of their subscriptions to the congress, shall have the right to receive all the publications, papers and other printed data of this congress and shall also have the right to request, from time to time, such information of a legislative and statistical nature, referring to mining questions, as the secretary may be able to supply from the records of the congress and it is further recommended that the secretary shall employ the necessary assistance to compile such data and to publish a bi-monthly bulletin which shall contain abstracts of pending legislation, opinions and other information of interest to the mining congress and this work be considered one of the important functions of the congress; that the Ways and Means Committee for each state as above mentioned shall consist of three members to be appointed yearly by the Executive Committee of the American Mining Congress and that the assessment for each state to be raised by these state committees shall, in the discretion of the Board of Directors, be approximately such a proportion of the total budget as the value of the mining products of each state bears to the value of the total mining products of the United States.

The smallness of the general apportionment and the lightness of the burden of any state or corporation under this scheme can be immediately seen by the record of the output prepared by the Government in which the total valuation of all products of the mines of this country are for the year 1911 in excess of two billion dollars. The total amount to be raised, we should suggest as a start, should be fifty thousand dollars, which is a small amount to provide for the proposed increased activities of the congress and this would show that for each million dollar output we are only asking for twenty-five dollars.

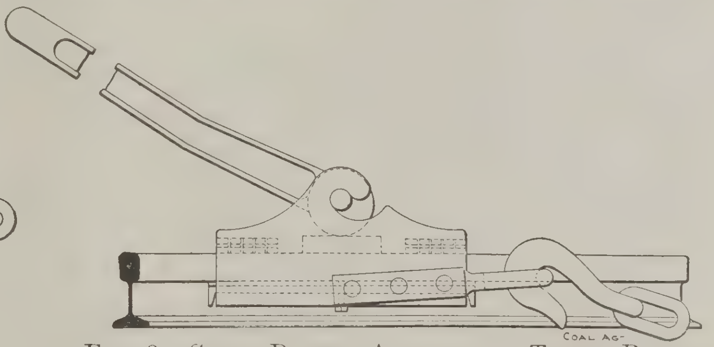

Fig. 2. Same Device Adapted to Track Rails

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West Virginia's Coal Production for 1912

The production of coal in West Virginia in 1912 reached a total of 66,786,687 short tons, valued at the mines at $62,792,234, according to the figures compiled by E. W. Parker, of the U. S. Geological Survey.

West Virginia is a vast coal field, all of the state west of the escarpment of the Allegheny Mountains being in the coal-bearing formation, the actual coal-producing area embracing 17,000 sq.m. out of a total of 24,022 sq.m. in the entire state.

All West Virginia coals are bituminous or semi-bituminous, and mostly high grade. Some cannel coal and a peculiar type known as "splint" is mined in the southern part of the state. The production for 1912 marked the maximum record. It was nearly as much as the total output of bituminous coal in the whole United States in 1882 and exceeded the total production of both anthracite and bituminous coal for the year 1877.

Cost of a 50-Coke-Oven Plant

SYNOPSIS—We give below the estimated cost of 50 beehive coke ovens. This estimate was made a few years ago by a well known authority on coke ovens for a mining operation in Tennessee. It was made in detail and is given as it was made. It is valuable to anyone contemplating the erection of beehive ovens, as well as to those who desire to make a comparison with any other plant.

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Excavating, tamping and filling	$3750.00
80,000 crown and lining brick, $24.00	4320.00
6,250 tile, 12 in. x 12 in. x 3 in. at $0.10	625,00
50 sets arches at $2.75	137.50
50 sets jambs, $2.75	137.50
100 rings, $1.80	180.00
75 tons fire clay, $3.00	225.00
2500 bbl. lime, $0.10	250.00
340 tons sand, $1.00	340.00
15,000 lb. coke oven door frames, $0.02½	375.00
50 coke oven valves, $0.75	37.50
50 pcs. in. x 18 in. pipe, $0.15	7.50
20 tons cast iron bowl pipe, 4 in. dia.	500.00
50 saddles for 4-in. bowl pipe 1-in. opening	75.00
50 coke ovens (labor)	1250.00
1600 yd. stone in place, $3.75	6000.00
30 tons railroad steel	900.00
500 railroad ties	125.00
33,000 lb. metal ties, $0.02½	825.00
1300 spikes, $0.02½	32.50
Total cost	$20,092.50

STEAM PLANT

1 125-hp. boiler	$1400.00
1 pump 10 x 5 x 18	200.00
1 injector	16.00
1 feedwater heater	300.00
Pipe and fittings	150.00
Engine and foundation	1200.00
Boiler and engine house	200.00
3 tanks	450.00
Total cost	$3916.00

SEPARATING PLANT

Bins	
50,000 ft. lumber at $18.00	$900.00
Doors and windows	13.00
Bolts and washers	200.00
Foundations	350.00
1 rotary screen for coal	1000.00
1 rotary screen for coke	750.00
Elevators coal	500.00
Elevators coke	500.00
Crushers coal	750.00
Crushers coke	750.00
Total Cost	$5713.00

STORAGE BINS

Storage bin	$200.00
Robinson washer, complete	15,000.00

HOUSES, STORE, ETC.

25 houses at $350.00	6250.00
1 house	750.00
1 store building complete with fixtures	1000.00
1 barn	300.00
1 tool house	100.00
Total cost	$8400.00
Laboratory	
Building	$200.00
Fixtures	600.00
Total cost	$800.00

EQUIPMENT

7 head live-stock, $150.00	$1050.00
2 larries, $325.00	650.00
1 tool box	10.00
2 stoves	10.00
12 leveling, $1.00 bars	12.00
2 levelling scrapers, $5.00	10.00
2 levelling barrows, $7.50	15.00
10 coke barrows, $9.00	90.00
10 sets hose, $5.00	50.00
20 scrapers, $3.50	70.00
1 railroad truck	25.00
10 running boards, $1.00	10.00
12 ladders, $0.75	9.00
1 drill press	50.00
1 pipe dies	90.00
1 steel stamp	2.50
1 set steel figures	2.50
1 carpenters vise	5.00
1 blacksmith combination vise	15.00
1 set branding irons	1.00
1 anvil	25.00
1 screw plate and dies	15.00
1 pair platform scales	40.00
1 100-ton railroad scales in place	950.00
1 Grindstone	10.00
50 grain sacks	9.00
2 carts	40.00
1 wagon	40.00
1 pump	450.00
Add 5 per cent	187.00
Total cost	$3943.80

Tools	
1 ax	$1.0
1 bar (spike)	1.0
1 bar (crow)	1.5
3 bars (pinch), $5.00	15.0
4 buckets, $0.40	1.6
2 brooms, $0.35	0.7
1 basket (feed)	0.5
6 brushes, $0.50	3.0
1 cold cutter	0.5
2 cars (oil), $1.00	2.0
2 chisels (cold), $0.50	1.0
1 cutter (H)	0.5
6 curry combs, $0.25	1.5
2 fullers, $0.50	1.0
2 flatteners, $0.50	1.0
6 files, $0.25	1.5
1 flue expander	15.0
2 hammers, set, $0.50	1.0
4 heading tools, $0.50	2.0
1 hatchet	0.5
3 hoes, $0.40	1.2
1 hoe (mason)	0.7
2 hammers (spike), $1.50	3.0
3 hammers, $0.75	2.2
2 hay forks, $0.75	1.5
1 jack (hoisting)	9.
1 jack (curving)	20
3 lanterns, $0.75	2
2 oilers, $0.50	1
2 picks (clay), $0.75	1
2 picks (RR), $0.75	1.
3 punches, $0.50	1.
6 padlocks	9
1 riveting machine	5
2 saws	2.
2 spirit levels, $2.00	4
1 square	1
1 set shoeing tools	5
2 swedges, $0.50	1.
6 shovels (coal), $0.75	4.
2 shovels (RR), $0.75	1.
1 sledge	0.
2 shovels long handle, $0.75	1
2 shovels scoop, $1.00	2.
1 syringe	0
1 pr. shears	1.
6 pr. tongs, $1.50	9
1 track gauge	3.
5 wrenches, (S), $0.75	3.
4 wrenches monkey, $0.75	3.
3 wrenches box, $0.75	2.
1 wagon jack	5
Total cost	$167.

RECAPITULATION OF COKE-OVEN ESTIMATE

50 coke ovens, bee hive type	$20,092
Steam plant	3916
Separating plant	5713
Storage bins	200.
Washing plant	15,000.
Houses, store, etc.	8400
Laboratory	800
Equipment	3943
Tools	167
Grand Total	$58,232.

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State Mine in Victoria, Australia

The province of Victoria has a state mine at Wonthagg which reports a profit of nearly $50,000 last year. I gross output was 470,261 tons for the 12 months a the daily tonnage was about 1800 tons. Only 454,42 tons were shipped to market, the rest being used by th miners and the power house.

The mining rate is 66.6c. per ton. This was fixed after a strike lasting from Apr. 4 to May 17. The me had demanded that the three-shift schedule be changed t two and in return the manager sought a reduction in th mining contract from 73 to 66.6c. per ton. Eventuall the men conceded this reduction. The average wag earned per day under the new contract is $3.29.

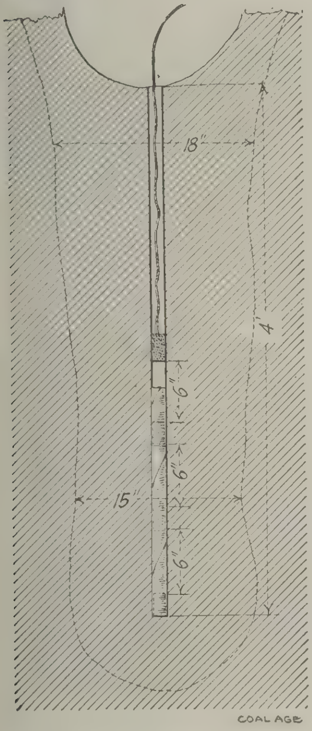
It is estimated that the coal area exploited by th Wonthaggi mine contains 26½ million tons. The are covered is 5100 acres. The plant uses electricity for hoisting, haulage, ventilation, coal cutting and pumping.

The equipment consists partly of engine-driven generating sets producing 3-phase alternating current at 520 volts and a frequency of 50 cycles. This is supplemente by Curtis turbo-alternators generating 530 kw. with exhaust and 1000 kw. with high-pressure steam.

The value of the plant is about $800,000 so the profi last year was over 6 per cent.

Blasting Pole Holes

The holes made for telephone and other poles can be blasted by electricity according to Vandeventer and Warren, telephone engineers, writing in the *Dupont Magazine.* The holes should be 4 ft. deep for a 20-ft. pole to 7 ft. for a 50-ft. The average hole is 4½ to 5 ft. deep. Poles are set for telephone service 150 to 175 ft. apart with an average of 35 to the mile. The holes have a diameter varying from 14 to 18 in. The cost of digging holes for 25-ft. poles by post-hole diggers is about 58c. each.



Arrangement of Cartridges

When blasting the holes by dynamite, the explosive should be distributed in the hole, as a charge at the bottom only, does not open the hole at the surface. A 4-ft. punch bar can be used for making the cartridge hole. It can be driven into place with a sledge and if knocked sidewise when driving can be removed without difficulty.

The Dynamite Should Be Divided into Short Cartridges

As the dynamite must be distributed, much time can be saved by making up cartridges of paper, 4 ft. 6 in. long, by rolling stiff wrapping paper round a stick of proper diameter and fastening four quarter sticks of 40 per cent. dynamite about 6 in. apart beginning at the bottom, as shown in the figure.

These small cartridges can be kept in place by the use of ordinary housewife's pins, stuck through the walls of the paper tube. This spaces the dynamite plugs properly and leaves a free space between them, thereby insuring the firing of the lower pieces, the cap always being placd in the top piece. Without the paper tube, there is some danger of the lower pieces not exploding, especially if much loose dirt intervenes. Water does not affect the proper exploding of the lower pieces, but loose soil does. A convenient way of placing the pieces of dynamite is to have a stick with marks 1, 2, 3, 4, etc., on it, and push the pieces into the tube one at a time and pin them in place.

There is no need for using an electric exploder, but the use of safety matches is suggested. The fuse need project only 2 or 3 in. above the surface, and should be bent to one side. The operator is safe in staying within a few feet of the hole, when the dynamite is exploded, as there is no general upheaval of earth. An ordinary post-hole digger is desirable for removing the loose earth. No digging bars are necessary, the earth being well broken. The average time for cleaning is from 5 to 10 min. and the cost for dynamite 8½c., fuse and matches, 1c.; labor, 14c.; supervision, 3c., in all 26½c. The explosion hardens the sides of the hole and makes tamping around the pole, when set, less laborious. About 30 to 50 holes a day can be made by 5 men.

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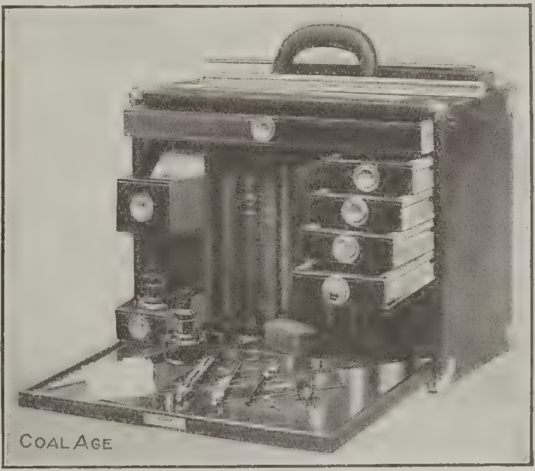
Draftsman's Chest

The draftsman's chest shown requires little explanation and is designed so as to be compact and at the same time to form a handy storage for all commonly used draftsmen's tools.

The case is covered with leatherette and the drawer fronts are solid mahogany. The top drawer is large enough to take scales, rules, etc., while the smaller drawers are used for the smaller instruments. The small drawer on the left is for a card index in connection with a vest-pocket, morocco-leather loose-leaf memorandum. The slide for ink bottles provides for three bottles and it will be noted that there is room for several reference books. The tray is the door or cover and is provided with brass cylinder locks and two keys. There is room provided back of the cover, when locked, for triangles, curves, etc., while under the drawers on the right-hand side there is provided a pigeonhole.



View of the Draftsman's Chest

This case is a recent product of the American Drafting Furniture Co., Rochester, N. Y.—*American Machinist.*

COLLIERY NOTES

The economical limit of animal haulage is reached at about 1500 feet.

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An acre of coal 1 ft. thick is estimated to contain about 1800 tons. From 1200 to 1400 tons is usually minable.

⁂

Experiments are being conducted in Germany to discover the usability of liquid air and liquid oxygen as explosives for mines. The liquid oxygen is mixed with aluminum powder and detonated, producing a force 2½ times that produced by black powder. One advantage that it possesses is that no bad fumes are produced.

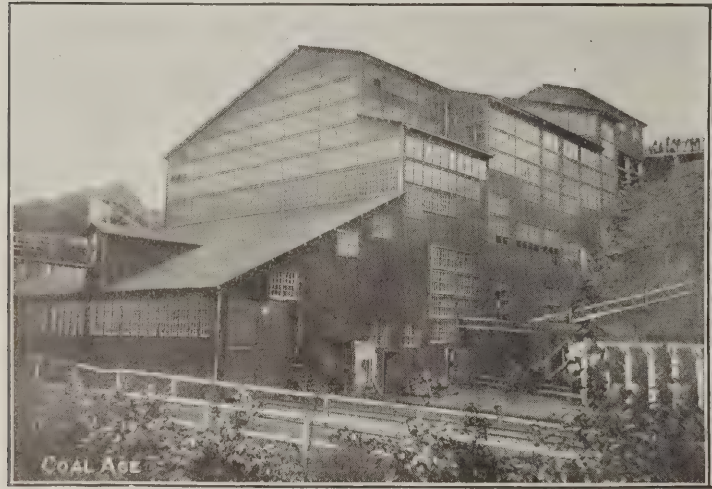
⁂

The Administration report on the railways of India gives the number of tons of coal mined in India during the year 1912 as 14,706,339. Of this amount 4,590,618 tons were used by the railways, while 1,325,238 tons were exported to ports outside of India. There was also imported into India 144,804 tons of coal from the United Kingdom and 415,987 tons from other countries.

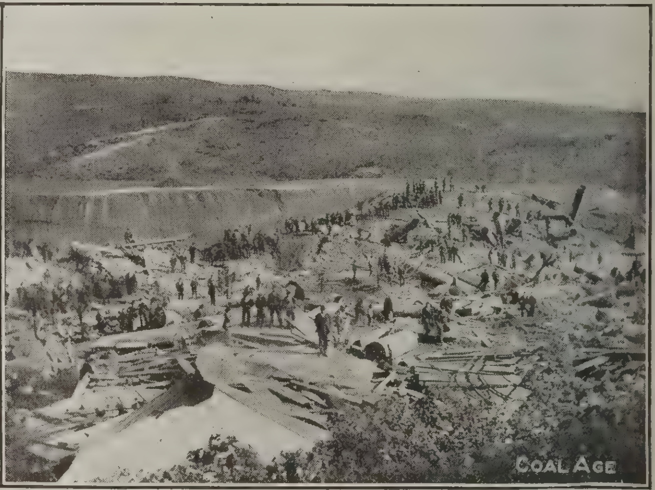
SNAP SHOTS IN COAL MINING

DUNCAN COAL CO., LUZERNE, KY. TIPPLE IS EQUIPPED WITH LINK-BELT SCREENS

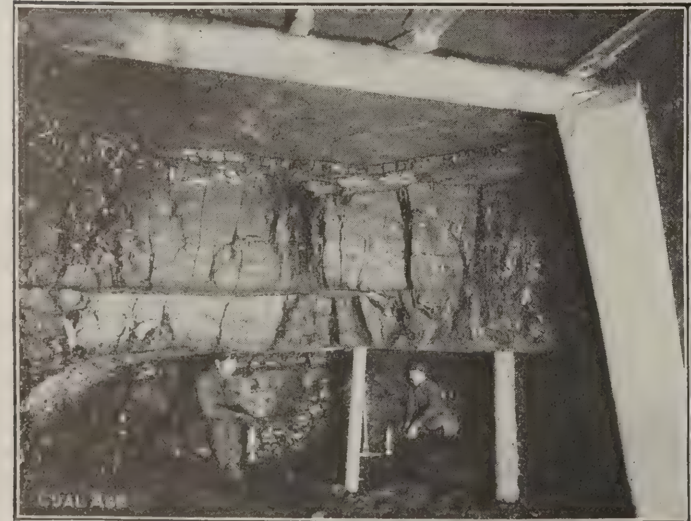
TIPPLE AND POWER HOUSE OF NORTONVILLE COAL CO., AT NORTONVILLE, KY.



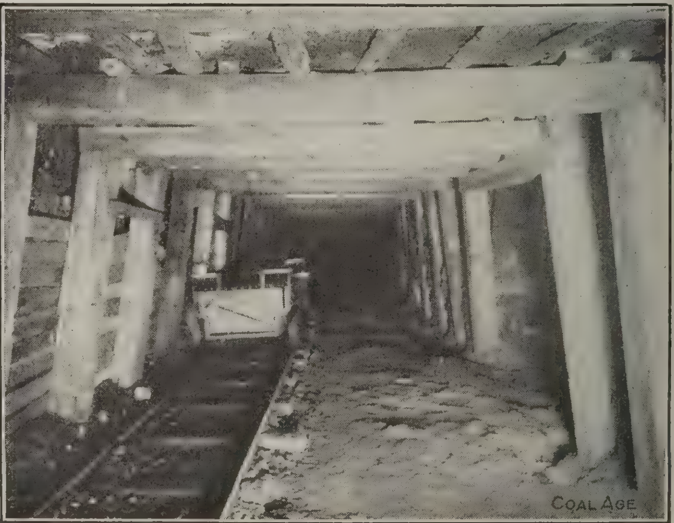
TREVORTON MINE AT SHAMOKIN, PENN., NOW WORKING IN THE NORTH FRANKLIN SEAM



AN OLD PHOTO, SHOWING RESULT OF BOILER EXPLOSION AT THE HENRY CLAY ANTHRACITE COLLIERY



A ROOM IN MINE OF THE ROSEDALE COAL & CLAY PRODUCTS CO., CALGARY, ALTA.



SHOWS STYLE OF TIMBERING EMPLOYED IN ENTRIES OF ROSEDALE MINE AT CALGARY

Discussion of Miners' Compensation Laws*

SYNOPSIS—Full text of a most interesting and profitable discussion of compensation laws as they affect the miner and the operator, in coal mining. Description of the working of such a law, in Illinois, given by Thomas Moses, superintendent of the Bunsen Coal Co., Westville, Ill. Minor accidents previously disregarded are reported under the law. Conditions in other states—Alabama, Indiana and West Virginia discussed by mining men from those states.

⁂

THOMAS MOSES (*Illinois*)—In the passage of this law, the Illinois Legislature was much divided; the laboring people of the state were also divided. One board of organized labor was asking the legislature to pass the law, while the Federation of Chicago and the Board of Labor there were working for its defeat. Many were lobbying for the passage of the law, others for its defeat; but after a strenuous fight, the law was enacted. It was so amended that any person employing labor could elect to come under the law, or if they wished, reject it. The law was made optional with employer and employee. But any person who refused to come under the Compensation Law thereby forfeited the right to the "fellow-servant plea," or to assume risk for liability. Few coal companies, as I understand it, elected to operate under this law. Insurance companies who kept track of legislation of this nature, immediately raised their rates. The small operator became afraid to go under the law, for fear that an accident would throw him out of business. The insurance companies, as I am informed, made their rates so high, that the small operator was forced to go almost without insurance of any kind, and fight his own battles with his men and settle his liabilities as they arose.

ELECTED TO OPERATE UNDER THE LAW

The company by which I am employed, however, elected to operate under the Compensation Law, although there was much uncertainty as to the outcome. Close figures were kept on the cost and also on the accidents, which we were making strenuous efforts to reduce. We improved the equipment in the mines, to make them safe and sanitary; in fact, we put the mines in first-class condition, and adopted the slogan "Safety First" in and out of the mines. It surprised us to find that the accidents, after making these improvements, increased wonderfully. We had a greater number of accidents the first six months, under this law, than had ever been known in the mines before.

We were much concerned about this. We searched the records and found that the reason for the great increase in the number of accidents was explained by the fact that many accidents were being reported now that had never been reported or thought of before. A man would get his finger mashed, or cut a little, and he would at once go to the doctor and have it treated, which was then reported as an accident, and he was paid compensation, if he was off duty the required length of time. The law requires a man to be off nine (9) days before he is entitled to receive compensation, and then he gets one-half of his average earnings in the past. If he is killed, I do not recall the exact percentage to be paid, but the minimum amount is $1500 and the maximum $3500. The difference is gaged by the number of dependents and the earnings of the deceased before his death.

We found that when there was no claim for liability, a man who mashed a finger, or had a chunk of coal fall on his toe, or had a similar slight accident said nothing about it, as a rule, but went on with his work. But, under the compensation law, he would wait till perfectly well before he would return to work. The majority of miners (it proved so in our case) belong to the Mutual Mine Workers Benefit Association, and get a sick benefit of about $5 a week, for a certain number of weeks. Nearly all of them belong to one, two or even three sick benefits; so that the average miner, when he is getting half wages from the company and his sick benefits besides, can make more money than if he was working. That is one thing that helped to increase the number of accident reports.

EFFECT ON LITIGATION

I would draw attention to one point in the law that must be carefully guarded against, wherever such a law is enacted. It is as necessary to prevent the miner who is a rascal from cheating his employer, as it is to prevent the rascally operator from cheating his employees. We have had three law suits under this Compensation Law. The facts to be proven in court, in these cases, are, first, that the injury actually exists, and, second, the extent of the injury. How it happened does not enter into the trial; it makes no difference how it happened, the employer must pay for the injury. The extent of the injury may sometimes be questioned; as it often happens miners claim to be hurt when they are not hurt. I will mention one case.

The day after New Year day a miner in our employ came to the mine a little the worse for wear, and went to work in an entry. About 10 o'clock he went out sick. Some two or three weeks after this he made application for compensation, claiming that he was injured on that morning. I called the man to the office and asked him how he was injured. "Well," he said, "I went into the entry and the air was bad; it was full of blackdamp and I was overcome; it so poisoned my system that I was unable to work any more." I then called in the boss and others who had charge in the mine and they stated at once that in that particular part of the mine there was no question about good air. We investigated and found this to be a fact. We found that on the day this man claimed to have been overcome by bad air, the man in the next entry had worked all day, loaded ten tons of coal and drilled a hole and said he felt no effects whatever. The miner, however, pressed his claim, which I refused to pay, and we went into court.

The court adjustment is as follows: The complainant selects a man, and the company selects another, then the county court selects a third man, and a trial is held before this commission. But here is the weak point in the law. When the complainant selects his man, he is going to select one who is friendly to him; and the company, likewise, selects a man friendly to them; and the county court man is the only unbiased man. It appears to me therefore that he would be sufficient alone to try the case. We tried the case, however, subpoened every man who worked in that part of the mine or had any business there, as a witness, and their testimony was all about the same, with the result that the commission threw the case out of court.

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*From the published Proceedings of the sixth annual meeting of the Mine Inspectors' Institute, U. S. A., held at Birmingham, Ala., June 10-13, 1913.

We have had three suits, in all, of this same nature. There is no question but that we will be held up by some of the men; but I must say, we have been given a fair deal. For 11 years previous to the time we started under the Compensation Law there never was a case of litigation that went to a jury but that the claimant got a verdict. A coal company never won a case in that county, for ten years. Of course, some cases were thrown out of court; but if it went to the jury, almost in every instance a verdict was returned in favor of the injured person. Since the Compensation Law went into effect, we have had three law suits and won all three; because it seems to have changed the sentiment toward the coal companies.

Men Report Violations of Law

Another thing: The men, in their daily work, don't hesitate to report one another when working in dangerous conditions; and they don't hesitate to stand up and tell just how an accident occurred. Previous to that, when a man was hurt or killed, the boss and all the witnesses were summoned; and if they happened to be foreign-speaking men, they immediately could not talk. Then, we had to get an interpreter, and he told the men just what to say and what not to say. Now, they can all talk at an inquest, and there is no trouble in getting them to tell the truth. Formerly, when an accident happened the boss would try to cover up the facts, if he was the least bit to blame. It was hard to get at the truth, under the old system; but now it is no trouble to find out exactly how an accident happened. We have a good fellow feeling among our men, which I think the Compensation Law is bringing about.

Two weeks ago I was invited to the local of one of our mines, when they had some matters to be brought up for discussion. I went and the proposition was made to me: "Mr. Moses, we are interested in your campaign for safety; we believe that you are honestly trying to do all you can for our protection. We visit back and forward a good deal during the day, and we want to make you this kind of a proposition: That every time we see one of our men working in danger we will report it to the boss, if you will agree to compensate us for the time that it takes. We ask this because we don't want to be regarded as carrying tales to the boss; if you give us the right to report to the boss and he does not recognize and remedy the danger, then we will report to you." Such a condition is only possible since the Compensation Law went into effect; if one had thought of making such a proposition before, he would have been thrown out of the window.

We have heard here, again, as we have heard at other sessions, that we do not have in the mines today the practical miner that we had some 30 years ago; coal is not dug today in the manner it was 30 years ago. We had, in our mines, in this country, then, a majority composed of English, Irish, Scotch, Welsh and German miners; and we wonder where these practical miners have gone. We recall that the doctors 30 years ago were not as good as the doctors of today; the lawyers 30 years ago were not equal to the lawyers of today; the merchants 30 years ago are not to be compared with the merchants of today. Advance has been made in every occupation, either professional or industrial, with the exception of coal mining; and we all admit that the miner today is not as good as the miner 30 years ago. Now, there is a reason for that; and the reason, in my opinion, is that the father has seen that he has no future in the coal mine; the battle was too hard against him and he naturally advised his sons to go into some other business, where the chances for advancement would be better. The sons have followed the advice of the father and taken up other lines of work.

Whenever we create in our mines a condition unfair to our employees, they will migrate into other callings. We must take them into consideration; we should be forced to do it, whether we want to or not. We should be compelled to provide for them in case of accident, and provide for their dependents, in case of death. The law should compel us to furnish first-class equipment for every mine, and to care for those injured by accident. When this is done, we will see the standard of practical miners grow, as we have seen the standard of every other occupation grow.

Now, I am not going to take up more time, because there are many angles and I cannot touch on them all; but I will be glad to answer any questions that I am able to answer regarding our experience with this matter. I will say this, however, we do not regard the Compensation Law of Illinois as perfect—far from it; but it is a step in the right direction—it is on the statutes and will never come off; and what is more, it is bound to be placed on the statute books of every coal-mining state. The thing for us all to do is to get busy and find out what is the best law. The principle is just and fair. There can be no question but that the operator is rightly obligated to pay what the coal miner has the right to claim; and the price of coal to the consumer must cover the cost of accidents as well as the cost of production. If it costs a human life to dig 300,000 tons of coal, should we not sell that coal with a view of compensating as far as possible for that loss of life? If we can mine 500,000 tons per life lost, so much the better; but the present death rate is 300,000 tons.

About two weeks ago I was called to Chicago where a number of men (employers and employees) were trying to eliminate some of the objectionable features of the Compensation Law. I am not a lawyer, but I want to state that there are some honest men working hard to overcome the dangers that stand in its way. The law at present meets opposition from the insurance companies, because it considerably reduces their business. It meets opposition from the lawyers for the same reason. Every dollar paid in compensation for injury or death goes to the man injured, or to his dependents if he is killed. The lawyer does not get it and the courts do not get it. They have never been entitled to one cent of that compensation.

Effect of Law to Raise the Standard of Mining

Mr. Bolt (*Illinois*)—I would like to ask Mr. Moses whether or not the operation of the Compensation Law in Illinois has had a tendency to raise the standard of the men employed in the mines; and what bearing it will have upon the education of future generations of men employed in the mines.

Mr. Moses—I think it will have the effect that when a person is injured at a coal mine he will not be burdened with the thought that those dependent on him will have to suffer for lack of support. With the knowledge that in case of accident the necessities of life will be provided for those dependent on him, I believe the tendency will be to uplift the men who work in the mines.

Mr. Bolt—But, to what extent will the amount paid as compensation benefit the family in an educational way. My father was a coal miner and his children were all educated in the coal mines. During his life time he had several serious accidents; and the only compensation received came from his immediate family. Of course, the only persons who suffered through his injury were himself and his immediate family. What I wanted Mr. Moses to explain or bring out was the fact that the real and lasting benefits to be derived from the adoption of a compensation law will be the education of future generations of mine workers. It will prove a greater benefit to the children of the injured parent, rather than to the parent himself, and, for that reason I claim that by the adoption of such a law throughout the United States, whereby employees will be compensated for injuries and their dependents, in case of death, the people who are going to be especially benefitted by that law will be the future generations, because they will be provided with food, clothing and shelter and, above all, a common school education.

The coal companies of this country as a whole ought to stand for higher education in the mines, first, last and always; and I believe, if they will do this, the day will come (it is not now, and we may not even live to see it) when coal operators will thank every person who had anything to do with the uplift movement and improving the condition of those in their employ. When we make a man a thinking man, a man capable of looking after his own interests, we create a man who will look after the interest of his employer, and this will foster a spirit of fairness. For that reason I believe (and I think you will agree with me) that the adoption of a compensation law—a comprehensive and sanely-worded compensation law—in all of the states is going to elevate by educating those who will be our miners in the future.

Mr. Moses—I heartily agree with Mr. Bolt in all he has said, and will say further that the compensation law is intended to relieve distress and if you relieve distress, you are going to elevate the condition of the people you relieve.

T. C. I. Plan in Alabama

Mr. Flynn (*Alabama*)—While Alabama has no compensation law, our company has been operating, for the third year now, under what is known as a voluntary-relief plan. That plan is similar, in fact almost identical, with the one Mr. Moses has just explained; and what is law in Illinois, is the adopted policy of my company in Alabama. I do not fully agree with Mr. Bolt; I believe that the Compensation Law *will* assist to educate the present generation of miners. As I said last evening, in my opinion, 80 per cent. of the safety in coal mines depends on the education of mining men. I can say for Alabama, the state where I have the most knowledge of mining conditions, and the most intimate experience in mining operations, that when you put on the statute books a law requiring coal operators to compensate their employees for accidents, you can rest assured that the companies will get busy; because it is cheaper to educate men to exercise due care than to pay for accidents.

Our company is carrying on a thorough system of education. We have men who constantly visit every mine employee. Experienced and practical men are employed continually to see that a miner does nothing that is unsafe. It is their duty to explain to the miners the practical and safe way. We are educating the present generation of miners up to a higher standard of realizing the dangers to which they are subject in their daily occupation.

Mr. Moses' statement that miners are deteriorating fast may be true enough, because parents are not taking their boys into the mines as they did years ago; and for the further reason that, in the earlier history of this country, coal mining was the only practical trade open to miners that came to this country from Europe. They had been coal miners themselves; this was a new country; coal mines were just being opened up; and, for that reason, they naturally went into the mines. Labor conditions here were not so crowded as in the countries from which they came. Over there, all of the industries were practically crowded; there was all the labor wanted for any kind of industry. That is not the case in this country, especially in Alabama. There has been a scarcity of labor for a number of years; and today some six or eight thousand men can find employment if desired. The rapid development of our coal mines has started other industries, and blast furnaces, steel plants, rolling mills and railroads have been built all over this country. These numerous industries have taken many of the younger generation from the mines, which explains why they have gradually drifted into other occupations.

I remember my father was a blacksmith by trade, but his eyesight became affected by constantly looking into the bright light and he had to give up his trade and go into the mines. Like 90 per cent. of other workers, he took his boys with him, as soon as they were old enough to go. But my father was very solicitous for the safety of his boys, more so than for himself; and the very fact that he had his own flesh and blood in the mines with him made him a much more careful employee than if he had had no responsibility other than looking after himself. But to return to the system of education and the voluntary-relief plan, aside from the human side of the question there is also a moral side. The human side would be considered on account of sentiment, but I have always contended that all the wealth of the world will not compensate for the loss of one human life.

To my mind, the Compensation Act will do much to educate the miners up to a higher standard, and they will protect themselves and prevent accidents, by teaching caution; because the company will soon only employ men with a practical education. I believe there are in the coal mines of the Tennessee Coal, Iron & Railroad Co. as many practical miners today as 30 years ago, notwithstanding the fact that they have,as laborers, mostly non-English-speaking men. Today 40 or 50 per cent. of the miners are negroes, and only about 20 per cent. are non-English-speaking foreigners from southern Europe—

English, Irish, Welsh, Scotch, etc. That class of labor is not coming to Alabama now, in such numbers as formerly. The contention is that the condition of miners in Europe now is better than in America; and they are more contented and less inclined to leave their native country. I think this is true, but if we have this class of labor we must educate them, and our company has succeeded in educating them up to a point that they exercise due care in regard to their own safety.

We have many accidents from absolute carelessness; we will always have them. We all get careless, at times; we work under dangerous conditions. I always tell the miners when I am going around the mines that I am never afraid of a man getting hurt in a place that he things is dangerous. It is the coal that the miner thinks will not fall, that catches him. I often say, in talking to the miners: You can gamble on making it 7 or 11; you can gamble on throwing nine; but you cannot afford to stake your life against a piece of rock or coal not falling; because when you lose your life you have lost all. If you want to gamble, then gamble on something less valuable than your life. As I said last night, I believe if the inspectors and mine officials would exercise all of their ability and use all the time at their command, to insist on miners doing their work in a scientific and safe manner, I believe we could cut out 50 to 75 per cent. of the accidents that occur from carelessness and negligence, or trusting to their own judgment as to the danger of rock or coal falling.

Advocates the Apprentice System

I advocate a system of apprenticeship by which to raise the standard of efficiency to that of the practical miner of other days. This system was opposed by the organization to which practically 90 per cent. of our miners belonged. The system that I believe has done more to eliminate the practical experienced miner than any other system is the apprentice system. Organized labor is bitterly opposed to what they term the "labor system," where one man takes in a helper until the helper becomes an experienced practical man. They claim every man ought to have an equal share of what he makes. I don't believe in such a theory. I believe in the apprenticeship system in coal mines; and I believe if we had a compensation act, that the miners themselves would realize that mining is a skilled trade. There is an art in mining, and it requires skill to perfect one's self, just the same in coal mining as in other trades. In all other trades they have the apprenticeship system, why not in mining?

If we had the apprentice system, the operator would be more careful in the selection of labor that he placed in his mines; he would not be willing to endanger the lives of 150 or 200 practical men for the sake of putting in some inexperienced man, who by reason of his inexperience would perform some act and cause the loss not only of his own life, but that of every man in the mine. They would be more careful in the class of labor they selected, and would educate them up to a higher standard of efficiency. We have got to have labor to operate our mines; and in order to replace the labor that is drifting away from the mines, we have got to adopt some method that will fill the mines with practical miners, who will educate their fellows to take care of their own safety. I am a firm believer in a compensation law for all classes of workers in coal mines as well as in all other trades.

Commission Appointed in Indiana

Mr. Pearce (*Indiana*)—I wish to say, for Indiana, that it is, at the present time, one of the few coal-producing states that has no compensation law; but I am glad to say that there has been a commission appointed, which met the first of this month; and there is little doubt but that this commission will recommend a compensation law that will be passed by our next legislature. I am a firm believer in a compensation law, and am convinced that if any state hopes to promote progressive legislation it must not oppose the enactment of such a law. I understand that, at the present time, the constitution of most of the states prevents the enactment of a compulsory compensaion law; but I feel sure that within the next two years, Indiana will have enacted, as nearly as possible, a model compensation law.

The statement has been made that we have not made the advance we should in the mines; or we have not today the practical miners that we had some 30 years ago. We must remember, however, that mining conditions have advanced very rapidly in 30 years. We are mining coal today with electrical machinery; and electrical equipment has been installed in our mines; and we are working under entirely different systems that were not thought of 30 years ago. I believe we have as practical men, and I might say, even more practical men in the mines today than 30 years ago. Our mines are developed on a more scientific and practical basis and a larger scale of operation, giving greater efficiency both for the operator and the miner, and producing a maximum output of coal at a minimum cost.

The West Virginia Law

Mr. Martin (*West Virginia*)—I am glad to be able to report that West Virginia is one of the states that has adopted a Workman's Compensation Law. The law, however, has been in effect less than a month and I have had no time as yet to read or consider it, and am therefore unable to say much as to its good or bad points. Nevertheless, we have it and it has come to stay. We believe that in a few years it will work out its own defects. West Virginia has had a great forward movement in respect to the safety-first idea. I believe that the compensation law, which will compel the operator to make compensation for workmen injured or killed, will have a tendency to reduce the number of fatal accidents. We can see an improvement in that direction already. Many of the companies have put on district bosses to take care of from 25 to 40 men. Previous to a year or two ago, this movement had been given very little consideration in West Virginia. The mine foreman was supposed to visit all working places, in compliance with the mine law; and in many cases he was unable to do justice, in respect to the safety of the mine. We have also been studying the question of humidity in the mines, and many companies have installed appliances to reduce the quantity of dust, by sprinkling, using a pipe line and hose. This, together with a special system of timbering, which many companies have installed, we believe, will go a long way toward reducing the death rate in the mines of the state. And so, as I said before, I am glad to say that West Virginia has enacted such a law.

POWER DEPARTMENT

Machines for Continuous Current

By C. A. Tupper*

SYNOPSIS—The second of two articles upon this subject. It deals with motors and the precautions that should be observed to insure the successful and continuous operation of this class of machinery.

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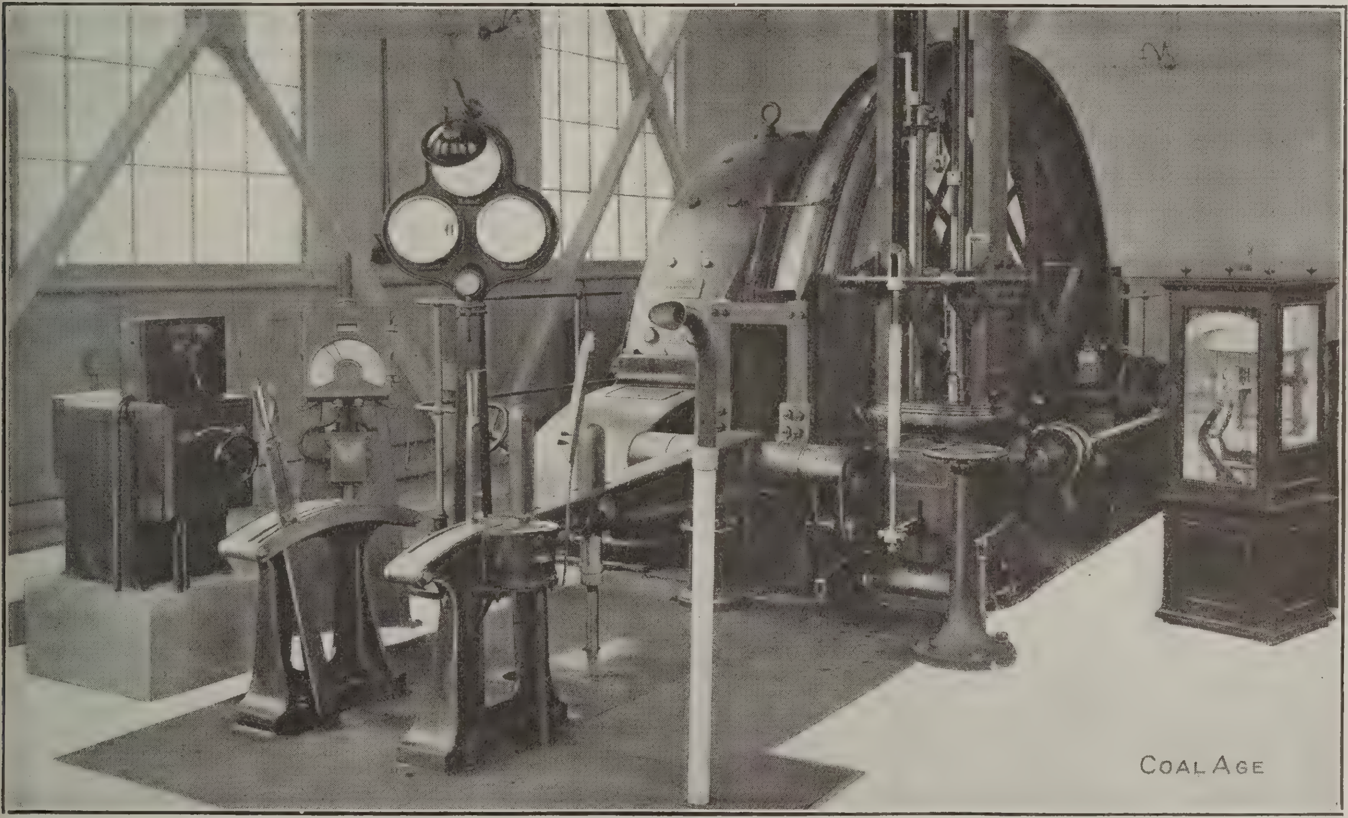
The greater number of the previous observations on the installation and operation of generators also hold good for direct-current motors, allowing for the usual differences in the size of the machines. The following, however, applies particularly to the three types of motors.



A Continuous-Current Motor Geared to a Mine Hoist

As an especial precaution to observe, do not attempt to start a shunt-wound motor until you have tested out the field circuit and made certain that it is closed. Failure to do this has caused much trouble and expense to coal-mine operators installing new motors. This test can easily be accomplished as follows:

If an automatic-release starting box is used, remove the armature lead at terminal, usually marked "Arm" at box, and carefully insulate end of cable. Then close the main switch, also starting-box lever, and note whether the release coil holds the lever in position. This coil is in series with the field and hence insures a closed circuit.

Again, with the above conditions, go to the motor and with pliers or a piece of iron note whether the poles give a strong magnetic pull. In doing so be careful not to touch the field terminal with the piece of iron, thus grounding or short-circuiting the field. As a final and third test, slowly open the main switch, and if an arc results, the field circuit is complete. Open the main switch and replace the armature wire at the starting box. If the fields are separately excited through a field switch, the above tests can more easily be made.

When connecting a motor supplied with a starting box having no voltage release, it is important that the lead from the motor be connected to terminal marked "Arm" and lead from switch to terminal marked "Line."

To start up, close the main switch and gradually cut out starting resistance until the motor runs at full speed. See that the armature oscillates in its bearings and that the oil rings are carrying oil. If speed seems excessive, check connections to see that no coil is in backwards.

If a field rheostat has been provided for increasing speed, see that all resistance is out of the circuit when starting.

The directions given for shunt-wound motors will also apply to compound machines. In case the speed is above normal, the series field is probably opposing the shunt. If sufficient starting resistance is at hand, the motor should be tried as a shunt and as a series machine. In the latter case do not attempt to get the motor up to speed. Just

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*C. A. Tupper, Cleveland, Ohio.

Coal-Unloading Crane Driven by Continuous-Current Motor of the Mine-Locomotive Type

allow it to turn a few revolutions to see that it runs in the same direction as when running as a shunt motor. This test should be made under no-load conditions.

After testing for rotation as above, make permanent connections and start up the motor.

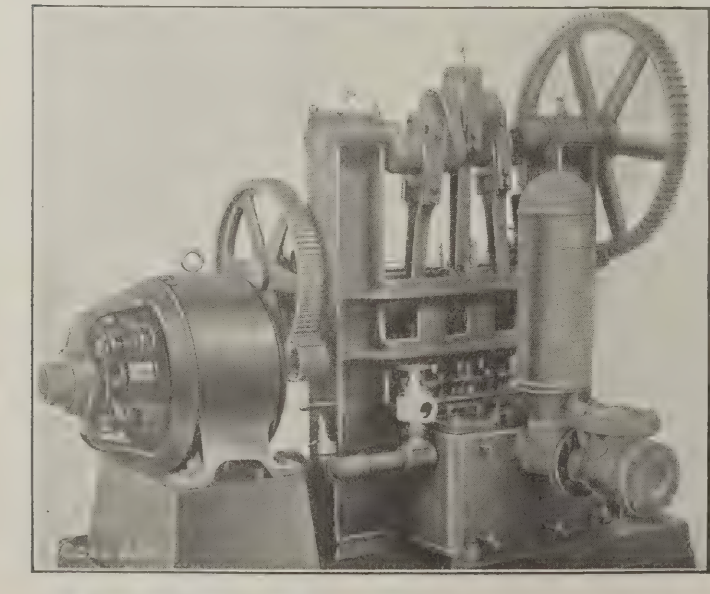
Never attempt to start a series motor without load, as it will attain a dangerous speed. On starting, gradually cut out the resistance, and on shutting down put it back into circuit.

Rules to Be Always Observed

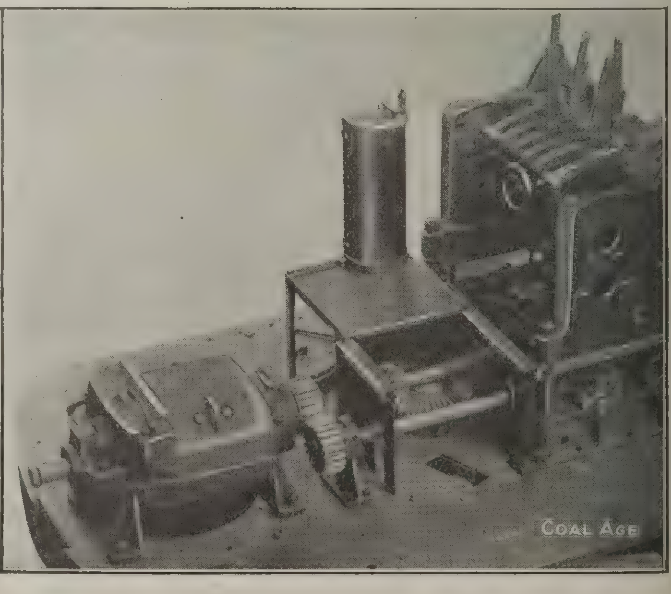
For all classes of direct-current machinery, generators and motors, there are a few simple rules which should always be observed.

In the first place, keep the commutator lubricated by using a very small quantity of vaseline applied with a cloth. If the commutator becomes rough, sandpaper moistened with oil may be used, running the machine at slow speed; or, if a piece of sandstone is available, hollow this out to fit the commutator and apply, moving it back and forth across the face of the commutator sideways until the surface becomes smooth. However, if the commutator is in bad shape, very rough, or out of true, it should be turned down. This can be done with the armature in its own bearings, using a special slide rest and running the machine slowly. After turning down the commutator, go over it carefully and remove any copper which may have lodged between the bars.

A good running commutator should present a dark, glossy appearance free from scratches. Too much attention cannot be paid to the commutator and brushes, for these are the vital parts of the machine, and their



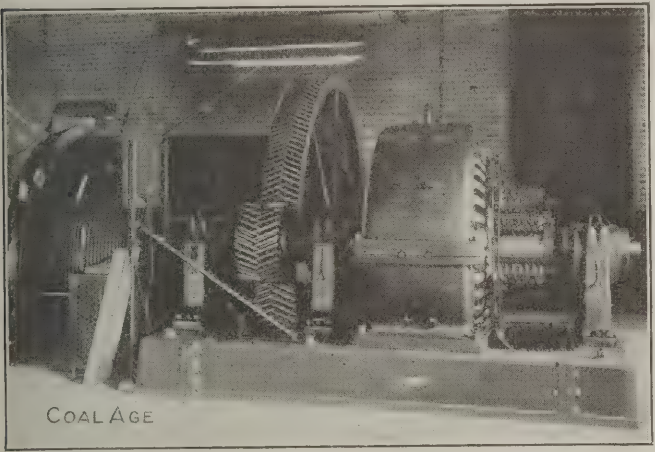
A Mine Pump Geared to a Continuous-Current Motor



Continuous-Current Motor and Controller on Coal-Dock Crane perfect or imperfect condition in a central station is strong evidence of the competency or incompetency of the attendants. There is a certain knack in caring for a commutator, easily acquired by any careful, painstaking man, and a good point to remember is that prevention, not cure, is the best remedy for commutator trouble.

If properly installed and operated, most standard machines will run practically sparkless at all capacities up to a reasonable overload. Bad sparking would, therefore, indicate improper installation, lack of attention, or in rarer cases a mechanical defect that has developed after the machine has left the factory; whatever its cause, it should be investigated at once, as sparking is destructive to both commutator and brushes.

Sparking, when first starting a machine, may result from the following: Dirty commutator, improper fitting and spacing of brushes or insufficient tension upon them. The proper adjustment of brushes and holders will effectually overcome these faults.



A Continuous-Current Motor Driving a Mine Hoist

A Direct-Current Underground Locomotive

A Direct-Current Surface Locomotive

Position of Brushes with Respect to Field

The improper setting of brushes with respect to field coils will also produce sparking. Most armatures are so wound that brushes stand on line with the center of the polepiece, when on the neutral position. The best operating position will be found from three to six bars from the neutral, forward with rotation for a generator, and backward against rotation for a motor.

The brushes can be more accurately adjusted as follows: With machine running idle at normal voltage, shift as above mentioned, until very slight sparking is noticed under the edge of the brushes. If the lead obtained, after following these instructions, is too great, causing, in the case of a motor, greatly increased speeds, or in a generator, decreased voltage, an experienced man would then advise that the brushes be set to sparkless commutation at operating load. Sparking may appear after the machine has been in operation, from developments caused by lack of attention to any of the above details, also from roughened commutator, open circuit in armature windings, or from operation at other than normal voltage and load.

With belted machines see that the armature oscillates freely in its bearings while running under load, as this will greatly lengthen the life of the commutator and bearings.

Breaking a Field Circuit

Never break a field circuit suddenly, as the inductive discharge voltage is always many times higher than the operating voltage, and may puncture the insulation of the field. A discharge resistance should be used connected to a special field switch, which is ordinarily supplied with the larger machines.

Do not open a switch on a circuit carrying a large amount of current. Trip the circuit-breaker first, then open the main switch.

See that all switches, circuit-breakers, etc., are open when the machine is not operating.

Always close the circuit-breaker first; then close the switch.

In case no protective device is used on the generator and trouble appears on the line, put all rheostat resistance in the circuit first, and then open the switch. Bearings should be given daily attention; nearly all bearing troubles are due to faults in operation rather than in design or manufacture. Some of the causes that lead to hot bearings are as follows: Poor grade of oil, grit and dust in oil well and bearings, foreign particles in oil grooves stopping circulation of oil, oil well not full, too tight or too heavy a belt, too much end thrust on armature, sprung shaft, babbitt worn down or badly cut, leaving a rough surface.

See that no bolts, nuts, screws, etc., are left around, as these may be drawn into the machine when its fields are excited and it is running. And in conclusion, upon all occasions, take care that direct-current generators or motors are kept clean, dry and free from dirt.

EDITORIALS

The Economical Combustion of Coal

In its relation to economy, the proper burning of coal for the production of power is of as great importance as its extraction from the bowels of the earth. The fuel item is one that often determines the success or failure of an industry. Hence, it is that the engineering features of modern boilerroom practice are attracting so much attention of late. The rise in the market price of coal has given fresh impetus to the investigation of the fuel question. The object sought in these investigations is to ascertain the particular features that increase the efficiency of the furnace in which the fuel is burned.

The efficiency engineer discovered some time ago that the supply of a sufficient amount of air (oxygen), per unit weight of coal burned, was not the only essential feature in the economical combustion of the fuel. He found that the element of time per unit weight of fuel burned, was also an important factor and one on which the real economy of the operation depends.

A given weight of coal burned in a given supply of air yields a known quantity of heat (B.t.u.), just as a given weight falling through a given vertical height performs a known work (ft.-lb.). But, just as the performance of a given work in a fixed time indicates the *power* employed, so the production of a given number of heat units (B.t.u.), in a fixed time, shows the energy developed and the efficiency of the combustion.

This reasoning, based on scientific knowledge, has led to important practical results. It is now well understood that, to produce the greatest efficiency in the combustion of fuel, for power purposes, the combustion must be rapid and take place at a high heat. By this means, the loss of heat from convection, conduction and radiation is reduced to a smaller percentage of the total heat developed, and the fuel itself is more completely burned.

In producing this combustion, the essential factors are: 1. To burn the coal under a high air pressure. 2. To utilize as large a percentage as possible of the heat generated by the combustion of the fuel, in the actual production of power. In the use of a high air pressure, say 4 or 5 in. of water gage, the fuel will often be blown from the grate. To avoid this difficulty, a balanced draft is necessary, which produces a differential effect, with the result that the combustion is maintained at a higher temperature and the fuel is more completely burned. Under these conditions, the furnace temperature is often extremely high—white hot.

The scheme is, after all, nothing less than an application of the old principle of a blacksmith's forge and a "hollow fire." The increased supply of cxygen produces a rapid and complete burning of the fuel at a high temperature. The heat of the combustion is greatly conserved by the type of furnace known as the "dutch-oven arch." To produce the best results, the air blast must be evenly distributed throughout the fuel bed.

A recent inspection of some steam plants, located in the vicinity of old culm piles and refuse-fuel heaps, reveals the fact that many of these plants are burning this refuse of earlier times, successfully. Such refuse now forms the chief fuel supply of many coal-mining plants where, formerly, the marketable sizes of coal were used. Such has been the increased market demand, in late years, for the smaller sizes of coal, for the production of power, that many coal-mining plants now depend wholly, for the production of their own power, on the refuse "dirt" of former years.

In the burning of anthracite dust, mine and washery refuse, etc., however, the use of a segment grate is necessary. Preferably, the construction is such as to reduce the air space to 5 per cent. of the grate area, or less. This segment grate is set in a dutch-oven furnace; and a high air pressure of 4 or 5 in. of water gage is used with a balanced draft in the furnace to prevent the fine fuel from being blown away. In the sharp competition, at the present time, it is more than ever necessary to employ every means to increase the economy of operation.

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The Pneumatic Signaling System in Mines

The importance of a good signal system at shaft and slope mines has often failed to receive the attention it deserves, until some incident has occurred to reveal the inadequacy of the signal system in use. The common method formerly employed for transmitting signals between the engine room and the shaft or slope bottom, or from the mine opening to the inside workings was that by which a gong was sounded by pulling a wire, or by making an electrical connection through a wire conductor.

The defects and petty annoyances arising from these systems are numerous. Wires are broken, or false signals are given by falling material coming in contact with the wire; or by someone meddling with the wire by which the signal is transmitted. The spirit of mischief, always prevalent among irresponsible men and boys in mines, has resulted, in some instances, in serious accident due to the meddling with signal wires, which is possible in both of the old systems of signaling.

Much annoyance is also caused by the corrosion of the wires and connections. There is always the possibility, also, that the proper signal may fail of transmission at one or more points, which would prove a source of danger. Interruptions are at times caused by the freezing tight of the wires, or the short-circuiting of the electric current, at intermediate points.

The pneumatic signaling system is devoid of all these defects and possesses the further advantage that the pipe line through which the signals are transmitted can be made to serve as a speaking tube. The system permits of no interruption or meddling at intermediate points, except as the pipe line may be broken by a heavy fall. A pneumatic system of signals properly installed is practically free from any expense for maintenance, during the life of the mine. One of its chief advantages is the that it cannot get out of order through disuse; but ways ready when required, after a season of idle- . At such times, an electric system of signaling re- s much attention to again put it in shape for use. pneumatic system is also more exempt from damage ase of fire than either of the other systems of signal-

ne pneumatic system is in use in many of the mines he Lehigh Valley Coal Co., and it is stated that the aware & Hudson Coal Co. have recently decided to in- this system in their mines. The same system is in in the mines of the Oliver & Snyder Steel Co. and in umber of mines throughout the West.

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he Public Coal Lands of the West

: is always a mistake to permit a misstatement of facts ccur in the defense of a good cause, one which is so red of ultimate success that only mistaken advocacy delay it. It is with this spirit that we view and re- the errors pointed out by George O. Smith and G. H. ley in the letters we print today.

nd it is strange to note when reading those letters with the peculiar vertigo which blinds and weakens controversialists, Mr. Ashley has made a misstatement ebuttal which he would doubtless be as pleased to cor- as we are to admit our own errors in fact. No hunt- musty files of governmental reports will be needed, ply a reference to our issue of Nov. 1, which was be- him when he wrote the letter in question.

Ir. Ashley quotes us as saying that the Geological Sur- sells coal lands. If he will read again carefully he light upon the word "indirectly," which he com- ely overlooked in his quotation. This adverb was not ust in without intention but with the somewhat insane a that it was necessary to prevent the subscriber and of reader from thinking for one unreflecting minute t we thought the Survey really did sell lands of any d. We could hardly believe that our readers would nk us guilty of such a misapprehension of one of the t known facts of civics, but we put the word in the tence to make assurance doubly sure.

But to show how correct the sentence is as printed when said that "Mr. Smith has indirectly the selling of the rimony of a nation"; we wish to call attention to one eresting fact. The Land Office in making its yearly ort says but little about coal-land sales except to total ir distribution, number, acreage and value since 1873, the director of the Geological Survey tells us how sales compare now with those before the year 1907 l gives the number of acres sold at each price since t date.

Of course, the Survey does not sell land, it only names price. If an individual could only do that, he could l Scranton, Pittsburgh or New York City within six nths if he made the price low enough.

In accepting the statements of Mr. Smith and Mr. hley, we must specifically object to forming an opinion the amount sold under the new *régime* until we are d how much of the coal land sold since July 1, 1907, s been classified by the department and how much has n sold before withdrawal or at prices below rates ap- aised, as is customary when lands have been filed, on before such withdrawal.

Moreover, we may be excused for wishing personally to know that the 905 sales made represent 905 conveyances to separate individuals and associations and not sales at different prices to a fewer number of such persons, actual or constructive. We are moved to make this inquiry because we find that the conveyance of the square-mile sale is not reported in the 1911-1912 report of the Geological Survey, for the land sold under any one price above $50 per acre does not amount to any such acreage. This sale was apparently entered under several separate price items, which method is not an incorrect one but such as obviously increases the number of entries, as some of them may be thereby made as low as 40 acres.

The Western coal-land question is of great interest and we expect to give it in the future more editorial space. In some matters we shall doubtless find ourselves in sympathy with the Geological Survey, though in many matters we are wholly at variance. Some of their difficulties are those of all geologists and they are merely conspicuous victims of their profession. The ascertainment of even surface-land values is an economic question of difficulty and the relation of coal value to location is of similar uncertainty. When to that problem is added all the geologic irregularities of the Western coal lands, the strain approaches the breaking point.

By putting the lands at an unsalable figure, the coal will remain in the ground so that no public officer will be condemned for giving coal land away for a questionable purpose or accused of enriching an individual at the public expense. The position of a governmental officer in these days of public scandals is not an enviable one. But the people must be served rightly even despite the threat of the muckraker. The public wealth must not be monopolized by the government merely because its officers fear that, otherwise, they might in some cases enrich an individual. Such governmental caution as we too often see resembles the fears of the miser.

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Protection That Does Not Protect

The developments of the past week, in Scranton, remind one of a game of hide and seek. We refer to the peculiar situation growing out of the recent investigations undertaken by the Scranton Protective Association, in the interest of property holders; and the work of the Mine Cave Commission, authorized by the Davis Mine Cave law, which passed the assembly and was signed by Governor Tener, July 28, 1913.

The question of surface support, in Scranton, has assumed the aspect of a three-cornered fight between the resident property holders, the city officials responsible for the enforcement of law and the protection of the lives of citizens, and the coal companies operating the mines underlying portions of the city.

The Mine Cave Commission has been severely criticized for its seeming inactivity during the past three months. The report made to the city council Nov. 14, however, is a vigorous arraignment of the director of public safety and incidentally, also, of the city solicitor, to whose evasive methods the commissioners ascribe the delay in the enforcement of the law. So strong was the evidence presented by the commissioners that the city fathers have now asked Director Terwilliger for an explanation of his failure to act on the reported violations of the law.

The amusing feature in the situation, which has reached a white heat, in Scranton, is the absence from the city, on a hunting expedition, of both the director of public safety and City Solicitor Davis. It might be appropriate to ask: Why are these two much needed officials more absorbed in their own pastime and enjoyment than in the faithful prosecution of the work entrusted to their care? Is the hunting of game of greater moment than the protection of the city's interests, at a time when law is being violated?

All interests are now looking forward hopefully to the coming of President Truesdale to Scranton to confer on the question so important to the business interests of the city. The Lackawanna president can be expected to evolve a scheme that will bring relief and make the people of Scranton proud of the Anthracite Road.

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Effect of New Tariff Law on Coal Business

"Largely sentimental" is the way New England views the effect of the new tariff law on the coal business. The reduction of the old rate of 67c. to the 45c. imposed by the Payne-Aldrich law of 1910 was of negligible effect, and the placing of bituminous on the free list now is hardly likely to attract any materially increased tonnage from foreign ports. What foreign coal comes to New England is almost exclusively from Louisburg, Cape Breton, and while in ten years the consumption of American soft coal has steadily increased in our north Atlantic states at the rate of several hundred thousand tons a year, the receipts of provincial coals have in the main grown steadily less.

Portland and Boston are the only centers where Cape Breton coal is imported in any quantity, and in 1912 at Boston the entire tonnage received was only slightly over 300,000, or less than 7 per cent. of the total by water. The answer is that Dominion coal is relatively so inferior and withal so expensive to put on the market, that even duty-free, the outlet for it here is bound to continue narrow, and restricted to special instances.

For several years the Cape Breton coal entered at Boston has been exclusively for one of the large gas-producing companies, under an old and long-term contract, and the smaller and smaller amounts taken from Louisburg is due to the larger tonnages received each year from West Virginia. Buyers have been so liberally educated in heating values the last few years, that there is less and less interest in prices alone; there is now a broad discrimination against fuels that are high in ash or low in fusing temperature, and the differential between "poor" and "good" is each year an increasing one. On quality, then, there is little chance of any influx of provincial coal, and quality as a factor will probably more than offset the elimination of the 45c. duty.

From Great Britain, the only remaining possible source of supply, receipts of coal since 1903 have been practically nil, and doubtless they will remain so, at least under ordinary circumstances. Ocean freights, the cost of mining, and a normal market at home are of themselves sufficient to keep British shippers from ventures in this direction.

Indeed, it is not as if "free coal" were an untried experiment. Jan. 15, 1903, by special act of Congress, called forth by distress in the big cities on the Atlantic seaboard as a result of the great strike in Pennsylvania, coal was admitted free for one year, and had it not b for the attempt of the Hampton Roads agencies that s son to get an abnormally high price for their West V ginia output, there would have been much less impor coal than was the case.

On Apr. 1, 1903, the f.o.b. price of Pocahontas a New River coals was "established" at $3.35, a price 5 higher than the high season price of ten years later, a two or three of the largest corporations who refused pay it were found later with Cardiff steamers alongsi Needless to say, the Hampton Roads price soon drop to $2.50@2.60, then a normal figure. The statistics the port of Boston show that there were practically imports of British coal after May, 1903.

That episode was, of course, a special case, and Brit coals and freights have since advanced along with Am ican prices and rates, and the increasing coal traffic o seas is from here across, to points that were formerly s plied from England, and not from England here. Ame can coal, therefore, needs no more protection than nat and geographical position themselves afford, so far as c cerns our northeastern states, and "free coal" as a bo to New England is rather like a soft word—it costs v little and does no one any harm.

Of the indirect effect of the tariff on coal mini through the manufacturing industries, there are differe opinions. It may be there will be a halt to the expansi that has gone on so fast during the past decade or t but it is hardly expected that the consumption of bitu inous, in the aggregate, will decrease.

There is caution now in most directions, particula among textile people, but once adjusted to the new sche ules and policies and with the money market more s tled, there is small reason for thinking 1914 will be a but a flourishing year for soft coal in the United Stat It is only indirectly that any slump is likely to come, a representative opinion does not countenance such a p sibility. Certainly on neither ground, inroads by forei shippers nor through industrial depression, is there lia to be any serious upset in the present course of the c business in New England or elsewhere.

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Recent Legal Decisions

By A. L. H. Street*

Adjustment of Coal-Land Transaction—Plaintiff, havi accepted repayment of advances made by him in the pu chase of coal lands, in lieu of an interest in the lands recover which he had sued, was precluded from afterwa suing to recover an interest in the land. (United States Ci cuit Court of Appeals, Fourth Circuit; Coal & Coke Ry. C vs. Nease; 207 Federal Reporter 237.)

Liability for Demurrage—When a vessel is chartered carry a cargo of coal and is directed to report at a certa coal company's docks for loading, the charterer becomes liab for demurrage incurred because of the company's failure give customary dispatch in loading. (United States Distri Court, District of Maine; Carleton vs. Three Hundred Sixt seven Tons of Coal; 206 Federal Reporter 345.)

Duty to Instruct Inexperienced Employee—The rule of la which requires an employer to warn an inexperienced em ployee against the dangers which are incident to the work which he is assigned is not limited to minor employees, a extends to adults. (Pennsylvania Supreme Court, Zeskie v Pennsylvania Coal Co., 88 Atlantic Reporter 414.)

Duty to Furnish Miners' Props—A Kentucky mine ope ator is liable for injury to a miner resulting from failure furnish him roof props on request, as required by statut unless the danger was so imminent that a reasonably pruden miner would not have remained at work under the circum stances. (Kentucky Court of Appeals, Left Fork Coal Co. v Ownes' Administratrix, 159 Southwestern Reporter 703.)

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*Attorney-at-Law, St. Paul, Minn.

SOCIOLOGICAL DEPARTMENT

The Use of Injectors on Breathing Apparatus

NOPSIS—Answers are given to Prof. John Cadman's rtion that injectors are dangerous in breathing ap- atus. German authorities declare that there is no und for favoring breathing appliances in which the ctor is omitted. Just as steam operates a boiler inspira- by its passage through a tapered orifice, so the oxygen ping from its cylinder draws air through the injector breathing equipment. The injector draws from the containing exhaled air and tends to cause a ht vacuum, which is increased by the absorption of bon dioxide by the potash in the alkali cartridge. If bag is punctured or its connections leak, carbon noxide may be drawn in. To avoid this, new appar- s provide that the pressure shall, in all parts of the ice, be greater than atmospheric and that the air cir- ation shall take place at increased pressure in the gs. Care to hold air in the lungs when putting on the met will also aid in preventing such unduly low ex- ation-bag pressures.

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Coal Age has already published some items (Vol. 3, ge 718) about the danger alleged by Prof. John Cad- n, of Birmingham, England, to be attendant upon the of injectors with breathing apparatus. His views re- ved much attention in the papers at the International ngress on Rescue Work and Accident Prevention, held Vienna, Austria, September, 1913. It may be worth ile to present the following notes, translated from ab- acts in the "Montanistische Rundschau." The first is m a paper by Doctor Fortsmann, mining assessor and nager at the rescue-work headquarters in the Rhenish- estphalian coal-mining district:

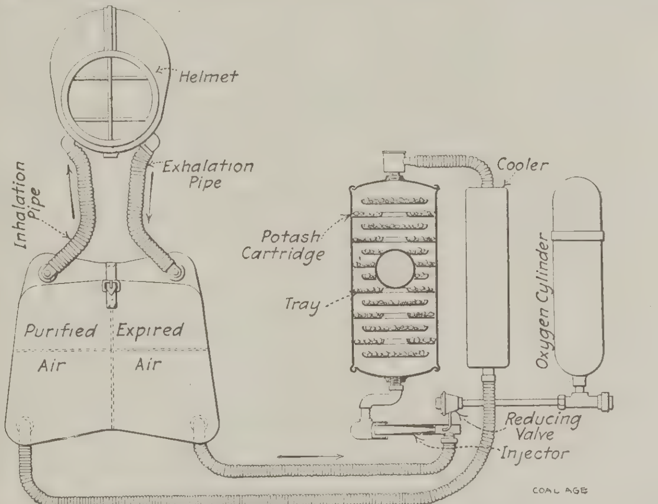
ressures Lower Than That of the Atmosphere

"Professor Cadman, of Birmingham, has, in recent ars, determined that pressures below atmospheric in eathing apparatus equipped with injectors may occur d, in case of leaks, be dangerous to the wearer. He erefore discourages the use of injectors on such ap- ratus. It has long been well known to us that such w pressures occur and are a source of some danger. evertheless, in Germany, the introduction of injectors is garded as essentially progressive, and the danger is met abundant warnings to the rescue crew of the danger of aks, together with careful tests immediately before put- ng on the apparatus. The publications by Professor adman have caused the Rhenish-Westphalian rescue eadquarters to make extensive experiments concerning e magnitude of its danger. These tests have resulted as llows:

"The degree of the low pressure occurring in breath- g apparatus varies within wide limits. It depends upon:

1. The adjustment of the blow-off valve;
2. The degree of depression produced by the automatic;
3. Whether the breathing bag is completely filled with air or not.

"The quantity of outer air entering the breathing apparatus through a leak is dependent upon these factors, as well as upon the size of the opening. With large leaks the penetrating air may become dangerous if it contain poisonous gases. Such leaks can, however, be determined even by a cursory test with the depression meter. For small leaks (through orifices of 0.08 in. diameter), the man with the depression meter can also determine, if he makes the test carefully, whether under normal conditions so much outer air does not, at least in case of great exertion, enter the breathing apparatus as to endanger the life of its wearer.



New Model of Draeger Apparatus Which Forces Air and Oxygen through Potash Cartridge. Drawing Air through the Resistant Potash Cylinder May Sometimes Cause Mine Gas to Be Sucked through Leaks

Apparatus with Injectors Is of Proved Value

"According to this, the opinion expressed against injectors is exaggerated, and there is no ground for preferring injectorless breathing apparatus, with which much less work can be accomplished."

The other paper which treats of this subject is by Mining Assessor Grahn, instructor in the mining school at Bochum, and manager of rescue work for a Westphalian mining association:

"Oxygen breathing apparatus with injectors, as in particular that of the Draeger Works, of Luebeck, the Westfalia Co., in Gelsenkirchen, and the Mining Engineering Co., Ltd., in Sheffield, England, has been used for a number of years in most mining districts and in related industries, the results generally being excellent. At the Bochum mining school, for 12 years past, all pupils and often mining officials also, have been in-

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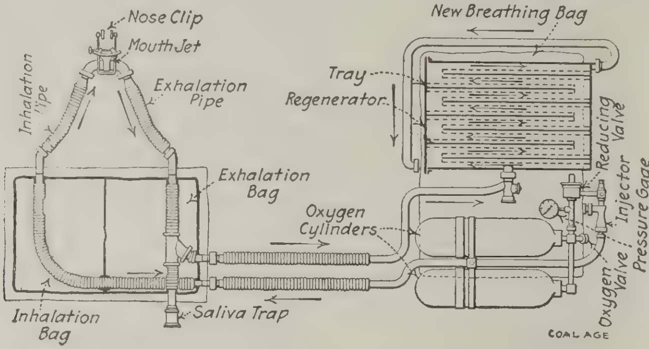
Note—Translated for "Coal Age" by E. F. Buffet.

structed in the use of breathing apparatus with injectors. For as long a time such apparatus have been kept for the use of the mines in the district in case of emergency.

"Such disasters as that in an English coal mine, at Swansea, mentioned by Professor Cadman, which was attributed to mine air containing carbon monoxide, which had been sucked into the apparatus as a result of injury to the regenerator, have not so far, to my knowledge, been observed in the Rhenish-Westphalian industrial district.

Importance of Testing

Breathing apparatus which have not been duly filled before the beginning of breathing and carefully tested for tightness and efficient working of the automatic, have indeed, in individual cases, where improperly used, led to accidents, especially to carbon-monoxide poisoning.



Modification of Westfalia Apparatus with an Additional Breathing Bag Carried on Back to Avoid Pressures Lower than Atmospheric

The fact determined by Professor Cadman that low pressures occur in injector breathing apparatus and, if leaks be present, may admit air from outside, is correct and has been observed since this apparatus has been in use.

According to my determinations, the depth of depression can amount under especially favorable conditions, to 3.2 in. of the water column.

What quantities of outside air may be sucked into breathing apparatus through leaks of determined size under certain conditions, is a subject extensively investigated by Doctor Forstmann, in Essen, and more fully reported in his address. According to this, it appears almost impossible that the rescue man can be endangered in gases of combustion with an ordinary carbon-monoxide content of not more than 1 per cent., when the cross-section of the leak does not exceed 3 or 4 sq.mm. (0.0047 to 0.0062 sq.in.).

Pressure Provided Equal to or Greater Than Atmospheric

To meet objections that have been raised in many quarters on the ground of the foregoing facts, the firms named which manufacture breathing apparatus are making, where desired, the following changes or improvements:

(a) The Draeger Works, in Luebeck, let the injector on its 1910-1911 model blow the exhaled air through the regenerator instead of arranging it so as to suck the expired air through as formerly.

(b) The Westfalia Co. and the Mining Engineering Co. furnish with the previous 1912 model, a second large breathing bag to be carried on the back and c nected in the circuit of the air behind the regenerat The bag is furnished inside with weak rubber bands that it contracts as soon as the ordinary pressure in apparatus falls. The relief valve of the exhalation bag set so as to blow off at a higher pressure than befo namely, 4 in. water column. Of the alterations just m tioned, I have hitherto been able to test only that of Westfalia in the trial room of the mining school.

These experiments have proved that, if the appara be properly used, these changes prevent low pressure b ter than the old plan. I have in view to make furtl tests, with the Westfalia and Draeger apparatus, an expect to report upon them to a meeting of this congre

For the use of injector breathing apparatus of the and new designs, in case of emergency, the following ru are most important to follow, hereafter as heretofore:

(a) The apparatus before using is to be subject by the well known methods to very careful testing, pecially for tightness; (b) The entire apparatus, a especially the breathing bag, must be filled with air b fore the rescue man exerts himself; (c) During use, t apparatus is to be constantly watched by the leader.

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Underground First-Aid Stations

By Joseph Daniels*

The Northwestern Improvement Co., operating c mines in Montana and Washington, has taken an acti lead in adopting safety measures and appliances and organizing and training its officials and men into efficie rescue and first-aid units. Examples of some of t underground first-aid stations in the mines of the Rosl field are shown in the illustrations.

Fig. 2 shows a station at the intersection of a manw and entry in No. 5 mine. Part of the wooden stopping used for a door and the rest carries a first-aid box mou ed in a wooden frame which is illuminated by five 32- lamps. The wooden frame is 2 ft. 6 in. long, 2 ft. wi and 6 in. deep, made of inch boards and lined with asbestos back. The bottom of the box forms a shelf which may be placed any supplemental articles, such bottles of picric acid. The stoppings and the walls are all whitewashed. No man in the mine can fail to know where to go in case of emergency, and there is always sufficient light by which to work. Fig. 1 shows details of the station box.

Another form of station is shown in Fig. 3. This is cut in the coal and roof rock on the entry at the partin and is about 12 ft. long and 6 ft. high and lined with wo and then whitewashed. In addition to the first-aid bo already described, a roll of blankets carried in a close

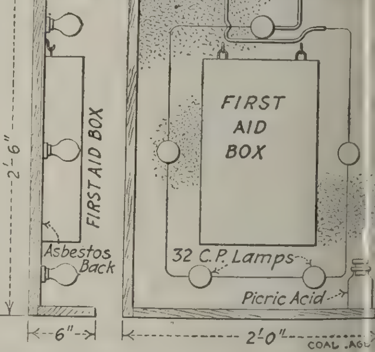

Fig. 1. Manner of Installin First-Aid Box in Roslyn Min

sheet-metal tube or frame 5 ft. long, 10 in. in diameter, is suspended on a pair of hangers. A stretcher, also carried in a metal tube which is 8 ft. long and 7 in. in diameter, is similarly carried by hooks. These metal tubes are either of galvanized or ordinary iron painted black and have a large red cross marked on them. A complete assortment of splints rests on the tubes. These stations are being installed throughout the various mines of the field.

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*College of Mines, University of Washington, Seattle.

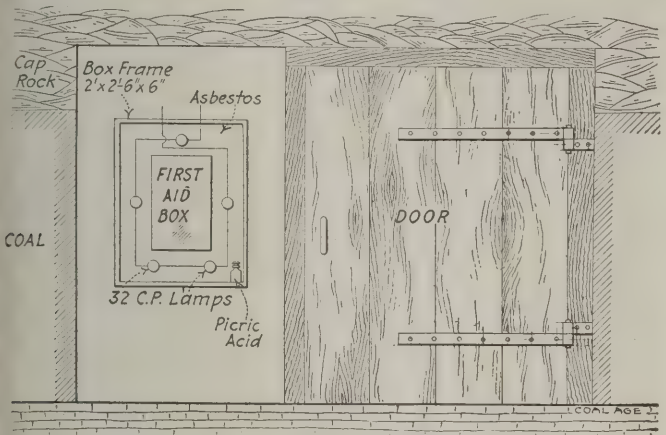

Fig. 2. Station at Intersection of Manway and Entry No. 5 Mine

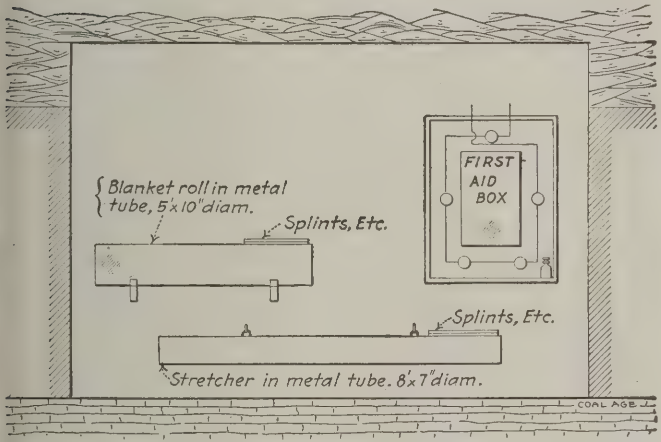
FIRST AID BOX
Blanket roll in metal tube, 5'x10" diam.
Splints, Etc.
Splints, Etc.
Stretcher in metal tube. 8'x7" diam.
COAL AGE

Fig. 3. Front and Rear Walls of Rescue Station

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Training for Rescue Work

The Bureau of Mines has kept in mind the fact that there is a broad gap between theory and practice, and has inaugurated a series of practical maneuvers in the mine of the Consolidation Coal Co., at Chiefton, eight miles south of Fairmont, W. Va. In this mine, the conditions of an explosion are imitated and a rescue drill is practiced.

In all, 24 teams of 5 men each will be put through their paces by the men in charge of car No. 6, now stationed at No. 72 or the Chiefton mine. One of the company tenements has been formed into a rescue station, one room being devoted to first-aid equipment and the second to helmets and pulmotors. The upstairs apartments are used as changerooms for the teams which will be trained.

Near the entrance to the mine, a smokehouse has been built for testing the apparatus in formaldehyde gas in order to find whether there are any leaks before venturing into the mine. A blind entry off the main heading directly inside the entrance has been equipped as an underground emergency hospital.

The door leading to the smoke area which is to be used in training work, is 350 to 450 ft. in, along the main haulway. The area consists of 3 rooms and 3 side entries closed off by stoppings and brattice cloth. In case the apparatus of any of the men should fail, a fan furnishing 25,000 cu.ft. of air per min. can clear out the smoke in from 3 to 5 min. Thus there is no risk accompanying these drills.

There is to be, as usual, some spectacular work. The bureau is convinced that the interest of the people, and above all that of the wives and the co-laborers of the miners and others engaged, should be aroused. Consequently electric lights have been strung in the main roadway and window sashes have been placed in the trap doors. The roads leading to the smoke area have been made clean for visitors, so that anyone can go in the mine and watch the work without having his clothes soiled.

Two teams will undergo training each week. They will be taught not only rescue work but first aid, a syllabus of 24 first-aid and 6 rescue events being provided for instruction and practice. C. O. Roberts is first-aid instructor and E. Steidle is foreman in charge of the car. The names of the companies presenting teams for training are given in our issue of Oct. 4, p. 502.

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The Human Factor in Welfare Work

The success of the work of all welfare organizations, such as that at Decota, W. Va., is not so much in the elaboration of details, or even in its response to the actual needs of the people affected as in its *mutuality*. At the Y. M. C. A., built by the Carbon Coal Co. and described in our issue of Nov. 15, every effort is made to enable the employees to feel that the enterprise is their own and depends on their efforts for its proper support.

The management of the coal companies has never interfered with the association policies, but has left the entire management of its affairs in the hands of the men and the trained secretary. The company gives liberally to the support of the work and feels that it is a good investment. The men are also liberal in their patronage for they know that any surplus revenue, instead of going to the company or to the pocket of any private person, will be used by themselves in an extension of their own enterprise. The success of such an undertaking depends largely on the selection of the right person to be the leader. He must have had the training which will give him the correct perspective; he must know the value of the human personality; he must be able to sympathize with human weakness and know how to develop the best in each of his men.

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The Colorado Fuel & Iron Co. employs a rather novel method for humidifying mine air. A radiator is placed on both sides of the heading through which the entering air passes. The waste steam from the radiator is conducted to a perforated pipe to which is attached a curtain of burlap or brattice cloth. The purpose of the burlap is to bring the condensed steam in contact with the air current. As the air pases over the radiator it is heated and its capacity to pick up moisture is greatly increased. It then strikes the saturated curtains and absorbs the moisture.

DISCUSSION BY READERS

Starting Fan after Explosion

Letter No. 8—Referring to the recent discussion of this subject, I want to say that the question of whether a fan should or should not be started, after a brief idleness because of being damaged by the explosion, is a difficult question to answer directly; because the conditions vary so much, in all accidents of this kind.

In my mining experience of 57 years, I have had much to do with gas and have witnessed many serious explosions. I was in Bryndu colliery, near Pyle, South Wales, when the explosion took place there, in 1858, that killed every man in the split of air in which it occurred. In 1862, I was at the Park Shaft colliery, Briton Ferry, South Wales, when an explosion took place that killed every man on the east side of the mine, which was ventilated by a separate air split. In 1867, I was at the Ferndale colliery, South Wales, when all the men on the east side of that mine were killed by an explosion. The two mines last mentioned were ventilated by furnaces, which were the only means of producing the circulation of air through these mines.

If we assume an explosion takes place in a gaseous mine ventilated in five or six separate splits or air currents, it may happen that this will be wholly confined to the one split in which it occurred; or, if the explosion is assisted by accumulations of dust and more or less gas distributed throughout the mine, all of the splits may be affected alike, the explosion being general. In that case, the force developed would probably be sufficient to damage the fan, which would have to be stopped for repairs. It is natural, then, to imagine that the main entries and roadways would be blocked by numerous caves or falls of roof.

Under these conditions, it is certainly a difficult problem to decide upon the best thing to be done. There are, probably, many men still living in the mine and many who have been killed by the blast or buried beneath the falls. Moreover, fires may have been started in different parts of the mine. As has been stated before, in this discussion, the fires would produce more or less circulation of air through the mine and endanger the men who are still alive, as much as would result from starting the fan. On the other hand, if no fires exist in the mine and there is no circulation of air, the accumulations of gas in the workings will endanger the men still alive and entombed therein. In a gaseous mine, there is, of course, the danger, in starting the fan after a brief idleness, of driving accumulated gas into a fire area and causing another explosion, with the possibility of a greater loss of life even than before.

In the face of these numerous difficulties, it frequently happens that good use can be made of the mine-rescue corps, wearing helmets or other breathing apparatus. It may be possible, by this means, to penetrate the inner workings and obtain information of the condition of the mine and rescue many survivors. Whenever this is possible, it is certainly the best thing to be done; but this system has not as yet, in my opinion, been fully developed and is often ineffective, except where the circumstances are peculiarly favorable.

Where the explosion in a gaseous mine has affected one split only, there is grave danger in allowing the fan to remain idle for any length of time, which would permit the accumulation of large bodies of gas in the other splits. In this case, the fan should be put in operation as quickly as possible, and steps taken to confine the circulation of air to those splits not affected by the explosion.

W. D. Owens, Div. Supt.,
Lehigh Valley Coal Co.

Pittston, Penn.

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The Certificate Law

Letter No. 2—The question of a universal certificate law seems to be attracting the attention of mining men to a considerable extent, at the present time. As has been suggested, an intelligent exchange of views and opinions on the question will not only be interesting, but cannot fail to secure a better adjustment of the matter.

The remark was made by Mr. Dixon, Coal Age, Oct. 25, p. 604, that it would be a wise provision if each coal-mining state would pass a law, making the holders of a duly authorized certificate of competency in another state eligible to like office in that state also. He argues that: "Such a law would encourage the interchange of intelligent mining men and * * * * * provide a means by which ambitious young men could obtain a wider experience and increase their competency."

I am of the opinion that nothing would be gained by the enactment of such a law; and that the present condition has a greater tendency to stimulate ambitious young men to study and increase their competency and gain a wider experience than the proposed change could effect.

It appears to me that it would be a difficult proposition for the different states to enact laws that would be sufficiently universal in their application to the various conditions and requirements existing in different coal fields. Some states are more progressive and further advanced in their mining laws, and require a higher degree of proficiency in candidates for the position of mine foremen than is the case in other states.

Under the present system of examination, each state maintains its own standard and coal operators do not suffer by the employment of mine foremen who have been examined and certificated by a board in another state where the requirements are not as severe. The adoption of such a universal system of certification would, I believe, tend to endanger the lives of miners by increasing the migration of irresponsible foremen of limited training and experience, and by the employment of foremen who are not fully acquainted with local conditions.

The matter of standardizing examinations in different states, as conducted by different examining boards, would be another difficult proposition. No two examining boards mark alike, and the grading of candidates in examination would depend as much on the intelligence of the examiners as upon the replies of the candidates. It should be no great burden or task for a mine foreman holding a certificate of competency in one state, to secure a like certificate in another state, if he is capable of meeting the requirements made necessary by the different conditions in the other state. On the other hand, it would be an incentive to the candidate to further study and the acquirement of greater knowledge.

It goes without saying that the examination in different states must conform to the conditions of mining and the standard of proficiency required in each case. It is also true that the mining industry is progressing, and it is necessary that the standard of examinations must advance at the same rate, in order that only capable and efficient miners be awarded certificates of competency. It does not follow that a miner who is qualified and competent to discharge the duties of mine foreman in one mining district or state is like qualified or competent to discharge the same duties in another district or state where the conditions are more complex.

It is my belief that the coal-mining industry of the country can be best promoted, and the safety of miners best conserved, by each state enacting laws regulating the mining of coal in its own territory. I believe that a certificate of competency to act as mine foreman should be good only in the state where it is granted, and that no certificate of competency should be issued for a longer period than six years.

It is too often the case that a candidate will prepare for examination by studying diligently for a few weeks previous to going before the board; and when the examination is over and the certificate granted, all further study is dropped. If, however, the candidate knew that he was required to pass another examination in a few years, again, he would keep up his study and interest, and his mining knowledge would increase. It is enough to convince any reasonable mining man of the absurdity of granting certificates of competency for an indefinite period or making those certificates good in all states, when we observe the number of mine foremen who read no mining journals or make any systematic effort to acquire more mining knowledge. There are many such foremen in all mining camps.

Having been a member of the new examining board, referred to by U. S. Wilson, Coal Age, Nov. 8, p. 710, I am familiar with the incident he narrates of a man holding a second-class or "Class B" certificate granted by a previous examining board in Tennessee, failing to pass an examination for a first-class or "Class A" certificate, or even to receive a sufficient average to entitle him to the "Class B" certificate which he already held. I want to say that the failure of that man to secure the necessary mark in the second examination before the new board was due to no fault or unfairness of either examining boards; but can be attributed to the fact that after receiving his "Class B" certificate, in the first examination, he neglected further study of the methods and systems of mining and, as a consequence, instead of advancing in knowledge and experience, he retrograded to that extent that his present knowledge and qualifications would not warrant the granting of a "Class B" certificate.

This incident is only one of many I could mention in support of my argument, that certificates of competency should be frequently renewed. I believe in a progressive system that will keep men studying methods of safety, means of sanitation and plans of producing coal, and that will stimulate them with an ambition to make better mine foremen. There is the same demand for raising the standard of competency in mining that there is in teaching school. As systems of education have changed and the required standard has been raised, so mining operations are conducted upon new and improved methods, and require a higher degree of proficiency in mine foremen than was required a few years ago.

John Rose,
District Mine Inspector.

Dayton, Tenn.

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Letter No. 3—The question raised by Mr. Dixon, Coal Age, Oct. 25, p. 604, in regard to making mine-foreman certificates good in all coal-mining states, is an interesting one. It is quite true that, previous to the certificate law being enacted, a competent man could secure a position to act as mine foreman in any district or state where he might chance to go, without being required to pass an examination to prove his competency.

I do not wish to detract one iota from the importance of the certification of mine foremen, as, in my opinion, every official connected with mining, in an active capacity, should be required to pass an examination, from the mine manager down to the shotfirer. I would urge that such examinations be required in every coal-mining state. The certificates should be graded, and a percentage of efficiency required in accordance with the importance and responsibility of the position desired by the candidate.

On the other hand, while I believe in the examination of candidates for mine foremanship, in each state, it does not seem to me fair to require a man of experience to serve another apprenticeship in mining when he migrates to another state. In my opinion, the mining laws of the state should not require that a candidate for mine-foreman certificate should have a specified number of years' experience in the coal mines of that state. Where such period of apprenticeship is required by law, as in the case of the bituminous mining law of Pennsylvania (Art. 24, Sec. 4), or the coal-mining laws of Colorado (Sec. 40), the law should be so amended as to eliminate this requirement. The bituminous law of Pennsylvania requires an apprenticeship of five years and the coal-mining laws of Colorado demand a similar apprenticeship of two years, before a candidate is eligible and can be granted a certificate of competency to act as mine foreman. I believe the eligibility of a candidate should depend solely upon his competency as determined by an examination in the state where he desires to serve as mine foreman.

It cannot be denied that the different coal fields present conditions that vary widely in their requirements, in respect to the safe and economical extraction of the underlying coal. But, after all, the principles involved in the operations of mining are very much the same; and a man who has proved his competency in examination before a properly constituted examining board, should not require more than one or two years of service as assistant mine foreman, in the state, to make him eligible to the higher position of foreman.

In my opinion, Mr. Dixon's suggestion of a universal certificate of competency would have a tendency to lower the standard, not only because the holder of such a certificate would feel he could hold the same position in any state; but, because it would authorize the employment of many mine foremen under conditions with which they are totally unfamiliar. It would remove the stimulus for study and improvement. While the incident cited by Mr. Wilson, Coal Age, Nov. 8, p. 710, where mine foremen operating adjoining mines on the border line of Kentucky and Tennessee could not cross the state line and occupy the same position, presents a somewhat aggravating condition, it may prove a necessary requirement in other mines and districts of these states; and, as a law, it shoud be strictly enforced.

J. E. Ambrose.

New Durham, N. J.

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Collapsible Stoppings

Letter No. 10—To speak of "collapsible stoppings," in reference to mines, is quite indefinite, and the question has well been asked: "What is a collapsible stopping?" Most of the stoppings as built at the present time may be classed under that head, as in few instances only, would they withstand the force of an explosion.

While it would certainly be an expensive proposition to build all main stoppings of a noncollapsible type, yet I am heartily in favor of building the stoppings on the main heading in a substantial manner, so that they will be capable of withstanding the shock due to an ordinary local explosion. I believe this is especially necessary where gas and dust are met in dangerous quantities in the workings. It is as important that the stoppings should be in place after an explosion, as before, in order that the ventilating current shall take its true course. I venture the opinion that more lives will be saved where the stoppings have withstood an explosion and remained intact, than where they have been blown out by the force of the blast. In the former case, the ventilating current will again resume its regular course, while, in the latter case, the ventilation in the workings would be deranged and the accumulation of gas that would result would make possible a second explosion and further loss of life.

In regard to gaseous and dusty mines, the main point to be considered in the ventilation of the mine is to divide the workings into separate ventilation districts or panels, and to leave a sufficient barrier of coal between the several panels. Where this system is adopted, an explosion of gas in one panel will generally be confined to the district in which it occurred. The air current in the other districts, or panels, would not be vitiated as a result of the explosion, and the situation is more easily handled immediately following the explosion.

John E. Spicer.

Cumberland, B. C., Canada.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

TABLE SHOWING SATURATED-VAPOR PRESSURES FOR DIFFERENT TEMPERATURES

Degrees, Fahr.	Barometric Pressure, Mercury (32° F.) In.	Pressure, Pounds per Square Inch	Degrees, Fahr.	Barometric Pressure, Mercury (32° F.) In.	Pressure, Pounds per Square Inch
−30	.0099	.0049	70	.7335	.3602
−20	.0168	.0082	71	.7587	.3726
−10	.0276	.0136	72	.7848	.3854
0	.0439	.0216	73	.8116	.3986
5	.0551	.0271	74	.8393	.4122
10	.0691	.0339	75	.8678	.4262
15	.0865	.0425	76	.8972	.4406
20	.1074	.0527	77	.9275	.4555
26	.1397	.0686	78	.9587	.4708
32	.1815	.0891	79	.9906	.4865
34	.1961	.0963	80	1.024	.5027
36	.2122	.1042	81	1.058	.5194
37	.2205	.1083	82	1.092	.5365
38	.2293	.1126	83	1.128	.5542
39	.2382	.1170	84	1.165	.5723
40	.2476	.1216	85	1.203	.5910
41	.2574	.1264	86	1.243	.6102
42	.2674	.1313	87	1.283	.6299
43	.2777	.1364	88	1.324	.6502
44	.2885	.1417	89	1.367	.6711
45	.2995	.1471	90	1.410	.6925
46	.3111	.1528	95	1.647	.8090
47	.3229	.1586	100	1.918	.9421
48	.3352	.1646	105	2.227	1.0938
49	.3478	.1708	110	2.578	1.2663
50	.3610	.1773	115	2.977	1.4618
51	.3745	.1839	120	3.427	1.6828
52	.3885	.1908	125	3.934	1.9318
53	.4030	.1979	130	4.504	2.2119
54	.4178	.2052	135	5.144	2.5261
55	.4333	.2128	140	5.859	2.8774
56	.4492	.2206	145	6.658	3.2696
57	.4657	.2287	150	7.547	3.7063
58	.4826	.2370	155	8.535	4.1914
59	.5001	.2456	160	9.630	4.7292
60	.5183	.2545	165	10.841	5.324
61	.5370	.2637	170	12.179	5.981
62	.5561	.2731	175	13.651	6.704
63	.5760	.2829	180	15.272	7.500
64	.5964	.2929	185	17.050	8.373
65	.6176	.3033	190	18.954	9.330
66	.6394	.3140	195	21.130	10.377
67	.6618	.3250	200	23.457	11.520
68	.6850	.3364	205	25.993	12.765
69	.7086	.3481	212	29.925	14.696

The Coal Age Pocket Book

EXAMPLES IN HYGROMETRY

Caution—It is absolutely necessary in the use of such formulas as embrace terms or constants of a given denomination to use only values of that denomination. For example, the formula for finding the weight of moisture that will saturate a cubic foot of air at a temperature of t degrees, is

$$w = 0.6235 \frac{p_v}{0.37\,(460 + t)}$$

This is recognized as being derived from the formula previously given for finding the weight of one cubic foot of dry air at a pressure p and temperature t, by substituting for the atmospheric pressure p (lb. per sq.in.), the saturated vapor pressure for p_v (lb. per sq.in.); and multiplying the formula by the specific gravity of water vapor (0.6235) referred to air.

In these formulas, the pressure must always be expressed in pounds per square inch, because the constant 0.37 is in that denomination; and the temperature must be given in Fahrenheit degrees, for the same reason. Also, the weight will be found in pounds per cubic foot and if desired in grains per cubic foot, must be multiplied by 7000, as there are 7000 grs. in 1 cu.ft.

On the other hand, the formulas given for calculating the relative humidity of the air, or the actual vapor pressure contain the constant 88, which is based on barometric pressure (in. of mercury) and Fahrenheit temperatures. The constant 88 is used for all temperatures above 32 deg., and 96 for any temperature below 32 deg.

The table of saturated vapor pressures, on the preceding page, gives the pressure or tension of water vapor for different temperatures (Fahr. scale), from 30 deg. to 212 deg. The pressures are given both in inches of mercury and pounds per square inch.

Example—Find the actual vapor pressure, the relative humidity, dew point and weight of moisture present, in grains per cubic foot, when the readings of the dry- and wet-bulb thermometers are 62 deg. and 54 deg. F., respectively, and the barometric pressure is 28.2 in.

Solution—The actual vapor pressure, in this case, as calculated from the saturated vapor pressure corresponding to the wet-bulb reading (P_{54} = 0.4178 in.), is

$$p_v = 0.4178 - \frac{28.2}{30}\left(\frac{62 - 54}{88}\right) = 0.33235 \textit{ in.}$$

The saturated vapor pressure for the given temperature (see Table) is P_{62} = 0.5561 in., and the relative humidity,

$$H = \frac{0.33235 \times 100}{0.5561} = 59.7 \textit{ per cent.}$$

The dew-point temperature corresponding to a saturated vapor pressure of 0.3323 (see Table) is 47.7 deg. F.

The actual weight of vapor is

$$w = 7000 \times 0.6235 \frac{0.597 \times 0.2731}{0.37\,(460 + 62)} = 3.6 \textit{ grs. per cu.ft.}$$

Two Letters on Public Coal-Land Sales

SYNOPSIS—George Otis Smith declares that the Land Office has sold almost as much coal land in six years under the new valuations as in five years before under the old prices. Since July 1, 1907, it has disposed of 225 square miles. The average price of the assessed lands is $41.30, and of the sales, $18 per acre. In Colorado last year sales of coal resources equaled output. Appraisals have increased taxable values in the states where public coal lands have been evaluated.

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Your editorial of Nov. 1 on "The Western Coal Lands" is incomplete in its quoted statements of fact. In the interchange of views between Senator Shafroth and myself, at the recent Philadelphia session of the American Mining Congress, I distinctly stated that the sales of government coal lands under the new system of appraisal compared favorably in acreage with those made under the former practice of disposal at minimum prices. The "solitary square mile" was mentioned only as the high-water mark in public coal-land prices, and as such was used as the basis for some extemporaneous comparisons of taxable values of coal land, of coal-mining plant and of output.

Recent Public Coal-Land Sales

The facts are that in the six years beginning July 1, 1907, when public coal-land appraisals began, the sales numbered 905 entries as opposed to "this one insignificant sale," as you term it, and the area sold was 225 square miles, rather than "a solitary square mile." In the five years prior to July 1, 1907, the acreage of coal lands sold as such was some nine square miles in excess of the area just given.

Again, that "$400 an acre" quoted in the Coal Age editorial is not at all a fair measure of the appraisal prices fixed by the Geological Survey. Under the regulations in force, a large part of the public coal lands will continue to be valued at the minimum prices specified in the law, $10 and $20. Thus it is that more than two-thirds of the sales under the new system have been at those minimum prices and the purchase of large acreages at these prices will doubtless continue. The average price for the 18 million acres appraised in the six years ended June 30 last, is $41.30, while the sales for the same period averaged about $18 an acre, or perhaps $5 more than for the corresponding period prior to 1907. It needs to be understood that the new prices are higher than the old only as well determined differences in tonnage and quality of coal are given consideration in the valuation of the lands. Large areas have been classified and valued, but each forty-acre tract is treated by itself in all appraisals above the minimum rate.

Sales of Coal Lands Equal to Output

In passing permit me to correct some Colorado figures given in Coal Age's excellent report of the Philadelphia meeting. I deny that there are "9,425,000 acres of (public) coal land in Colorado which could not now be purchased at any price and might later be offered for $400 per acre." The facts are: On July 1 last; there were 2,844,202 acres of public lands in Colorado classified and put on the market as coal lands at an average price of $59; there remained awaiting classification 5,037,721 acres, some of which has since been restored to entry; and the restorations to entry as coal land and non-coal land in Colorado during the preceding 12 months was more than 3 million acres. Also, the public coal lands sold in Colorado last year had an estimated tonnage equivalent to the year's output from Colorado mines. Several of these facts were mentioned by me at Philadelphia.

Appraisals Have Increased Taxation on Neighboring Coal Lands

The important subject of taxation, which was given special emphasis both by the Senator from Colorado and in your editorial, is a phase of this matter also fully appreciated by those of us charged by you as having "theories." Indeed, knowing as we do from personal experience and observation, that the development of the West brings in its train large public burdens, it has been a source of particular gratification to those of us working on the valuation of public coal lands in the Rocky Mountain States that our appraisals, which are a matter of public record in the local land offices, have resulted in the increase in taxable values of adjacent lands, and thus augmented the revenue available for public uses.

In counties where the assessors have had the interests of their fellow citizens at heart, the large corporate and private owners of coal lands have been forced to pay taxes on a coal-land valuation rather than on one based on the use of the land for grazing. The reports of this change in practice that come to our attention, both as criticisms from the large holders of idle lands and as requests for assistance by state officials, lead me to venture the suggestion that the local governments have largely benefited by reason of the federal policy of putting a reasonable valuation on the public coal lands.

Furthermore, recent legislation makes it possible for the surface of coal lands to be separately acquired for agricultural use, and such surface patents are being issued for hundreds of thousands of acres, with the result that to that extent the government coal lands are not untaxed any more than have been the millions of acres of railroad and other large grants and holdings of coal lands assessed on only a grazing-land basis. I mentioned this significant fact at Philadelphia.

Why Tax Coal Land and Not Output?

In conclusion, permit me to suggest in the columns of the Coal Age, as I did on the floor at the Mining Congress, that the principle of taxation of coal in the ground has little beyond the sentimental force of precedent to support it. The need of the community for returns from taxable property and the ability of the owners to pay taxes are better harmonized in a system of taxation on output.

Let us extend the principle of the Federal income tax and have state and local taxes that come nearer to varying directly and not inversely with the taxpayers' ability to pay. Moreover, as pointed out by R. V. Norris in his address at Philadelphia, reported in full in the Nov. 1 issue of the Coal Age, even moderate taxation of the coal in the ground puts a tremendous premium on haste and waste in mining, while the suggested method of a tax on output would result in the payment of taxes in maximum amounts at times of greatest production and largest local population and consequent need for public funds.

and would discourage mining in advance or in excess of normal demand.

George Otis Smith,
Director, U. S. Geological Survey.
Washington, D. C.

(Letter No. 2)

Your editorial on "The Western Coal Lands," in Coal Age for Nov. 1, reminds one of the old definition of a lobster as "a red fish that walks backward," recalling that the lobster is not red, is not a fish and does not walk backward. Confident from constant reading of your journal that you wish to be both accurate and fair, I venture to offer some figures and suggestions. You say:

> Mr. Smith . . . . has managed after a long delay to dispose of a solitary square mile.

While Mr. Smith is doubtless interested in the sale of the public coal lands, the Survey of which he is director has nothing to do with the sale beyond setting the price which, in the majority of cases, is the minimum allowed by law. There has been no delay in the sale of coal lands, as sales have proceeded month by month at practically the same rate as before the present policy was adopted. Instead of "this one insignificant sale," "a solitary square mile," of 640 acres, the government, under the present policy, has sold over 144,000 acres.

Survey Would Put Some Coal Land below Legal Limit if Permitted by Law

The implication of the second paragraph that the Western coal lands are being held at $400 per acre, as though that were the usual or average price, is misleading, to say the least, for the average is almost exactly $^1/_{10}$ of that figure. As just stated, most of the coal land is and will be priced at the minimum allowed by law, namely, $10 or $20 per acre, and much of it would be priced still lower did the law allow. On the other hand, where the land priced is in the center of one of the fields of high-grade coal, near successfully operated mines, the prices may be as high as several hundred dollars, if the coal is of coking character or if present in many beds or is of great thickness. The land cited by you as selling at $400 per acre is in the heart of one of the best fields of the West and adjoins large working mines, with 70 ft. of developed coal, of probably a little better grade than that of the Illinois and Indiana coal now going into Chicago. Under the present regulations, as high a price as $400 per acre could only be given under these extremely favorable conditions of location and knowledge of coal quality and tonnage. The statement that Western coal lands "held for $400 * * * * * would barely bring $5 or $10 per acre * * * * * if sold by individuals" must certainly have been a slip of the pen. As a matter of fact, the government sale prices are based on and compare favorably with private sale prices in the same fields when the lands are sold on the same basis; that is, for immediate development with both buyer and seller knowing the quantity and quality of the coal.

Appalachian and Western Prices

You state in another paragraph:

> The majority of the fuel in the Appalachian States can be bought for $5 to $100 per acre.

Undoubtedly *"the majority"* of the fuel in the Appalachian States can be bought at prices within the limits given, notwithstanding the fact that a perusal of the columns of Coal Age for the present year fails to show a single sale of coal lands in the Appalachian field at less than $30 per acre and shows many sales at over $100 and up to $2000 per acre. There are doubtless plenty of coal lands in the Appalachian States that can still be bought at less than $30 per acre, and many of them will never be worth that sum. On the other hand, the larger part of the coal lands of the West are and will continue to be valued at the minimum price allowed by law, $10 to $20 per acre.

The unfairness of your editorial is in comparing the highest-priced lands of the West with the lowest-priced lands of the East, as though they are in any way comparable in actual value. It is true that none of the Western coal lands have ever sold at as high a figure as some of those in southwestern Pennsylvania or the anthracite fields of that state, but lands containing good coal, situated near railroads, are limited in the West and, where they occur, the coal finds wide and ready sale, yielding, as a rule, a higher average profit per ton than similar coals in the East.

After all, the value of coal lands is determined by the net profit per ton and the available tonnage and, as most of the limited fields of good coal in the West near railroads are in private hands, and as many of them contain from 2 to 20 times as much available coal per acre as most of the Eastern coal fields, this, with the higher average net profit per ton, will explain the good prices at which coal lands in the West are sold between private parties. A comparison of assessments on coal lands in Colorado, as taken by the writer from the county assessor's manuscript reports (as given on page 34 in Survey Bulletin 424), with the assessments on Eastern coal lands shows that the Western coal lands in the limited fields of high-grade coal are held at as high, if not at higher, figures than lands containing coals of corresponding quality in the East.

Land Valuations Are Not Throttling the West

The questions which you raise as to taxation are a little out of my line, but I cannot help noting that the surface of coal lands is open to entry under the homestead, desert land and other forms of non-mineral entry, to whomsoever will use them and thereafter subject to taxation like other agricultural lands; that Wyoming, the principal coal state of the West, does not tax coal in the ground but as it is mined; that instead of "development * * * * * being throttled," the Western coal operators have the same complaint of over-competition as their brothers in the East, though it is not so keen or grinding. The Western coal mines are today amply meeting all of the market demands of that region for coal and apparently are pushing out into territory that would appear to belong to other fields further east, as when Wyoming coals are shipped to Omaha, and they are doing this with probably a little more satisfactory financial returns than the mines of the East. It is this slightly higher return for mining in the West, especially in the limited fields of the better coals, that is reflected in the prices of Western coal lands where sold by private owners. High retail prices of coal in the West are not the result of artificially restricted development, but of long average haul, slightly higher cost of mining (averaging about 30 per cent.) and possibly slightly better net profits.

If it be admitted that the present coal-land laws are entirely inadequate to properly meet present conditions of the coal industry, I cannot see how the public would profit by your suggestion of a return to the last century interpretation of those laws. Rather, we need new laws based on first-hand information that will be fair to present coal owners and operators and to the public as the present owner of much coal and as the present and future users of coal.

George H. Ashley,
Chief, Coal Section, Land Classification Board.
Washington, D. C.

You Are Interested in This

The next few issues of Coal Age will be the most interesting and valuable ever published. There will be an article on "Shaft Sinking," which will describe how obstacles were overcome when sinking through water-bearing strata. There will also be an article describing the coke plant owned by the State of Tennessee. The author will give valuable cost data, both on construction and operation. Another article will describe the coal fields in Nova Scotia, and still another writer will expound a theory regarding the process of coal formation. He will try to prove that anthracite is the result of extreme pressure, and that it is formed from bituminous coal at a far lower temperature and in shorter time than soft coal is developed.

Then there will be an excellent article defending the flame safety mine lamp, which will show that such lamps have been blamed unjustly for many mine disasters. The author declares that he believes a safety lamp may be crushed in a gaseous mixture without causing an explosion. A European writer has given us an article on "Cementation in Shaft Sinking." This will describe methods employed in France to effectually exclude water from shafts, both during sinking and subsequently. These are only a few of the articles we will print in the next two or three issues. Two or three of those above mentioned will appear next week. If you are interested in the latest progress in coal mining, this reminder is sufficient.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

The Scranton District Mining Institute will hold its annual dinner in the Town Hall at Scranton on the evening of Nov. 29. It is reported that upward of 1200 banquet tickets have already been sold. J. H. Dague, of Scranton, is president.

An International Exposition on Safety and Sanitation will be held Dec. 11 to 20, at the Grand Central Palace, under the auspices of the American Museum of Safety. Dr. Tolman, of 29 West 39th St., New York City, is director general of the exposition.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

Fuel Consumption in California

On account of the large production of petroleum in California, and its use for fuel, coal mining has practically ceased in that state. According to Edward W. Parker, of the U. S. Geological Survey, the production of coal in the last two years has been only 10,747 tons in 1911, and 10,978 tons in 1912.

The production of petroleum in California in 1912 was 86,450,767 bbl., of which not less than 50,000,000 bbl. was used directly for fuel. Large quantities of oil were also used in place of coal for gas making, and on the estimate of 3½ bbl. of petroleum, being equivalent to one ton of ordinary bituminous coal, it is probable that from 14,000,000 to 15,000,000 tons of coal would be required to perform in California the service now rendered by petroleum in the production of heat, light and power.

There is still, however, some demand for coal in California, particularly for domestic use and for the bunker trade at San Francisco, but this is almost exclusively supplied by coal from other states or from abroad.

There are within the state a number of small, widely separated coal fields, chief among which are the Mount Diablo field, of Contra Costa County, the Corral Hollow field, of Alameda County, the Priest Valley and Trafton fields, of San Benito County, and the Stone Cañon field, of Monterey County. The first two, which are on the eastern border of San Francisco Bay, and consequently in the west-central part of the state, produce black lignite or semibituminous coal.

The coals in Monterey County are of the same geologic age as those farther north, but they have been altered into true bituminous. The alteration in the San Benito County area has not progressed so far as in Monterey County, but the coals closely approach the bituminous grades. None of these, however, possess coking qualities.

Explosion at Acton, Ala.

An explosion in No. 2 mine of the Alabama Fuel & Iron Co., at 3:45 on the afternoon of Nov. 18 probably entombed 40 miners. Up to 9 o'clock the bodies of L. L. Patterson, E. Bright, John Langston, Henry Childers, Burns Kittrell and two unidentified negroes had been recovered. Kittrell went into the mine to do some cleaning, only five minutes before the explosion occurred. On Nov. 19 the number of dead recovered totalled 24 and 6 had been rescued alive.

Some of the victims are white and some are negroes. The normal quota of employees is 70 men, but as Nov. 17 was payday, some of the men did not report for work on 18th.

The first rescue parties reported several dead, lying beside the tramway of the main slope. State Mine Inspector C. H. Nesbitt and a number of surgeons arrived from Birmingham.

The mine has been considered one of the best equipped in the district.

Erratum

In our issue of Nov. 8, the article entitled "A Central Station in West Kentucky," appeared as being written by Newell G. Alford, of Earlington, Ky. This should have read, "By Newell G. Alford and Robert E. Wipfler, engineers for the St. Bernard Mining Co., Earlington, Ky."

INQUIRIES OF GENERAL INTEREST

Gas in Pump Discharge

We are pumping water 600 ft., from the swags in a nongaseous mine. At the end of the discharge pipe line, we can light the gas. Since no gas is generated in the mine, I would like to ask if you can explain where this gas comes from that is given off at the end of the pipe.

J. W.

Sullivan, Ind.

The gas is probably marsh gas (CH_4) with which the water is charged. It is common, in marshes, to see bubbles of gas rising to the surface of stagnant pools containing more or less organic matter. The slow decay of this matter forms marsh gas, which fact suggested the name of the gas.

In the present instance, the gas given off at the end of the pipe line may have been formed in the same manner; but it is more probable that the gas is given off from the strata underlying the coal seam, in such small quantities as not to have been noticed or detected in the mine workings. There are many mines generating small quantities of gas, in this manner, which are supposed to be "nongaseous mines"; because the quantity of gas generated is so small that it is carried away by the air current as rapidly as formed.

It is probable that, under the action of the pump, the gas absorbed by the water is liberated in the pipe line. The vacuum created by the suction of the pump and the motion given to the water in the act of pumping, would both tend to liberate the gas, which would burn when ignited in contact with air.

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Burning Culm Piles

The slow burning of slack piles has proved an intolerable nuisance in many mining camps. Can you give me information of the cause of these piles taking fire and the best way to handle the fire after it has started, so as to cause its extinction?

A. H. Gardner.

Louisville, Ky.

The cause of slack or culm piles taking fire is commonly due to the generation of heat within the pile. The fire may have been started, in some cases, by a stray spark from a locomotive or chimney; but, in the large majority of cases, the fire is due to spontaneous combustion taking place within the pile. The prevention of these fires is more easily accomplished than their extinction. In order to prevent a culm pile firing, it is necessary to avoid, as far as possible, the mixing of fine coal and slack with the waste of the mine. Another means of prevention is to carry off the heat generated within the pile, as far as this can be done. In some cases, this has been accomplished by drilling holes into the pile and sinking pipes to provide a sufficient ventilation to reduce the heat within the pile; but not allowing of the admission of sufficient air to promote combustion. How far this plan will be successful will depend very much on the inflammable nature of the coal, the size of the pile, the presence of pyrites or sulphur in the coal slack, and other causes that favor the generation of heat.

When fire in a culm pile has attained considerable headway, it is a difficult matter to extinguish it. Water is only a temporary benefit thrown on the pile, as the moisture thus provided greatly assists the decomposition of the coal and the generation of heat, with the result that the fire will be increased rather than decreased, later. A more practicable way of dealing with the situation is to dig out the fire, in its early stages, and do everything possible to decrease the heat being generated in the pile, as previously suggested.

In this connection, we would draw attention to the editorial in the present issue, entitled: Combustion of Coal, which suggests the great value of much mine waste, in the production of power. By the installation of a proper grate and furnace, the waste heaps of former years can be utilized to good advantage, for power purposes. This is what should be done with all culm piles, the burning of which proves a nuisance in any community. No argument is required to prove the economy of so doing. Instead of being a nuisance, the waste heaps then become a source of revenue.

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An Important Inquiry

From the time the first issue was published, to the present, I have been an interested reader of Coal Age, and have been particularly impressed with the practical nature of the discussion, of many important mining questions.

In regard to discussion, there is one question that occurs to me, which I believe should be brought to the attention of readers, and some definite policy decided upon, in order to arrive at practical conclusions as to what should be considered the most safe and sane way of handling the many difficult and dangerous problems that confront mining men today.

We have all noticed that the opinions expressed by practical mining men of equally long experience and intelligence, differ widely as to the best methods to pursue on occasions calling for prompt and efficient action to effect the rescue of lives endangered or the protection of property. It seems to me that some method should be suggested or some means adopted that will determine the superiority of one method over another. Certainly, in the discussion of such important questions as: Starting a Fan after Explosion; The Use of Mixed Lights in Mining; The Building of Collapsible Stoppings; etc., some definite conclusion should be reached. What can be done to gain this end?

Charter Subscriber.

Johnstown, Penn.

[The above is one of a number of similar inquiries received from time to time, and we would be glad to receive suggestions as to the best method of bringing the discussion of a question to a successful and practical climax.—Ed.]

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—What horsepower will be required to haul a loaded trip of 15 cars, weighing 1 ton (2000 lb.) each, up a 5 per cent. grade, 3800 ft. long, at a speed of 350 ft. per min.?

Ans.—When the grade is slight, as in this case, say less than 10 per cent., the weight of the loaded trip can be taken as the normal pressure on the incline; and, in this case, in order to find the load on the rope, it is only necessary to add together the tangent of the angle of inclination or the percentage of grade and the coefficient of rolling friction, which may be taken as 0.025. Multiplying this sum by the weight of a loaded trip will give the load on the rope. Thus,

$$L = 15 \times 2000\ (0.05 + 0.025) = 2250\ lb.$$

If greater accuracy is desired, a certain size of haulage rope should be assumed and its weight added to the weight of the loaded trip. Thus, in this case, a ¾-in. six-strand, seven-wire rope of Swede iron can be used, weighing 0.89 lb. per lineal foot. The total weight of this rope on the incline is then 3800 × 0.89 = say 3400 lb. This makes the total load hauled when the trip is at the foot of the incline, 15 × 2000 + 3400 = 33,400 lb. The total load on the rope is then

$$L = 33{,}400 \times 0.075 = say\ 2500\ lb.$$

At the given speed of hauling (350 ft. per min.), the required effective horsepower is

$$H = \frac{2500 \times 350}{33{,}000} = 26.5\ hp.$$

Allowing an efficiency of 75 per cent., which is more than sufficient for any ordinary slide-valve haulage engine, the required horsepower of the engine is 26.5 ÷ 0.75 = 35 hp.

Ques.—Find the horsepower of an engine, having two cylinders, each 30 in. in diameter, and a 5-ft. stroke, when the engine is making 60 strokes per min., with an average steam-cylinder pressure of 30 lb. per sq.in. and an average back pressure of 4 lb. per sq.in.

Ans.—The sectional area of each cylinder is

$$a = 0.7854 \times 30^2 = 706.86\ sq.in.$$

The average effective pressure, in this case, is 30 — 4 = 26 lb. per sq.in. The total effective pressure, for a single cylinder, is, then, 706.86 × 26 = 18,378+ lb. For a 5-ft. stroke and a speed of 60 strokes per min., the piston travel is 5 × 60 = 300 ft. per min. At this speed, the horsepower developed in a single cylinder, is

$$H = \frac{18{,}378 \times 300}{33{,}000} = 167\ hp.$$

For a duplex (two-cylinder) engine, at this speed, the horsepower developed would be 2 × 167 = 334 hp.

Ques.—(a) What is "lead", and why is it desirable that the valve have lead in a quick-running engine? (b) Why should exhaust pipes be larger than steam pipes?

Ans.—The valve of a steam engine is said to have lead when it is set at a slight advance so as to open the steam port a little before the piston reaches the end of its stroke. By this means, the live steam entering the cylinder assists the steam compressed in that end of the cylinder, to reduce the shock of the reciprocating parts and the engine runs more smoothly.

(b) The volume of the exhaust steam is always greater than that of the live steam admitted to the cylinder, because of the reduced pressure caused by the opening of the exhaust port. In order to accommodate this larger volume and to reduce to a minimum the back pressure in the cylinder, the exhaust pipes should always have a greater sectional area than the steam supply.

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per minute, under a water gage of 1 in., the length of the airway, including the return, being one mile

Ans.—A water gage of 1 in. corresponds to a ventilating pressure of $p = 5.2$ lb. per sq.ft. The formula for ventilating pressure, in terms of the quantity of air in circulation and the dimensions of the airway, is

$$p = \frac{k l o q^2}{a^3}$$

But for a square airway, $o = 4\sqrt{a}$. In order to avoid two unknown quantities, it is necessary to substitute this value for o in the formula, which gives

$$p = \frac{4 k l \sqrt{a} q^2}{a^3} = \frac{4 k l q^2}{\sqrt{a^5}}$$

Solving this equation for a, gives

$$a = \sqrt[5]{\left(\frac{4 k l q^2}{p}\right)^2}$$

Finally, substituting the given values in this equation gives, for the sectional area of the airway,

$$a = \sqrt[5]{\left(\frac{4 \times 0.00000002 \times 5280 \times 50{,}000^2}{5.2}\right)^2}$$

$$= 132.76\ sq.ft.$$

Ques.—Where is a common place for the piston rod of an ordinary hoisting engine to break?

Ans.—Piston rods that are secured to the follower by battering down the end of the rod so as to hold the follower firmly against a shoulder of the rod, instead of using a nut for this purpose, frequently work loose, the rod pulling out of its socket.

A more common occurrence, however, is for the piston rod to develop weakness at the point where it enters the crosshead. This is especially the case when there is any lack of alignment in the guides. The piston rod is more likely to break at this point than elsewhere.

Ques.—What parts of a boiler require strengthening by stays?

Ans.—In a plain cylindrical boiler it is necessary to stay the flat surfaces of the boiler, as, for example, the boiler ends.

COAL AND COKE NEWS

Washington, D. C.

The Interstate Commerce Commission has at last embarked upon what is perhaps its most important coal inquiry. Hearings in the case will be conducted first of all at Philadelphia and later at New York and Washington. The inquiry started on Nov. 17 in Philadelphia but all preparations had been made before that time. The Commission starts the proceedings on its own initiative because of a belief on its part that anthracite rates were unreasonably high. While the rumor is in constant circulation that the commission intends to bring about a reduction of from 15 to 20 per cent. in the charge for hauling coal from the mines to tidewater, no positive evidence in support of the idea can be secured. The fact that the anthracite rates are a good deal higher, relatively speaking, than other freight rates is admitted, and it is also acknowledged that in every recent instance where these rates have come up before the commission for adjudication there has been a reduction or a criticism showing that that body was disposed to reduce them.

Many data have been collected in advance of the actual opening of the hearings. These have been intended to show the character of the ownership of the railroads and of the anthracite deposits, with the apparent intention of demonstrating that this ownership is all in practically identical hands. Elaborate maps showing the movement of the coal have been prepared and filed by the roads and information has been furnished concerning the physical value of the properties and of their equipment. Estimates have also been made of the value of land and other investments, including trestles, sheds, wharves, docks, scales, coal pockets, buildings, etc., used by the coal carriers. Statistics as to the traffic movement on each of the roads have also been compiled and furnished to the commission to afford a basis for decision as to the equity of the anthracite rate. The Government has claimed for some time, that the alleged failure of the roads to live up to the commodities clause has made them less anxious to increase efficiency and decrease mining costs than would be the case if the mines were owned and controlled by an independent corporation entirely dependent on mining for its profits. This has been based on the belief that whenever there was a lack of profit from mining it has been made up by an increase in the charge for hauling the coal and vice versa.

Trust Inquiry to Use Data of Commission

Another assertion concerning the inquiry which opened on Nov. 17 is that an outcome of it may be found in the filing of antitrust suits at Washington as a result of the information developed in the course of the work there. This statement seems to be little more than conjectural, save that there is a basis for it in the fact that there is a disposition among Government officials to look for a ground of complaint, which would enable them to apply the Sherman law and thereby to get the credit of uncovering the violations, and bringing the offenders to justice. It is true, however, that while the scope of the proceedings now pending will be large, it is not possible, accurately, to forecast the extent to which they may be carried and they may have ramifications which are not now altogether evident.

Increased Pay to Trainmen and Full-Crew Bills

Estimates of the increased costs due to the award in the trainmen's arbitration case, have shown that the increase of 7 per cent. in wages will fall very heavily upon the so called coal roads between the anthracite regions and the coast points. This increase in expenses cannot be precisely estimated, but it is regarded as likely to fall heavily upon the same roads that have been already subjected to materially increased expense, in consequence of the full-crew bills adopted by Pennsylvania and other neighboring states within the past few months. The arbitration board declared that an increase in the cost of living equal to at least 7 per cent. of the cost in 1910, had occurred and this was practically the sole ground upon which action was taken. It is not believed to be an altogether fair estimate of the added cost of living in the section covered by the anthracite roads.

With reference to the apparent suggestion contained in the report that additional increases in operating expense will necessitate additional charges for freights, this is but one of many similar suggestions which have lately been coming to the Interstate Commerce Commission and to other Federal authorities, in favor of a prompt action by the commission designed to grant the 5 per cent. increase for which application has been made, or, at all events, to give the railroads some power to make charges above those that are now exacted by them for the movement of freight. It is quite generally admitted in administration circles that the case of the railroads is being greatly strengthened by such action as that of the arbitration board.

An inquiry of some importance and extent was instituted by the Interstate Commerce Commission on Nov. 17 with reference to the rates on bituminous coal from points in Virginia, West Virginia, Kentucky and Tennessee to points in Virginia, North Carolina, South Carolina, Georgia and Florida. The investigation thus planned will extend work which has been in progress in connection with coal rates in the bituminous field for some time past, the previous investigation of such rates having been more or less sporadic and dependent upon individual complaints filed from time to time.

HARRISBURG, PENN.

Suggestions of importance to both the miners and the operators of the anthracite fields were prepared at a meeting of the subcommittee of the mine inspectors of Luzerne County at a recent meeting in Wilkes-Barre. The meeting was the result of a session of the inspectors from this state held about a month ago in that city with James Roderick, the chief of the department of mines of the state.

At the meeting of the committee it was found that more than 75 per cent. of the accidents which occur in the anthracite fields are due to three causes, which are: Falls of coal and rock, the use of powder and other explosives, and to mine cars.

In regard to the first cause in which a large number of men is injured, it was suggested by the committee of inspectors that the chambers and gangways be made more safe by employing an additional number of props and timbers, the latter to be placed at smaller intervals than is now the practice. It was pointed out that in many cases the accidents from falls of coal and rock are caused by the failure of the men to place the timbers close enough together to prevent any of the loose material from coming through. Instances were cited where a piece of rock from the roof had slipped through without any warning and caused injury to either the miner or laborer, when if the timbers had been placed close enough together such an occurrence would have been impossible.

In regard to the use of explosives the committee is determined that more care shall be used in the handling of the same than is now exercised. It was pointed out that the only precautions adopted by many of the men in handling powder are those printed on the package. One bad practice of the miner of today is to open his keg of powder and make a charge while the contents are exposed to view. In many cases a spark from his lamp may fall into the keg, and the next moment an explosion occurs which may cause an explosion of gas and the injury of more men than the miner himself.

Precautions of Susquehanna Coal Co.

A compliment is paid the Susquehanna Coal Co. for the manner in which it is looking after the safety of the men in its employ. It was stated that the company had at its own expense placed 22 men at work, their sole duty being to instruct employees as to how to avoid accidents. The men go through the workings of the colliery daily and make suggestions to the men employed therein, and see that the same are carried out. The result of this system is most satisfactory to the company, and has resulted in a decrease in the number of accidents.

Those who were present at the meeting of the committee and the districts represented by them are: Hugh McDonald. sixth; Thomas J. Williams, seventh; S. J. Jennings, eighth; D. T. Davis, ninth; Joseph J. Walsh, tenth; David J. Roderick, eleventh.

PENNSYLVANIA

Anthracite

Mount Carmel—A 7-ft. bed of coal has been found on the Bolich property near Taylorville, and a 25-ft. seam has been discovered at the Locust Spring mine, of the Philadelphia & Reading Coal & Iron Co. The output of the colliery will be greatly increased by this new discovery. The Reading Co., have just opened a new hospital and washroom for the miners at the foot of the Locust Spring shaft.

Dunmore—The Pennsylvania Coal Co. is reported to be negotiating for the purchase of the Sibley colliery of the Elliott-McClure Co., on the mountainside, west of Old Forge. Formal announcement is expected soon.

The Sibley colliery has been in operation for many years as an independent company. The coal beds are said to contain many thousands of tons of coal yet. The Elliott-McClure Co., present owner, is a Philadelphia concern, and has worked this mine for several years.

Scranton—Following the dismissal of two slate pickers, 1000 miners struck at the Bellevue colliery, owned by the Lackawanna Co. The boys charge that the boss was discriminating against them, and when they complained of the alleged unfair treatment the strike was called.

A settling caused by mine working started in the rear of a building on South Washington Ave., the hole was ten feet in diameter and thirty feet in depth. The mine underneath this part of the city is operated by Sloan and the Central Coal Co.

Plymouth—The Delaware & Hudson Co. tract, in the vicinity of No. 4 shaft is perforated like a sieve with cave holes, which allows the surface water to flow into the mine workings, and to prevent this, a force of men have been put to work to change the course of a stream from the mountainside toward Brown's Creek. The borough has instructed its attorney to apply for an injunction restraining not only the D. & H. Co., but also the Lehigh & Wilkes-Barre Coal Co. and Kingston Coal Co., from allowing water to flow over its streets and into Brown's Creek.

The settling in the Dodds mine of the Plymouth Coal Co. caused considerable damage to property on Main St., and for a time it was feared that some of the buildings would topple over.

Bituminous

Brockwayville—The Toby Coal Co. operating in Elk County, has purchased a new tract of coal lands and will open a mine to take the place of the Black Diamond mine, which is almost exhausted.

Harwick—The Allegheny Coal Co. has filed a suit against three miners in which it seeks to recover $500 damages from each, for the defendants' refusal to vacate houses of the company after having received due notice to do so.

Du Bois—The Northwestern Mining & Exchange Co. will soon begin the sinking of a shaft at Cramer Station, Jefferson County, on the Buffalo, Rochester and Pittsburgh R.R., which is expected to result in the building of a new mining village and one of the largest coal operations of that company in this part of the state. Work is expected to start very soon.

Pittsburgh—For almost a year there has been such a brisk market that the demand for good coal land has been steady and it is at present said to be better than in a long time. A 5000-acre tract of coal in Cumberland Township, Greene County, is being examined as to the titles, preparatory to being transferred to a big steel company, the selling price averaging about $1000 per acre. The coal land belongs to J. V. Thompson and others at Uniontown, but just what steel company is buying it has not been disclosed. One rumor is that it goes to the Jones & Laughlin Co., but this is denied by a member of that corporation. Large tracts of coal in Allegheny, Washington and Westmoreland Counties are also being so closely held, as to be practically unobtainable, which accounts for the good prices being obtained for coal farther away from Pittsburgh.

The H. C. Frick Coke Co. recently filed a suit against William P. Snyder in which it seeks to recover $80,000 damages. It is alleged in the statement of claim filed by the company that Snyder and Charles Donnolly, now deceased, owned the McClure Coke Co., which was later purchased by the H. C. Frick Coke Co. It is averred by the plaintiff that it has been compelled to pay obligations which belonged to the McClure Coke Company.

The Pittsburgh-Buffalo Co. has paid to the Union Trust Co., trustee of the first mortgage bonds, $272,000 for sinking-fund account, to retire and cancel bonds of that amount.

The Johnetta Coal Co., a subsidiary of the Pittsburgh-Buffalo Co., during the week satisfied of record $57,144 of mortgages, held by owners of coal lands in Washington County.

WEST VIRGINIA

Clarksburg—The severe storm laid off 2000 miners, railroad cars being unobtainable.

Wellsburg—Four hundred men of the West Virginia and Pittsburgh Coal Co. at Gilchrist and La Belle are out to obtain the 8-hour day, check weighmen and a recognition of the union. The company will not concede the last demand.

Charleston—One death and three nonfatal accidents each working day is the record of the coal mines of West Virginia for the four months ending Oct. 31.

Following the purchase of the New River coal field by British interests, local operators predict that it may not be long until other extensive holdings pass formally into foreign ownership. Agents of D. A. Thomas, Welsh mine owners and capitalists, are in the West Virginia fields, and it is understood they have gathered options on more than 30 properties, with an annual output of 2,500,000 tons.

The case against John P. White, national president of the United Mine Workers of America and other national and district officials was called Nov. 18. The defendants are indicted for alleged conspiracy in restraint of trade.

Governor H. D. Hatfield and Chief Inspector E. A. Henry are conferring on a system of classification of mines into nonhazardous, hazardous and extra-hazardous operations. It is proposed that the more hazardous be more frequently inspected and the system is to be used as a basis for liabilities chargeable under the working men's compensation law.

Coal operators from Kanawha and New River districts met Nov. 8 and appointed a committee to confer with the Chesapeake and Ohio R.R. relative to car supply. Failing redress they propose to appeal to the state public service commission or the interstate commerce commission.

KENTUCKY

Henderson—The coal men nearby have started a price war and prices have been reduced 25 to 50 per cent.

Providence—Several thousand acres of coal privileges in the Lisman, Corluth and Nebo sections have been sold to Pittsburgh capitalists, W. L. Baker, of the Corluth country, secured options on the property some time ago. The syndicate will open mines.

Whitesburg—It is reported that a deal is pending between C. Bascom Slemp, the Virginia congressman and coal operator, and the Mineral Fuel Co. and the Consolidation Coal Co., looking to a change in the ownership of Mr. Slemp's fine coal properties in the Boone's Fork region. Mr. Slemp and a number of other prominent coal operators recently went through the new operations of the Mineral Fuel Co. at Fleming and Potter's Fork, and also visited the Consolidation Coal Co.'s mines at McRoberts, Dunham, Jenkins and Burdine.

ALABAMA

Acton—Twenty-four miners are known to have been killed and at least 12 others are still missing as a result of an explosion at the Alabama Fuel and Iron Co.'s No. 2 mine near here. It said that 43 men, the majority white, went into the workings early today but how many left before the explosion is not known. The Federal mine-rescue automobile car, recently transferred to Birmingham, made a quick run of 34 miles to Acton, arriving at the same time as the Tennessee Coal & Iron Co.'s rescue car which was dispatched by special train. The mine fan was not injured and was set in motion at once.

OHIO

Belle Valley—The Imperial Mine of the O'Gara Coal Co. had another explosion Nov. 12 in which one man was burned.

Columbus—Joint ownership of the Kanawha & Michigan Ry. by the Lake Shore and Chesapeake & Ohio Ry. must cease by order of U. S. Circuit Court.

Secretary B. F. Nigh, of the Ohio-Indiana-Michigan-Coal Association has been called before the Interstate Commerce Commission in the anthracite coal freight hearing. Mr. Nigh represents the association which consists of hundreds of dealers throughout the states of Ohio, Indiana and Michigan who are asking for a general reduction in anthracite rates. It is claimed that the rate to Buffalo compared with other rates of like distance is inequitable.

The joint legislative commission which was named by Governor Cox to investigate and report on a policy respecting the future of the canals of the state will meet in Columbus soon to take evidence. Coal men are very much interested in the proposition as the question of the abandonment of Ohio canals will be considered.

ILLINOIS

Springfield—Pittsburgh Coal Co., of Pittsburgh, purchased at receiver's sale all the properties of the Illinois Collieries Co. in Sangamon, Macoupin, Montgomery and Bond Counties for $2,000,000. The bonds were principally held by the Pittsburgh Coal Co. The receivership dates back to 1909.

Taylorville—The Christian County Coal Co.'s mine is closed and 350 men are on strike to get better terms for two motormen. The men do not work every day and want $87.45 per month.

Eldorado—The miners of the Eldorado Coal & Mining Co. are on a strike, to force the above named company to remove the mine manager, because he permitted violations of the mining law.

The miners have made a complaint to the State Mining Board, asking that the manager's certificate be canceled.

Belleville—Owing to the cylinder head of one of the cylinders of the hoisting engine at the Massie mine blowing out, the mine was closed down several days, and a serious accident was averted by the presence of mind of the engineer in applying brakes, preventing one of the cages dropping.

INDIANA

Petersburg—Parish & Co., of Bicknell, who have leased 1600 acres of coal land west of this city, are testing the territory with core drills for a suitable location for the shaft.

Terre Haute—An explosion occurred at the new mine of the Clovelly Coal Co., near here, on Nov. 10, driving both cages to the top of the tipple and causing great damage to same.

Three men are dead, the result of an explosion in the Higgins-Martin coal mine at Pine Ridge. Two of the men were suffocated, and the engineer died from heart failure, due to the excitement incident to the explosion.

COLORADO

Denver—Forbes, a camp of the Rocky Mountain Fuel Co., 12 miles north of Trinidad was reoccupied by the state militia on Nov. 5 after a skirmish in which Robert Nichol, the superintendent was fired on. The operators in the strike district agreed on Nov. 7 to take back all strikers but those guilty of crimes. It is said there are 140 thus blacklisted. The operators still refused, however, to recognize the union.

Large numbers of miners were returning to work at that date but the fight at Forbes was renewed Nov. 8 killing 5 nonunion men, probably mortally injuring 2 others, less seriously hurting another; four troopers were deported, two nonunion men beaten and four R.R. bridges burned. At La Veta three guards bringing home a miner were ambuscaded and all four men killed.

Gov. E. M. Ammons threatened to call on the U. S. troopers at Fort Douglas as he was hampered by State Auditor Roady Kenahan leaving the state without signing certificates of indebtedness for the support of the militia. At a joint meeting of the chamber of commerce and the real estate exchange, Frank Gove, counsel for the Victor-American Co. offered to give the city or state a mine, as the company officials wanted to see how successful municipal or state operators would be. On Nov. 11, five miners confessed to the ambuscade and murder at La Veta.

Pueblo—Judge Lewis declared to the grand jury investigating the strike, that attempts to prevent the mining of coal, which was still in the ground was not a conspiracy in restraint of trade.

MISSOURI

Fulton—The Callaway Coal Co. has begun stripping operations, with a $25,000 stripping machine at its property five miles southwest of here. The machine, it is estimated, will uncover 200 tons of coal a day, and at this rate between seven and eight acres of coal will be mined in a year. The company has options on 200 acres of coal lands which will be all that will be needed for several years. The machine will remove earth and rock 30 ft. deep at a single operation.

WASHINGTON

Spokane—Attorney N. W. Prockett, of the Puget Sound Traction, Light & Power Co., of Tacoma, Seattle and Olympia, has asked the Public Service Commission for the privilege of putting into effect at once the new tariffs for power furnished the coal-mining operators of western Washington. The privilege will be granted as soon as a few changes are made.

Organization of the Wilkeson Light, Fuel & Power Co. has been finally consummatd by coast men, taking over 960 acres of coal lands in Pierce County near the town of Wilkehon, and including the Briar Hill, Davis and Bowen properties, which are said to contain between 60,000,000 and 80,000,000 tons of high-grade bituminous coal. A townsite will be established and a light, water and power plant put into operation just as soon as possible.

NEW MEXICO

Dawson—Rees H. Beddow states that the explosion of Oct. 23 was caused by coal dust. The U. S. Bureau of Mines found only 0.19 per cent. of methane in the sample of air sent from the mine a week before explosion. In last 10 days experts have hunted gas and have nowhere seen a cap on the lamp. The loss of life is fixed at 263 men.

ALASKA

Cooks Inlet—Capt. Neilson has discovered a valuable deposit of anthracite along the Knik River at the northeastern corner of Cooks' Inlet.

Next year Fairbanks will receive coal from the British Yukon, near Five Fingers, where a mine was opened this year by C. J. Milton and other St. Paul capitalists.

RECENT COAL AND COKE PATENTS

Steam Boiler Furnace—Orland D. Orvis, New York, N. Y., 1,071,787, Sept. 2, 1913. Filed Jan. 20, 1911, Serial No. 603,685.

Gas Producer—Emile Dor-Delattre, Leige, Belgium, 1,072,098, Sept. 2, 1913. Filed July 24, 1911, Serial No. 640,182.

Smoke Consuming Device for Fire Boxes—W. D. Boyce, New York, N. Y., 1,071,689, Sept. 2, 1913. Filed May 15, 1912, Serial No. 697,443.

Furnace Door—F. Orth, Indiana Harbor, Ind., 1,071,786, Sept. 2, 1913. Filed Dec. 4, 1911, Serial No. 663,801.

Water Tube Boiler—Wilheim Schmidt, Cassel-Wilhelmshohe, Germany, 1,072,174, Sept. 2, 1913. Filed April 12, 1911, Serial No. 610,540.

Fire Box for Boilers—J. McClellon, Everett, Mass., 1,072,865, Sept. 9, 1913. Filed June 7, 1909. Serial No. 500,562.

Boiler Furnace—Gustav de Grahl, Zehlendorf, Germany. 1,073,039, Sept. 9, 1913. Filed Nov. 20, 1911, Serial No. 661,352.

Stop for Mining Cars—James A. Nolan, Bowerston, Ohio, 1,072,977, Sept. 9, 1913. Filed Aug. 7, 1912, Serial No. 713,938.

Apparatus for Separating Fine Coal and the Waste Materials Thereof. G. B. Damon, assigner to Lehigh Coal and Navigation Co., New York, 1,072,833, Sept. 9, 1913. Filed Aug. 8, 1908, Serial No. 447,630.

PERSONALS

M. G. Doll has accepted the position of general sales manager with the Bury Compressor Co., of Erie, Penn.

Frank Oakes, former general shop foreman of the Chicago works Link-Belt Co., has been made superintendent of their works at Philadelphia.

C. Willis Adams, former superintendent of the Link-Belt Co.'s Philadelphia works, has been transferred to their Chicago works to take up his duties as assistant to the president.

Oscar W. Schnell, general outside foreman of the six collieries of the D. & H. Co. in Larksville Borough, has resigned his position, and Charles Contine, of the Dickson colliery has been selected as his successor.

C. V. Kerr, the organizer of the Kerr Turbine Co., New York, and later with McEwen Bros., of Wellsville, N. Y., is now connected with the staff of the Centrifugal Pump Department of the A. S. Cameron Steam Pump Works.

Anthony Mohr has returned to Portland, Ore., after a five months visit in the coal mines of eastern Oregon in which he is interested. He reports that the development work in the mines in Wheeler county is far exceeding all expectations.

George Gould, breaker foreman at the South Wilkes-Barre colliery of the Lehigh & Wilkes-Barre Coal Co., has been appointed outside foreman at the Parrish colliery of the same company, to succeed John Bresnahan, who recently resigned.

Hywel Davies and W. J. von Borries have entered into a partnership under the firm name of Davies & von Borries as consulting mining, civil and industrial engineers, with offices at 39 Hernando Bldg., Lexington, Ky., and 110 S. 7th St., Louisville, Ky.

C. L. Newcomb, Jr., has been appointed to succeed G. B. Turner as western representative of The Goulds Mfg. Co., Seneca Falls, N. Y. Mr. Newcomb's headquarters will be at 12 Chamber of Commerce, Denver, Colo., and he will look after the company's interest in the Rocky Mountains and Northwestern territories.

M. M. Bardwell, who was formerly located in Louisville as general manager of the coal companies in which Byrne & Speed, of Louisville, are interested, has transferred his offices to the Western Kentucky operation of the Taylor Coal Co. at Beaver Dam. Mr. Bardwell still spends a good deal of his time in Louisville, however.

Elmer O. Long, assistant chief engineer of the Consolidation Coal Co. in Somerset County has tendered his resignation and will engage in business with Frank B. Flick, mining engineer and engineer for Somerset borough. Charles Ling succeeds George B. Glennas general manager of the Sunnyside Coal Co. at Johnstown.

Philip P. Bourne has recently been appointed chief engineer of the Epping-Carpenter Pump Co., with shops at Pittsburg. Mr. Bourne was for eight years, chief of the engineering staff at The Blake-Knowles Steam Pump Works, East Cambridge, Mass. This appointment is in line with other recent activities of the Epping-Carpenter Pump Co., in strengthening their organization and enlarging their business, especially in high duty and centrifugal pumping machinery.

John W. Smith, special disbursing agent of the U. S. Navy with the Matanuska coal mining expedition, was in Seattle recently purchasing horse sleds and other equipment necessary for the transportation of the coal to tidewater, a distance of about 300 miles. It is expected that the entire winter will be spent in moving the coal. There were about 800 tons taken from the experimental mine during the summer. According to Mr. Smith, this will all be aboard the naval ships by June, 1914 ready for its tests.

The Lehigh Valley Coal Co. has announced the following appointments as District Superintendent in the Wyoming Division, to fill the vacancy caused by the death of District Superintendent Joseph J. Jones: J. S. Hammonds, formerly District Superintendent at Henry, Mineral Springs, Franklin and Warrior Run Collieries, to be District Superintendent at Henry, Prospect and Dorrance Collieries; and Sheldon Jones, formerly Asst. District Superintendent at Prospect Colliery, to be District Superintendent at Mineral Spring, Franklin and Warrior Run Collieries.

CONSTRUCTION NEWS

McComas, W. Va.—The Thomas Coal Co. will equip its power station at Mora, W. Va., with new 100-kw. and 200-kw. rotary converters and switchboards, and has ordered the apparatus from the General Electric Co.

Dante, Va.—The Clinchfield Coal Corporation will soon place in operation in its mines eight 5-ton and two 10-ton electric mining locomotives recently purchased from the General Electric Co.

Ellsworth, Penn.—The Ellsworth Collieries Co. has arranged to add to its power-plant equipment a 937-k.v.-a. Curtis turbo-generator unit with 25-kw. turbo-exciter, switchboard panels and accessories. The apparatus will be built and installed by the General Electric Co.

Belmont, Ohio—Belmont Coal Mining Co. is remodeling the outside layout of its Glencoe Mine. The old car haul which extended into the mine was abandoned, and is now being replaced by a shorter and steeper one, which has the advantage of keeping all the machinery on the outside where it is accessible and can be better taken care of. The electric locomotives will now bring the cars out of the mine through an opening made for the purpose, delivering them to a chain car feeder, which feeds them regularly to the chain car haul. The new equipment is being installed by the Fairmont Mining Machinery Co., Fairmont, W. Va.

Elkins, W. Va.—The Davis Colliery Co. is remodeling the tipple at Coalton mine. Preparation is being made for a better grade of lump and egg coal. Shaker screens separate the sizes, delivering the lump and egg coal to separate picking tables. The tables are located over the railroad tracks, running longitudinally with them, and loading into the cars over adjustable booms—thus eliminating breakage. The nut and slack sizes are used for coking. A Bradford cleaner is being installed to improve the quality of these sizes. Contract for this equipment was awarded the Fairmont Mining Machinery Co., Fairmont, W. Va.

INDUSTRIAL NOTES

Bucyrus, Ohio—The recently organized Bucyrus Lumber Co. has taken over the planing mill, coal and builders supply yard of the White Lumber and Coal Co., of Bucyrus.

Oakwood, Ill.—The large new tipple of the Two Rivers Coal Co. at old Missionveld, southeast of this village, is nearing completion, and it is stated that coal will be hoisted here within a few weeks.

Spokane, Wash.—The Summit Coal Co. near the slope mines of the Northwestern Improvement Co. at Cle Elum has been sold to the Roslyn Fuel Company, the consideration being in the neighborhood of $40,000.

Erie, Penn.—The Erie Pump & Engine Works has recently purchased the business, patterns, etc., of the Lake City Engineering Co., of Erie, Penn. The business of the latter firm will be continued under the new management.

O'Fallon, Ill.—All Illinois coal-hoisting records were broken at the Nigger Hollow Mine No. 2, when 4400 tons of coal were hoisted in 7¼ hr.; the previous record being held by a mine at Benld, Ill., which hoisted 4356 tons in 8 hours.

Pittsburgh, Penn.—The H. C. Frick Coke Co. has purchased from the Pittsburg-Buffalo Coal Co. 395 acres of coal land located in Jefferson township, at a consideration of $274,000. The coal underlies 12 tracts of land facing the Monongahela River.

Windber, Penn.—The Berwind-White Coal Co. has closed a deal for the purchase of approximately 2000 acres of coal land owned by the Henrietta Coal Co. adjoining the Berwind-White No. 42 operation. It is likely that an opening will be made in this tract.

Franklin, Kan.—The Western Coal & Mining Co., which is opening up two new mines at this place, has announced that coal has been reached in both. One of the company's new mines at Lexington, Mo., has begun production, while the tipple on a fourth is being built.

Sewalls Point, Va.—The 200,000-ton storage plant of the Gulf Smokeless Coal Co., which has been building for some months, is now completed. It has been given a test, about 500 tons being dumped into the receiving pits and transferred to the storage yard. The plant consists of two 20-ft. concrete receiving pits built in the center of a cleared field. Railroad tracks run across the pits and the coal is dumped from hopper-bottom cars into the pits. After the coal has been dumped, it is dug out by a steam shovel and deposited in the storage yard on either side of the receiving pits.

NEW INCORPORATIONS

Indianapolis, Ind.—The Oak Ridge Coal Co. has been organized with a capital stock of $10,000. Robt. Hall, M. E. Magg and W. E. Linton are the directors.

Indianapolis, Ind.—The Oak Ridge Coal Co. has been incorporated here with $100,000 capital stock, to mine coal. The directors are Robert Hall, M. E. Magg and W. E. Linton.

Minneapolis, Minn.—The British Columbia Collieries Co. has been organized with a capital stock of $500,000. The incorporators are James C. Andrew, George B. Norris, George H. Derry and Walter H. Hickman.

Clarksburg, W. Va.—A charter has been issued to the Norwood Coal Co., with an authorized capital of $10,000. The incorporators are: Karl Horner, Chas. B. Shont, J. Lee Horner, Wm. H. Wolverton and Chas. B. Johnson.

Kewanee, Ill.—The Streicher-Stuhlsatz Coal Co., to conduct mining and construction business, has been organized with a capital of $2000. The incorporators are: John Streicher, John Stuhlsatz, John P. Steeicher and Peter Stuhlsatz.

Bristol, Tenn.—The United Collieries Co. has been organized with a capital of $5,000,000 for the purpose of extensive developments in the Black Mountain coal district. Chas. W. Pondurant is president and manager of the new company.

Charleston, W. Va.—The Horse Creek Block Coal Co. has been chartered, with an authorized capital stock of $100,000. The principal offices of the company will be in Charleston. The incorporators are: G. B. Combs, T. R. Farley, P. R. Hendrick, A. A. Honaker, John Jarrell and G. W. Johnson.

COAL TRADE REVIEWS

GENERAL REVIEW

Hard coal more active as season advances. Companies drawing on their stocks. Soft coal moderately firm with a tendency to decline. Lake shipping about finished.

Seasonable weather conditions have created a demand for hard coal at all the distributing centers, and the trade has attained the greatest activity of the year. The last rush of water shipments to points soon closing to navigation is now on, and there are some anxious phases to the situation. Stove coal continues the leader in demand, and the shortage is becoming more sharply defined as the season advances. While concessions in the circular are occasionally heard of on certain sizes, this is confined almost entirely to shipments threatened with demurrage charges; the market generally is so strong that the companies are already beginning inroads on their storage supplies.

Bituminous coal continues uncertain, with a pronounced wavering tendency, and generally firm, though far from active. The tendency is strongly toward a declining market due to the apathy in general business. Adequate, though not excessive, tonnages are reported at all the large distributing centers, and business is quiet. Contract consumers are showing a disposition to take more on their contracts, however, and it is clear that the more seasonable weather is having an effect upon conditions. The outlook is by no means clear. The opening prices for 1914 are already being discussed, and in view of the possible labor trouble next April, the opinion prevails that a higher level will be established.

An embargo of several days' duration was declared in the Pittsburgh district against Lake shipping as the result of the heavy storm of last week; the tremendous losses by the Lake shipping interests will now make it impossible to move as much coal to the head of the Lakes as was anticipated. Because of the tie-up in transportation facilities there was a temporary urgent demand, manufacturing interests being the worst sufferers, but normal conditions are now about restored. The trade is now face to face with the problem of finding new markets for the Lake tonnages, but with a heavy demand in the West not much difficulty is anticipated. However, the readjustment is being viewed with some uneasiness, particularly because of the rather critical position of the market.

The Ohio market has stiffened up sharply due to the recent storm; Lake shipping has, of course, been badly crippled because of the large number of vessels lost, and a congestion is threatened at some of the junction points. Considerable difficulty is being experienced in getting sufficient coal forward at Hampton Roads to meet contract requirements; shipments have been heavy, and the slow return of railroad equipment from the Lakes is tightening the car supply. Consumers in the Southern market are taking the minimum amounts on their contracts and domestic coal has failed to develop any briskness in spite of the approaching cold weather and uncertain car supplies.

The steam trade in the Middle West is showing improvement, but in spite of the severe weather conditions, the domestic market continues slow. Some storing of coal is already being done in anticipation of possible labor trouble next April.

EASTERN MARKET

BOSTON, MASS.

Hampton Roads coals plentiful, and only a quiet demand. New England consumers accepting deliveries more regularly. Georges Creek and the Pennsylvanias show no significant change. Water freights easy and anthracite showing possibly a milder tone, but with dealers no less anxious.

Bituminous—The Hampton Roads coals are mulling along, $2.85 continuing the price on what few sales there are of spot coal. There is a sufficiency of coal on hand at all the piers, so the dispatch is excellent, although with most of the agencies the coastwise trade is still being relied upon to furnish the more consistent market. Off-shore the demand is better, but so far confined to the larger shippers. In this section business is only quiet. The corporations are accepting deliveries on their contracts rather more regularly than early in the month and the advance of seasonable weather makes a difference. The prospect for December is not clear, however, and there are many who think spot purchases will continue to be made at the season contract price.

Georges Creek is also quiet, but with a normal movement on contract. The same is true of the better grades from Pennsylvania. There is some see-sawing of prices on the latter, the tendency being down rather than up, however, and all hands are still in doubt as to what the season will bring forth. The inferior coals are slow, and those operations that have been imprudent enough to ship on the market are netting some low prices at New York and Philadelphia. The call here for Pennsylvania is only scattering, and there is nothing that signifies any material improvement in the near future. All-rail trade is in about the same situation as the business at tide.

Freights—Rates from Hampton Roads are still easy at 70@75c. on large sailing vessels, with almost no inquiry for steamers. On Long Island Sound, barges from New York have been moving slowly and freights are up 5c. or so.

Anthracite—The last cargoes are now being loaded for Bangor and other Eastern ports that soon will be ice-bound. The demand is strong everywhere, although retail trade is having a temporary lull. The dealers, however, are still anxious about supplies, particularly of stove, and they are beginning to be in a mildly complaining mood. There have been several short interruptions to the movement of tows the past fortnight and that has meant rather slower shipment than would otherwise have been the case. Less is heard of premium coal in New York and there is perhaps an easier tone than a week ago.

Quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New Rive
Mines*................	$1.00@1.55	$1.25@1.65	$1.67@1.77	
Philadelphia*..........	2.25@2.75	2.50@2.90	2.92@3.02	
New York*............	2.55@3.05	2.80@3.20	3.22@3.32	
Baltimore*............			2.85@2.95	
Hampton Roads*........				$2.85@2.90
Boston†..............				3.72@3.82
Providence†...........				3.75@3.87

*F.o.b. †On cars.

NEW YORK

Bituminous slow but buyers are quietly accumulating surplus tonnage. Shipments on contracts continue good. Stove coal becoming shorter as the season advances. Most of the hard coals now in short supply.

Bituminous—The New York soft-coal market is in fair condition, but quiet. Consumers, as a rule, are not buying very heavily, but on the other hand, there is the general belief that they want to see more coal ahead at this time of the year. Such a condition is only natural as the appearance of a protracted spell of severe weather would soon wipe out all available supplies, and create a tight situation. It is this uncertainty that is probably the mainstay of the market.

The heavy storm of last week had little effect upon conditions here, particularly as regards Pennsylvania coals; the mines in that district were not in the storm zone, and experienced little or no inconvenience. Car supply on the Pennsylvania R.R., however, tightened up preceptibly toward the end of last week, being reported at only 60% requirements, and showed indications of being inadequate the beginning of the current week. The New York Central is furnishing a full supply. The labor question continues to be a bothersome factor, not so much in the supply, mines having a relatively full complement of men, but finding it impossible to keep them at work steady. The market continues as follows:

West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

Anthracite—The feature of the New York hard-coal market is the acute shortage of stove coal; the trade seems to be absolutely barren of this grade. Nut coal at the present time is nearly as short as stove, and as a matter of fact, egg is the only grade that can be supplied with any dispatch. This was in short supply a few weeks ago, but has rently become a complete drug on the market. As a rule usiness is quiet, not because of the lack of orders, but due ore to the difficulty in obtaining tonnage.

In the smaller sizes, buckwheats are generally heavy with ne exception of the high grades of No. 1 which are short. ice coal is holding its own, while barley is exceptionally ng. Pea coal continues the leader in the smaller sizes; the rade is expressing the wish that the producers would readjust their preparation so as to increase the proportion of ea coal.

The car supply seemed to be much improved in the region with the exception of the Reading on which the supply is naccountably tight; apparently, however, this applies more articularly on shipments East.

The New York hard-coal market is now quotable on the ollowing basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular*	Individual
Broken	$5.00	....	$4.95	
Egg	5.25	$5.10@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.75	5.20	5.20@5.70
Chestnut	5.50	5.50	5.45	5.35@3.45
Pea	3.50	3.50	3.45	3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.20@2.70
Rice	2.25	2.25	1.95@2.20	1.70@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

*An addition of 2½% is required on the prepared sizes in this column to cover the new Pennsylvania state tax.

PHILADELPHIA

Hard coal showing a consistent improvement with demand good on practically all sizes. Stove coal the leader. Companies beginning to lift their storage supplies. Car supply unsatisfactory. Bituminous uncertain.

The close of this week finds the anthracite trade at the highest stage of activity so far this season. Outside of egg coal almost everything is moving off without any special urging. Stove coal has been scarce for so long a period, that it is an old story, and as the winter advances, the shortage becomes more emphasized. Premiums of anywhere from 10 to 25c. per ton are made but notwithstanding the demand, one still hears of concessions on some of the sizes. Demurrage charges at the distributing points in the regions, for cars held over a certain length of time, is doubtless responsible, in some cases, for this condition. It is no doubt a fact that orders flow in more freely some days than others, and when it happens that there is an accummulation of cars that are approaching the danger line, an inducement in the way of concessions from the so called circular, furnishes a prompt disposition. This probably applies more to egg than any other size, as all other coals are moving freely.

Operations at the mines still continue at capacity, and the output is running well ahead of the corresponding period for last year. Coal stocks are already being depleted on certain sizes, particularly pea and chestnut. It is understood that none of the companies have any appreciable tonnage of stove on hand, and what little they had has doubtless been sent to the market. The car supply seems to vary from day to day. One hears of occasional complaints of the shortage and the situation as a whole is not satisfactory.

In bituminous coal the trade seems to grow worse instead of better. Orders are harder to get, but this may be accounted for by the fact that the operators are still holding to the prices that obtained a month or six weeks ago. A disposition to dicker, has a tendency to bring business, consumers seeming to be willing to buy, if they can do so at their price, or a little lower than what the operators are asking. The consuming trade seems to appreciate the unusual situation and are taking advantage of it. From now on, unless conditions change materially, there is likely to be a marked softening in prices, gradual but apparently sure.

BALTIMORE, MD.

The trade still facing a declining market. Complications from blizzard in mining regions. Car movement easy, and exports increasing.

That the coal trade here is still facing a declining market has to be admitted. This is particularly true in the West Virginia and Pennsylvania bituminous fields, due to the cutting off of heavy shipments to the Great Lakes. The steel industry, the cement trade and other branches of business that use considerable quantities of coal and coke, are all more or less flat.

In West Virginia good grade run-of-mine coals had been cut to 90c., while slack is selling about on the same basis, or in some cases a little less. In Pennsylvania, while little good coal can be had at less than $1.20 and $1.25, it is being offered freely at that price, a decided contrast to a few weeks ago when agencies were begging for it at $1.35 and $1.40.

The coke market is also weak, and it will not surprise the trade to hear that a number of important ovens will be banked at any time.

Complications appeared last week as a result of the blizzard-like weather in West Virginia, shipments being delayed four and five days, and all communication with the mine centers being shut off for several days. There were plenty of cars in the region, the only trouble being that the railroads could not move them as desired. Later in the week the car supply and movement was reported good.

The anthracite trade is quiet. Steam sizes are reported in only fair demand and the domestic grades are in best call.

Exports are again increasing, a total of over 60,000 tons having been sent out the past month, against 45,000 tons for September.

BUFFALO, N. Y.

Bituminous dull and unsteady. Free tonnage difficult to place. Uncertainty regarding readjustment of business following the closing of Lake shipping. Effects of the heavy storm.

Bituminous—The status of the trade at the present time is rather uncertain, but it is clear that there is more bituminous coal offering than there is demand for. Where dealers have good contracts behind them, they express complete satisfaction with the situation but the new jobber seeking to place tonnage is finding it difficult to do so. Indications are that the market will not be clearly defined until after the Lake navigation has closed, and the shipments in that business covered in other markets. Lake business has been heavy this season, and the readjustment will be felt.

Prices are steady and difficult to quote, probably being weak at former figures. There is a surplus of coal all over the eastern part of the state, and probabilities are that there will be a decline, although the trade is not of the opinion that even this will help to move the surplus tonnage. The heavy storm of last week delayed the movement from a day or two to a week. Lake shipments were at the same time reduced to practically nothing. The generally adverse weather conditions, however, have been against a good consumption of coal.

We quote the market weak and unsteady at $2.90 for Pittsburgh lump; $2.80 for three-quarters; $2.65 for mine-run, and $2.25 for slack, the last being no longer any firmer than the sizes; Allegheny Valley coal is quotable at about 25c. less.

Coke—Coke has failed to firm up any even at the reduced price quoted last week. The weak situation is said to be due to a conflict between coke and steel interests, and the outcome is dependent upon conditions in the steel industry. Coke is quoted in the local market on the basis of $4.70 for 72-hr. Connellsville foundry.

Anthracite—The heavy storm and snow blockade of last week was of too short duration to have any material effect upon the situation, and although there is a fair demand for hard coal, the weather is still the controlling factor. Retail trade is dull.

The movement by Lake is good, considering the storm, being for the week 126,000 tons. It is about at an end, though, as insurance on wooden hulls expired on Nov. 15, and will not be obtainable for anything after Dec. 1, except at very high rates. The underwriters will not be free to give extensions unless the vessel is especially promising, the Lake storm already having cost them about $5,000,000.

CENTRAL STATES

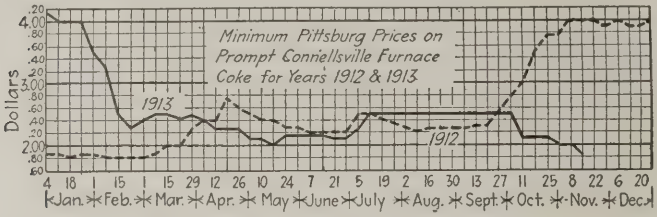
PITTSBURGH, PENN.

Coal movement recovering from effects of storm and temporary scarcity being relieved. Much Lake shipping lost. Connellsville coke stagnant, with consumption decreasing.

Bituminous—While the coal trade has largely recovered from the sudden rush of demand for domestic coal resulting from the storm referred to in last report, the movement of coal is not yet altogether normal as the railroads were seriously affected. In particular, an embargo was on for several days against coal destined for lake shipment as the terminals at Lake Erie docks were in no condition to receive it. The storm did great damage to lake shipping, destroying at least 125,000 to 150,000 tons of vessel capacity, and although little coal was actually lost, it will be impossible to move nearly as much up the lakes as was expected.

Shipments to manufacturing consumers tributary to the Pittsburgh district were much interfered with, and are hardly normal yet. For several days there was an insistent demand for spot coal, and relatively fancy prices were offered, but the market is now back to its old basis. Mines are running fairly well this week, with the car supply improving after what amounted to a blockade, and with a fair supply of men. We quote for short contracts and prompt: Slack, $1@1.25; mine-run, $1.40@1.50; ⅞-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The market has been extremely quiet the past week, with many more sellers than buyers. Prices have not yielded materially since last report, but it is not improbable that if any important inquiries had come out they would have developed lower figures. Furnaces are going out of blast and consumption is correspondingly declining. No one is taking any interest in contracts for 1914. It is uncertain how many furnaces will run and those that are sure of running expect lower coke prices so that they are not inquiring. We quote: Prompt furnace, $1.85@1.90; contract (nominal) $2.25; prompt foundry, $1.60@1.75; contract foundry, $1.60@1.75, per ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville regions in the week ending Nov. 8 at 354,045 tons, a decrease of 21,185 tons, and shipments at 376,479 tons, an increase of 10,933 tons. The preceding week production had been reported as exceeding shipments by 21,000 tons and the excess of shipments over production the succeeding week has improved the situation.

TOLEDO, OHIO

Heavy storm of last week stiffened the market up sharply. Transportation seriously crippled. Lake shipping badly delayed and a number of vessels lost.

The effect of the recent storm on the Great Lakes and sweeping over this section of the country during the past week has been to stiffen quotations here to such an extent that almost any price can be secured for track coal. The railroads have been urging mine shipments of their orders and as a consequence no difficulty in the way of short fuel supply was felt here.

Cars, however, are scarce. There is practically no equipment on track here and the T. & O. C. was for days the only road open, shipments being greatly curtailed over the B. & O. and Pennsylvania lines, and even yet the movement is exceedingly slow. The railroad men declare that the congestion here is no worse than in other years at the same season and some hope is held out that the freight congestion at other points will be better this year. Heretofore the lack of yard space at Detroit has forced embargoes on north bound freight, throwing back on Toledo the burden, not only of its own cars, but of hundreds of freight cars for Detroit and other northern points.

Toledo roads have long been preparing for the handling of a heavy volume of freight, and some of them notably, the Hocking Valley are in fair shape. The Hocking Valley has just received six new Mikado engines which are said to be the heaviest and strongest freight engines ever in use in this section. About Dec. 1 the 1000 new 115,000 lb. capacity coal cars ordered by this road will be delivered in part at least, which will greatly facilitate the movement; these will be the largest capacity coal cars in use in this section.

The demand for both domestic and steam coal has been good although the warm weather of the past few days has had a quieting influence on the domestic market. Prices are firm and holding unusually close to the list. Many large freighters carrying coal and ore were endangered and some went down during the big storm among them the Henry B. Smith, one of the big ore boats recently built; she foundered off Keweenaw Point, carrying down a crew of 28 men and 10,000 tons of ore.

COLUMBUS, OHIO

Sudden cold snap of last week caused a general stiffening in the market. Car shortage still bad and gradually growing worse. Prices ruling firm and inclined to advance. Lake demand still good.

The feature of the coal trade in Ohio during the past week was the storm which covered the state with about a foot of snow and caused a rush of domestic orders. The long expected had come and in most cases the dealers were able to cope with the situation. Their stocks were fair and they were able to make deliveries promptly despite the icy condition of the streets. As a result no shortage appeared in any line.

The storm also had its effect on the railroads and the movement of coal cargoes was slower than has been the case. Drifting snow and ice delayed all trains and as a result the car supply in Eastern Ohio was only about 40 per cent. of normal. In the Hocking Valley the supply was not much shorter than has been the case for some time and 50 per cent. was reported. In the Pomeroy Bend district the shortage was more pronounced and the output in that section was curtailed to 40 per cent. of the average.

There is a good steady sale of steam sizes and many of the manufacturing plants have gradually increased their requisitions. There is also a slight tendency on the part of managers of factories to accumulate a small surplus to guard against a shortage later in the season.

Lake trade is still active, although hindered by the severe storm which caused a falling off in ore movement and boats engaged in the lake coal business will either have to come back light or carry grain. The car shortage is seriously interfering with the lake movement. There is a good demand from the Northwest and the trade will probably continue until Nov. 25 or even later.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$2.00 @ 1.90	....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch...........	1.85 @ 1.75	$1.50 @ 1.40	2.00 @ 1.90	1.85 @ 1.75
Nut..............	1.30 @ 1.20	....	1.75 @ 1.65	1.40 @ 1.35
Mine-run..........	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack..	0.90 @ 0.85	....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack........	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.75 @ 0.70

DETROIT, MICH.

Increase in demand and a like decrease in car supply. Top prices of the season. Hard coal becoming scarce.

Bituminous—The local steam trade still continues active notwithstanding the advance in prices, and it is freely predicted that further increases are in sight. The railroads are finding themselves unable to cope with the situation, the difficulty seemingly being one of inadequate motive power, rather than lack of equipment.

As a result of these conditions operations in all the mining fields of both Ohio and West Virginia are seriously restricted. The sharp fall in temperature last week developed a new vigor in the trade, and dealers are insisting upon prompt delivery. Stocks in the hands of the large wholesalers are light, and prices are stiff and inclined to advance. Some abnormally high prices have been quoted during the past week. The following is approximately the market at the moment:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.90	....	$2.25	....	....	$3.00	$2.75
Egg............	1.90	....	2.25	....	....	3.00	2.75
Nut...........	1.65	....	1.85	....	....	....	....
Steam lump....	1.50	....	....	....	....	....	....
¾-in. lump......	1.50	$1.50	1.65	$1.65	$1.65	....	....
Mine-run.......	1.50	1.50	1.50	1.50	1.50	1.75	....
Slack..........	1.00	1.10	0.90	1.00	1.00	....	....

Anthracite—Dealers in hard coal are already experiencing trouble in making prompt delivery. Spot coal is becoming steadily scarcer and the market is strong on this grade.

HAMPTON ROADS, VA.

Demand still heavy on Pocahontas and New River. Shortage of coal at all piers. Gulf Smokeless Coal Co.'s large storage plant at Sewalls Point completed.

Coal shipments from Hampton Roads for the week have been heavy. A large number of the shippers are short and are having considerable difficulty getting sufficient coal forward to take care of contract business. There have, however, been a few spot sales during the week where some of the suppliers have had an excess of their contract requirements. While it is difficult to get exact figures at which sales have been made prices quoted have ranged from $2.85 to $3 although it is hardly likely any sales have been made at the latter figure.

The present shortage of coal at Hampton Roads is due to two reasons. There has been a shortage of cars on one or two of the roads, due to the fact that cars which have been sent out with shipments consigned to the Lakes have not yet been returned. The demand has also been heavy at all piers during the last few days which has cut down the accumulation. The largest shipments during the week as usual have gone to the New England market although there has been one or two small shipments to Southern ports. Foreign shipments have gone to Port of Spain, St. Thomas, Cristobal, Para, Manos, and Santiago.

KNOXVILLE, TENN.

Market in excellent condition. Car shortage. Domestic prices improve with the season. Large cotton crop and industrial outlook good.

The outlook in the Kentucky-Tennessee fields has never been brighter. The Southern Railway has developed an acute car shortage, but operators feel that this is compensated for by a general stiffening in prices. This lack of equipment will also be materially relieved by Dec. 1. All roads seem to be making every endeavor possible to handle everything offered them with the utmost dispatch. This is probably due in a measure to the close coöperation between the roads and the Southern Appalachian Coal Operators' Association.

LOUISVILLE, KY.

Closing of Lake shipping having a detrimental effect on the market. Railroads heavy buyers and are storing coal. Market quiet.

The recent cold snap stimulated the local market materially, but it is still rather weak at the moment. The low temperatures were not of sufficient duration to create a permanent demand. In addition to this, the heavy storms brought the lake shipping to an unexpectedly short termination, with the result that this tonnage has been thrown upon the open market.

The railroads are taking abnormally large tonnages which would seem to indicate that they are doing some storing; a few instances where the roads have confiscated coal en route has also been reported. Car supply is good, no complaints having been heard of in that quarter. Domestic quotations are about stationary, with no advance apparent for some time. The increased schedule announced for the 15th of the month was not put into effect, because of the unsettled condition of the market. Eastern Kentucky block is steady at about $2.35, with block and lump at $2.10, round at $1.50, and nut and slack at 80@85c. Western Kentucky lump is active at $1.35, while mine-run is selling at 90c.@$1 and nut and slack at about 70 cents.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

Steam coal quiet, but domestic slightly improved. Both furnace and foundry coke slow and blacksmith coal about normal. Practically no demand for pig iron. Car situation shows no improvement.

This week has brought no decided change either way in steam coal. The demand, other than on yearly contracts, is not brisk; the majority of contracts are taking their regular tonnage, though some of the larger ones have reduced shipments to the minimum. The domestic market is rather a puzzle just now; notwithstanding the fact that cold weather will soon be here, and the prospects for cars not encouraging, the producers are not shipping near the normal tonnage for this season of the year and dealers claim to have sufficient stocks for the time being. A few days cold weather, however, will undoubtedly catch many of them short. Consumers using only a car or two each season are waiting until they are forced to buy.

Furnace and foundry coke are both in small demand. Alabama under normal conditions, ships a large tonnage of furnace coke to Mexican smelters, but due to the present trouble, this demand has been temporarily cut off, until there is practically no Birmingham coke moving to Mexico; this is having a tendency to weaken the local market, but even under such adverse conditions, the price is holding up well. Blacksmith coal is about normal, the demand being satisfactory and prices at $2@2.25 f.o.b. mines. The car situation shows little change over last week. With the usual heavy winter movement, little hope can be held out for much improvement in this line.

INDIANAPOLIS

Domestic grades satisfactory in Indiana, both as to demand and price. Lack of cars interfering to some extent with full running schedule. Screening conditions are not improved.

The domestic coal situation is quite satisfactory to Indiana operators. Those mines having the best coal are running full schedule. The car supply is reported better than the movement, blockades at Terre Haute and Indianapolis being still the cause of complaint. The weather has not been favorable to coal consumption, as there have been only a few days so far where the temperature was near the freezing mark.

The local street-car strike gave the domestic movement a boost; there was talk of a sympathetic strike, which would include the teamsters and those short of coal hurried to get in their orders. Some of the retail yards have not caught up yet, although the strike was settled on Nov. 7. Prices for domestic grades are on a good basis. The top mark has been $2 f.o.b. mines but $1.90 is regarded the high end of the range, anything above that being a premium and causing trouble with contract buyers.

Screenings is still a sore spot with operators; for No. 4 from good coal 60 to 75c. can be done but Nos. 5 and 6 sell down to 40c. No satisfactory explanation is had of this unsatisfactory condition. The factories seem to be taking the normal amounts, so that industrial conditions are not held responsible. It is believed that the screenings trouble has its origin with large public utility concerns in Chicago, who seem to be able to fix prices. There has been no revision of retail prices in this city since Sept. 20.

CHICAGO

Domestic coal soft, but the steam market situation is more favorable; many steam users and railroads buying for storage purposes. Smokeless firm. Strong demand prevails for splint with the supply short. Hocking 1¼-in. lump sells at $3.65, f.o.b. Chicago.

Despite colder weather, blizzards in certain coal mining regions and an interruption of traffic, the domestic market in Chicago remains soft. Conditions in the steam trade, however, are more favorable, although it cannot be said there has been any boom.

In an effort to keep their forces at work the operators are turning out steam in preference to domestic sizes. In view of the fact that the agreement between the Illinois operators and miners expires next spring and a cessation of work is expected to follow, many of the larger railroads and steam users are laying by a supply of storage coal. The Chicago & Alton road has arranged to store 75,000 tons of steam coal. Prices for smokeless coal remain firm. Small lots of mine-run are selling at $1.50, with larger quantities on the basis of $1.40 when the coal is on track. Lump and egg command $2.50 in the country and $2.25 in Chicago, with the supply and demand remaining about equal.

Springfield operators are catering to the steam trade and are disposing of much of their product on long-time contracts. Steam lump is selling at $1.25, the mines, while domestic lump is quoted at $1.75. Carterville lump, egg and No. 1 washed is steady at $2, the mines, despite the presence of factors that have tended to disturb prices. The price of Hocking inch and a quarter lump, f.o.b. Chicago, is $3.65 and is a result of an advance to $2 at the mines. Comparatively few shipments are reaching here on account of a tie-up in transportation due to the recent storm. Prices for Indiana coal vary between $1.75 and $2, the mines. High grade, large-sized screenings sell at from 70@90c., the better grades at from 50@75c. and the low grades at from 30@40c. There has been little change in prices for coke.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump............	$2.57	$3.05@3.30	$2.52	
Steam lump..............	2.07		2.07	
Egg.....................		3.05@3.30		$4.30@4.45
Mine-run................	1.92	2.40@2.55	1.87	3.45@3.55
Screenings..............	1.12@1.22	1.55@1.80	1.47	

Carterville prices are: Lump, egg No. 1 washed, $3.05; No. 2 washed, $2.80.

Harrisburg quotations are: Domestic lump and egg, $3.05; steam lump, $2.65@2.80; mine-run, $2.40@2.55; screenings, $1.55@1.80; No. 1 nut, $3.05; No. 2 nut, $2.80.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.90@5; gas house, $4.90@5.

ST. LOUIS, MO.

Market unsatisfactory. No demand for domestic and steam business demoralized. Car shortage the only condition that is maintaining prices.

Instead of getting better the past week, conditions grew worse, mainly on account of the weather. Last week started off well but other parts of the country got the winter weather that St. Louis was promised.

The steam market is in a demoralized condition, and domestic is about the same. In some parts of the Standard field screenings are being given away practically for the freight, and the Carterville market seems to be getting weaker all the time. With Standard screenings at say 10c. a ton and 2-in. lump at $1.10, it is easy to figure out what the Standard operator is making when 40% of his product is screenings and the cost of production is about 80c. or more. In the Carterville market the domestic sizes dropped to 25c. a ton and it also affected Franklin County coals much the same.

The demand for anthracite has eased up considerably, although there is a fairly good tonnage moving in. Coke is rather plentiful with no great demand. It is strictly a jobbers' market now and they are trying to keep the prices up. The same thing applies to smokeless, with plenty moving in and no unusual call.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	**Standard**
2-in. lump	....	....	....	**$1.05@1.15**
3-in. lump	....	....	$1.50	....
6-in. lump	$1.75 @ 1.90	....	1.60	1.25@1.35
Lump and egg	1.85 @ 2.15	Over sold	....	....
No. 1 nut	1.40 @ 1.50	....	....	....
Screenings	0.40 @ 0.50	....	....	0.10@0.20
Mine-run	1.10 @ 1.20	....	....	....
No. 1 washed nut	1.75 @ 1.85	....	1.40	....
No. 2 washed nut	1.40 @ 1.50	....	1.60	....
No. 3 washed nut	1.15 @ 1.25	....	....	....
No. 4 washed nut	1.00 @ 1.10	....	....	....
No. 5 washed nut	0.45 @ 0.55	....	....	....

OGDEN, UTAH

Warm weather prevailing throughout Western Territory. All mines in Wyoming and Utah receiving plenty of cars. Mild weather in Colorado delaying coal shortage.

The operators are commencing to worry on account of the fine fall weather that is prevailing throughout the Intermountain territory. The mines in Wyoming and Utah are able to produce a large tonnage of coal when working at full capacity and with mild weather prevailing they are catching up rapidly on their orders. The sugar factories are consuming the slack and steam coal produced which is of great assistance to the mines. Owing to the lack of a severe car shortage this fall the production of steam and slack coal has been above normal, and the factories have not been troubled with their usual coal shortage.

Quotations are as follows:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.00	$2.75
Nut	2.50@3.00	2.50	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

PORTLAND, ORE.

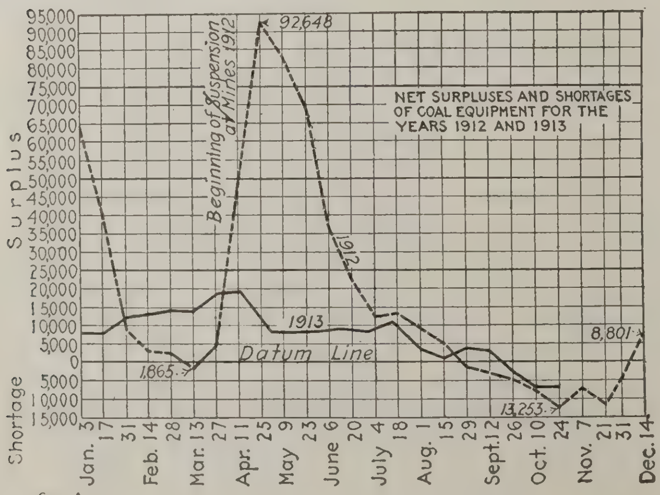
Ship arrives from Australia with 900 tons of coal intended for West Coast of South America. Another vessel due to arrive here soon with 1000 tons from the Antipodes. Retail business active.

The British ship "Segura" has arrived from Australia by way of Salaveri, Peru, with 900 tons of coal. The shipment was not intended for this port, but the ship was caught in a storm while discharging at the South American port's open roadsted and had to cut loose. The cargo was immediately sold here at a somewhat reduced price, but the coal will be retailed at $10.50 per ton, the ruling quotation on Australian coal here at this time. Another shipment of 1000 tons will arrive on a sailing vessel from Australia in a few weeks. This so far as now known, will be the extent of importations from Australia here this fall.

PRODUCTION AND TRANSPORTATION STATISTICS

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Nov. 1, as follows:



COAL AGE

	Surplus	Shortage	Net*
New England Lines	86	67	**19**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn	428	2,331	1,903
Ohio; Indiana; Michigan; Western Pennsylvania	220	3,100	2,880
West Virginia, Virginia, North & South Carolina	691	4,960	269
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	287	607	320
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,134	363	**771**
Montana, Wyoming, Nebraska	34	118	84
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,218	390	**828**
Texas, Louisiana, New Mexico	425	13	**412**
Oregon, Idaho, California, Arizona	2,197	146	**2,051**
Canadian Lines	0	500	500
Total	6,720	12,595	5,875

	June 30	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1	Oct. 15
Surplus	11,055	13,203	8,810	8,293	8,689	8,714	7,953	6,014
Shortage	2,821	1,826	4,029	7,038	5,209	7,731	10,393	12,502
Net*	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**	**983**	2,440	6,488

*__Bold face__ type indicates a surplus.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for September and the three months ending Sept. 30, 1913, in short tons:

	September		3 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	261,012	282,244	819,266	18	927,233	22
East	188,570	189,388	552,610	12	554,352	13
West	1,010,987	756,803	2,946,659	63	2,663,989	64
Total	1,460,569	1,228,435	4,318,535		4,145,574	
Coke	29,680	20,058	86,348		62,116	
From connections						
Bituminous	120,468	19,070	318,730	8	55,690	1
Anthracite	1,606	1,195	4,819		2,792	
Total (except coke)	1,582,643	1,248,700	4,642,084	100	4,204,056	100

FOREIGN MARKETS

GREAT BRITAIN

Nov. 7—Admiralty List coals are almost unobtainable for prompt positions, while Monmouthshire large coals are also scarce and dear. Buyers continue to adopt a waiting policy in regard to forward loading. Prices are approximately as follows:

Best Welsh steam	$4.80@4.92	Best Monmouthshires	$3.92@4.14
Best seconds	4.56@4.68	Seconds	3.72@3.90
Seconds	4.38@4.50	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.56	Seconds	2.34@2.46

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Nov. 15:

Stocks	**Week's Range** High	Low	Last	**Year's Range** High	Low
American Coal Products	..	..	80	87	80
American Coal Products Pref	100	100	100	109¼	102
Colorado Fuel & Iron	27¼	24½	27	41½	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102¼
Lehigh Valley Coal Sales	235	230	240	....	....
Island Creek Coal Com	48⅛	47	47½	53½	47
Island Creek Coal Pref	84	83½	83½	85	80
Pittsburgh Coal	19¾	18¼	18¼	24⅜	14½
Pittsburgh Coal Pref	89½	87	88¾	95	73
Pond Creek	18¾	18	18	23¾	16½
Reading	160¾	156¾	160¼	171	151⅜
Reading 1st Pref	84	84	84	92½	82½
Reading 2nd Pref	84	84	84	95	84
Virginia Iron, Coal & Coke	40	40	40	54	37

Bonds	**Closing** Bid	Asked	**Week's Range or Last Sale**		**Year's Range**	
Colo. F. & I. gen. s.f.g. 5s	93	95	93½	93½	93½	99⅛
Colo. F. & I. gen. 6s	104	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	78	80¼	79¾	Oct. '13	77½	85
Cons. Ind. Coal Me. 1st 5s	78	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	88⅝	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	86	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	78	79½	78	Oct. '13	73	80½
Tenn. Coal gen. 5s	..	98½	97¾	Oct. '13	97¾	103
Birm. Div. 1st consol. 6s	100⅞	101½	100⅞	Oct. '13	100⅝	103
Tenn. Div. 1st g 6s	100⅞	102½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	94	93	Oct. '13	92	98

Lehigh Valley Coal Sales Co.—Dividend of 25%, payable Jan. 17 to holders of record Nov. 17.

PRICES OF MINING SUPPLIES

MARKETS IN GENERAL

In the face of much adverse news, and in spite of many unfavorable factors, the situation has improved at bottom. The belief that a dollar will be more valuable at a later date has resulted in a stoppage of many enterprises.

There has been a decided falling off in the volume of business, which would indicate that the slowing down has become even more pronounced. This is natural. Conditions grow worse, and are apparent to those guiding affairs, before they are felt in the actual business field.

The iron and steel industry of the country is slowing down gradually, and pig iron is being produced at the rate of 78,000 tons daily, compared with 92,000 tons daily, early in the year. The unfilled orders of the U. S. Steel Corporation fell off 500,000 tons during the month of October, and are now 3,500,000 tons less than at the beginning of the year. Prices have slowly crumbled.

The crop situation shows an improvement. The government reports Nov. 10, indicated a gain of 100,000,000 bu. in corn, and a gain in reserves on the farms of over 60,000,000 bu. Other crops have been as satisfactory as could be desired.

The metal situation continues to show a restriction in the trade. Sales of copper are offered at marked concessions from the high figure in September and stocks are accumulating.

The award of an increase in wages of 7% to the railway trainmen was not a surprise, and the recommendations made by the arbitrators that something must be done to secure more revenue for the railways, was a somewhat unexpected concession. In all, the 41 railways in the eastern part of the United States will pay out about $6,000,000 more per year in wages, and the probabilities are that some increase in rates will be allowed. This, of course, will quickly be reflected in the iron and steel market where the railways are extravagant spenders.

Financial conditions have improved. Many cities which were unable to float their bonds early in the year have now been able to secure the funds needed for improvements, and even for some less judicious expenditures. A distinct gain has been made in municipal bonds, but railroads and industrial companies are unable to finance any new propositions. Monetary affairs abroad, moreover, show an improvement, and American bankers can, if they wish, secure help from Europe. The idle cars of the railways have all been put to work, and for a short period, more rolling stock could have been advantageously used. At one time, railways were short 6000 cars.

Labor disturbances have been far less frequent.

LABOR

The most important announcement in the labor world was that the railway trainmen on Eastern roads will secure an advance of approximately 10% in their wages. At the same time, wages were standardized. The Board of Arbitrators, however, refused to grant the request of trainmen relative to overtime, but indicated that such a matter might come up at a later conference. There have been few strikes of importance during the month, and for the most part, the attention of men has been drawn to securing positions, particularly as some of the larger employers of labor have been drastically curtailing their forces. The Baldwin Locomotive Works has reduced its force of 3000 men or more, about 15% and several firms have gone on part time. A severe car strike occurred in Indianapolis, machinists in Baltimore are striking, and labor troubles in the upper Michigan peninsula are steadily growing better. The strike of the trainmen on the Southern Pacific has been brewing for several months. Railroads have no difficulty in securing men for outside work, and factory hands are easy to obtain.

Immigrants arriving in this country the first 9 months of this year numbered 1,053,220, compared with 747,006 in the corresponding period last year and 595,736 in 1911.

IRON AND STEEL PRODUCTS

An unexpectedly large decrease in the unfilled orders of the United States Corporation in the month ending Oct. 30, unfavorably affected sentiment. This was followed by renewed weakness in the pig-iron market, and a steady falling off in orders for finished products. Most of the retarded business is due to the absence of railway buying, for practically all of the roads in the eastern states are awaiting the outcome of the request for an increase in rates which was recently made to the Interstate Commerce Commission. The only line of steel products in which there has been any semblance of activity is in steel shapes. Here the demand is good, due to the new subway construction in New York. There has been a large amount of material ordered for this and other jobs which will keep the mills actively engaged next year. In spite of numerous efforts on the part of foreign manufacturers to secure business in this country, no sales are reported except for deliveries on the Pacific Coast. The situation as regards scrap steel is particularly disquieting, as prices continue to decline, and there is practically no inquiry. In almost every line, there have been concessions in price granted during the month, and in no particular commodity does it appear that the bottom has been reached.

Pig Iron—Sentiment in the iron trade is more mercurial than in almost any other line of trade, and, just at present, every one connected with the industry feels that the trade is in for a period of declining prices and lessened production. It is not difficult to secure tangible evidence on the subject, for iron is selling at from $3 to $4 a ton less than a year ago, and the blast furnaces of the country are turning out 72,000 tons of pig iron each day, instead of 92,000 tons only a short while ago. Many seem to think that the country will go back to a production of 16,000,000 tons as was the case prior to 1906, but if such is the case, it will upset all precedent. Another factor which has not been given the consideration it should receive, is the statistical position; neither the producers of pig iron nor the consumers have any large stocks on hand and they are not going to permit any to gather. After the brief period of activity in 1910, all the pig-iron interests had a much larger stock of iron on hand than they should have had, and consumers, too, believed at that time that there was to be no limit to the demand for finished products, and so bought most liberally. Now all has been changed, everyone in the trade, and consumers as well, have known for more than a year that a revision of the tariff was probable, and they have been trimming their sails accordingly. Some of those in the trade best qualified to judge are of the opinion that there will be no concentrated buying movement for some time, but they are likewise of the opinion that prices are not far from the bottom.

Quotations for lots of fair size at the points named are as follows: Southern Foundry No. 2 Cincinnati, $13.75@14.25, a decline of 50c.; Southern Foundry No. 4 Cincinnati, $12.75@13.75, a decline of 50c.; Northern Foundry No. 2 Chicago, $15@15.50; Bessemer iron in Pittsburgh is $16.15, which price includes the 90c. freight rate from the valley, and is a decline of 50c. from last month; No. 2 Southern Foundry is $10.50@11.50 in Birmingham, a decline of 50c.

Steel Rails—Some of the smaller railways have purchased moderate lots, and an especially desirable order was received from the Louisville & Nashville. None of the large railways has intimated any likelihood of placing orders in the near future, and it has been more or less officially stated that the Pennsylvania and New York Central would not put out any orders until the early part of next year. These roads will probably require just as many rails for 1914 as they did in 1913; but it is the general policy of the railway companies not to make any commitments not absolutely necessary, until more definite news is at hand, relative to the increase in freight rates.

Quotations are unchanged, $28 per ton for standard section of bessemer rails, and $30 per ton for openhearth rails, f.o.b. Pittsburgh. These prices represent a quotation of $1.25 for 25- to 45-lb. rails, and $1.20 for 16- to 20-lb. rails, in Pittsburgh. In Chicago 16- to 20-lb. rails are quoted at $1.30, 12-lb. rails, $1.33. Relaying rails in Chicago are still held at $24 per gross ton, and in New York at $22.

Track Supplies—Few orders have been placed, and these of small lots. Prices have apparently reached bottom for the present, and there is no cutting for the quotations of last month, which are repeated as follows: Price in large lots f.o.b. Pittsburgh, $1.75@1.80; small lots, $1.90@1.95; in Chicago,

$1.95. Track bolts with square nuts are $2.15@2.25, and angle bars $1.50. All of these quotations are per 100 lb.

Structural Steel—Business is more active than in anything else in the iron-steel line, and there is a likelihood that the mills will be very actively engaged next season, also the fabricating shops. In New York City alone, there will be more work next year than for a number of years past, including such structures as the new Hell Gate Bridge, Equitable Building on lower Broadway, and a great amount of steel for Subway work. General building is inactive, and bids fair to continue so next year, especially in the Eastern cities. On the other hand a great deal of steel is taken in San Francisco and Pacific Coast cities, most of which will come from the East. There are also several large manufacturing plants in the East, which will call for steel construction. The price of fabricated and erected work continues unusually low. Structural shapes are cheaper than a month ago, being quoted at $1.30@1.35 Pittsburgh, for large lots. In Chicago, the price is $1.48@1.53; these quotations are for large lots.

Pipe—Business contiuues fairly active, and in line pipe, there has been specially good demand. The continued decline in raw material and other steel products is responsible for lower prices being named on pipe, which announcement was made at the end of October. This amounts to about $2 per ton, but, however, it affects only pipe larger than 2½ in., internal diameter. It would not be surprising to those in the trade if a further reduction in quotations were made, especially in the smaller sizes, for this trade seems to be stimulated. The following quotations is for fairly large lots, f.o.b. Pittsburgh:

	Black	Galvanized
¾- to 2-in. steel butt welded.........	80%	71½%
2½- to 6-in. steel lap welded..........	78%	69½%
7- to 12-in. steel lap welded...........	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

Diameter	Cents		Diameter	Cents	
	Black	Galvanized		Black	Galvanized
¾-in........	2.30	3.26	5-in........	30.50	45.00
1-in.........	3.40	4.83	6-in........	42.25	58.25
1¼-in.......	4.60	6.60	7-in........	59.50	85.00
1½-in.......	5.50	7.90	8-in........	62.50	89.00
2½-in.......	12.90	17.80	10-in.......	$1.03	$1.46
3-in.........	16.80	23.30	11-in.......	1.13	1.64
4-in.........	23.00	33.20	12-in.......	1.27	1.82

Sheets—Prices have again declined $2 per ton, and the old story is heard that mills cannot make a profit at these prices and buy sheet bars in the open market. It has been several years since prices have been quoted as low as this, and it is doubtful if these prices will last for any length of time. Most of the mills are refusing to make contracts for delivery after Apr. 1 of next year at these figures. Some of the smaller mills are operating to only about 50% of capacity, and others have 65% of their mills going. Sales have been made as low as 2c. Pittsburgh for No. 28 black, but most of the business has been done at 2.05c. Other quotations are as follows:

SMALL LOTS IN CENTS PER POUND

	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24..................	2.55	3.35	2.50	3.30
Nos. 25 and 26..................	2.60	3.50	2.55	3.45
No. 27	2.65	3.75	2.60	3.70
No. 28	2.70	3.80	2.65	3.75

WIRE PRODUCTS

Wire—Quotations have been cut without, however, stimulating very much buying. As stated, the heavy buying season is over and less business was booked this year than for a number of years past. The quotations are as follows: Pittsburgh painted barb wire to retailers in less than carload lots, $1.70; galvanized barb wire, $2; plain wire, $1.40; in Chicago plain wire is $1.60; painted barb wire, $1.80; galvanized barb wire, $2.10. All of these quotations are per 100 lb.

Wire Rope—Prices are cheaper, due to threatened competition from abroad. There is very little new business. Quotations are lower as follows: for bright cast-steel wire rope, 2½-in., 76c.; 2-in., 50c.; 1½-in., 29c.; 1-in., 14c.; ¾-in., 9c. All of these are per foot.

Copper Wire—The market is nominal, and no large new business has been placed in some time. The quoted price is 17¾c., but there is likely to be a downward adjustment very shortly.

METALS

Copper—Prices have declined steadily, since the last report, with a very small volume of business. Some of the independent sellers have offered electrolytic at 15.25c. and while the largest interests continue to ask 16c., there has been no business transacted at this figure. It is evident that consumption has fallen off materially and most of the demands for the next 60 days have been fairly well covered. Abroad the situation is fully as unsatisfactory, for, there has been a decided falling off in the volume of business in both Great Britain and on the Continent. The statistical position is about as satisfactory as could be desired from the producers' standpoint, and as they have impressed this fact upon possible buyers whenever the occasion offered it is perhaps well to suggest that there is always a turn, and statistics reflect past rather than future conditions. Those in a position to judge the market are of the opinion that quotations are more likely to decline than to advance.

Tin—For the first time in a number of years, an increase in the visible supply of tin has been shown in the reports. Stocks in the U. S. are larger than usual, and the demand is falling off. The price of tin has declined, whether on account of the statistical or other causes, it is difficult to conjecture, but in any event sales have been made at under 40c.

Lead—The market is firm, and sales of large lots are made at 4.35c. New York and 4.20c. St. Louis.

Spelter—While the demand is light, prices continue steady at 5.35c. New York.

Solder—Prices have declined and strictly ½ and ½ solder can be had at 25 to 25½c.

HARDWARE

Nails—Business has been quiet, as the mills are not aggressively seeking orders at these levels, and consumers do not care to make commitments at this time. Wire nails are held at $1.75 Pittsburgh and $2.05 New York, in kegs of 100 lb. and in large lots to consumers, but for small lots from jobber's store, $1.95 is quoted in Pittsburgh and $2.15 at New York.

Iron and Steel—Prices of shapes and angles from jobber's stocks have not declined as much as the mill prices, but this is explained by the very good demand for goods from store as many consumers are buying small lots, so as not to load up with the large shipment from the mill with a dull season ahead. Most of the prices given below, which are for warehouse delivery in Chicago and other distributing centers, are $2 per ton below those quoted last month:

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square......................	2.00c.
1½ to 4 in. x ⅜ to 1 in............................	2.00c.
1½ to 4 in. x ¼ in. to ⁵⁄₁₆ in........................	2.20c.
Norway bars	3.40c.
Soft steel:	
¾ to 3 in., round and square.......................	2.00c.
1 to 6 in. x ⅜ to 1 in..............................	2.00c.
1 to 6 in. x ¼ and ⁵⁄₁₆ in...........................	2.10c.
Rods—⅝ and ¹¹⁄₁₆ in................................	2.10c.
Bands—1½ to 6³⁄₁₆ in. to No. 8......................	2.30c.
Beams and channels—3 to 15 in.......................	2.05c.

MISCELLANEOUS

Portland Cement—The portland-cement business is far less active than at any time this year. Some of the largest manufacturers have important contracts to carry over well into next year, but the small concerns have not as good an outlet for their product, and it would not be surprising if there were a cut in the East, which would bring the price down 5 or 10c. per barrel. There has been a reduction in the West of 5c. per barrel, and it is likely that a further reduction will be made before spring. The market is not at all active and seems very weak. Prices are as follows:

Boston, $1.32, not including package.
Pittsburgh, $1.20, not including package.
Chicago, $1.25 f.o.b. not including package.
Cleveland, $1.30, f.o.b. not including package.
Detroit, $1.29, f.o.b. not including package.
Minneapolis, $1.40, f.o.b. not including package.
St. Paul, $1.40, f.o.b. not including package.

Bars, Concrete Reinforcing—The full extent of the lower quotations made in other lines of iron and steel has not been felt in the bar market. The base price for ¾-in. bars, in large lots f.o.b. Pittsburgh, is 1.40c., and for warehouse shipments, 1.85c., but it is not improbable that a large order would bring lower figures. The following prices are f.o.b. Pittsburgh:

	Cents per pound	
	Mill shipments	Warehouse stock
¾-in. and larger............	1.40	1.85
⅝-in.	1.45	1.95
½-in.	1.60	2.15
⅜-in.	1.70	2.25
¼-in.	2.00	2.50

Brattice Cloth—Prices have stiffened up surprisingly in the last six weeks, and practically all the benefit of the tariff concession has been lost. Prices have advanced fully 15%, and are now just as high as before the tariff went into effect. The demand is excellent, as this is the heavy consuming season of the year. Deliveries from abroad are slow, but there is still a fair stock in the United States.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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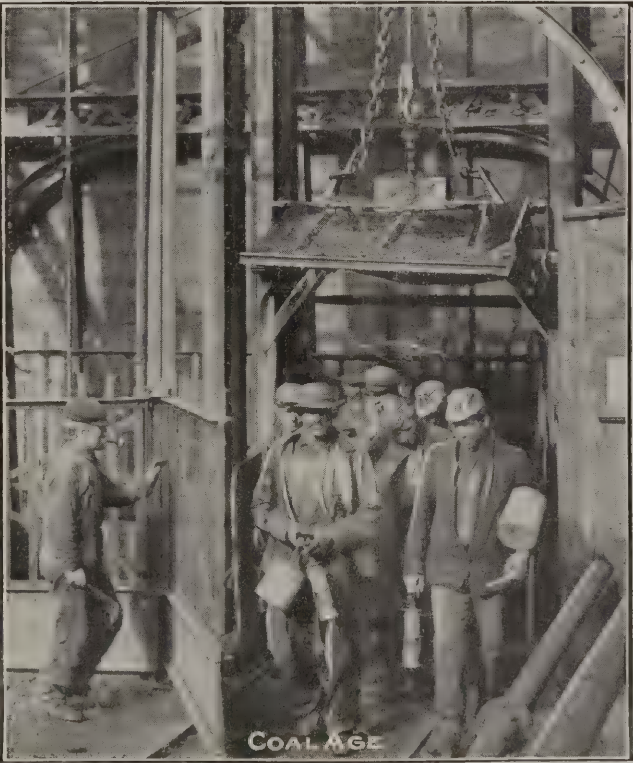
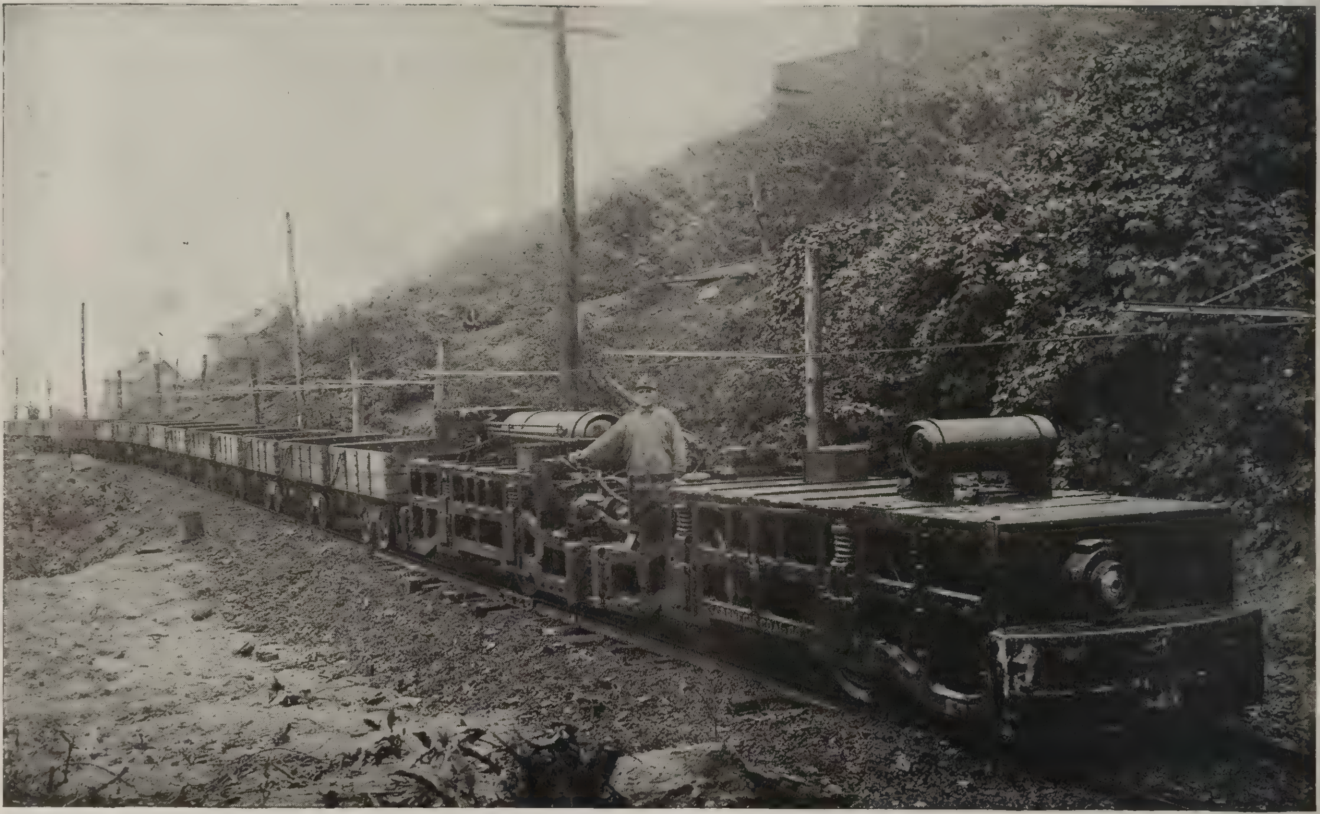
Manifold Mine of Youghiogheny & Ohio Coal Company, Franklin Co., Penn.



Miners coming out of Cage at the Manifold Mine.



Two Units in Tandem, used as a 30-Ton Locomotive.

The Largest Mine Locomotive That Has Ever Been Built

was recently installed at the mines of the Charleroi, Pa., Coal Works. This locomotive (*Baldwin-Westinghouse Barsteel type*) weighs 30 tons, and, it is estimated, can haul 100 cars, each loaded with three tons of coal, over the local grades, which are two miles long and largely against the load.

The locomotive consists of two units which can be separated and used as 15 ton locomotives if desired.

The use of two units in tandem distributes the weight over 8 wheels instead of 4, and hence the locomotive has great tractive power and also is easier on the track than if the weight were more concentrated.

The **Barsteel** frame construction gives ready access for inspecting, oiling, replacing brake shoes, adjusting brake rigging, etc., and also allows excellent ventilation to the electrical apparatus.

If you want to get out maximum tonnage at the least expense and in the shortest time ask for the advice of our mining experts.

One Unit, used as a 15-Ton Locomotive.

Address either Company

The Baldwin Locomotive Works, Philadelphia, Pa.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor*.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any post-office in the United States or possessions, and Mexico. $4 to Canada.

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

A Declaration Of Principles

The Weekly Ad-Talk Page

The selling section of your technical paper is nowadays ruled by the same Service Principles that govern the reading pages.

"Serve the reader" is the slogan of the entire paper, reading and advertising sections.

In the recent convention of the Federation of Trade Press Associations, the question of better advertising service, so that the reader will be able to reap greater benefits from the advertising section, received as much and as careful consideration as the ever-important question of the right editorial service.

Advertising service, in fact, was so linked with editorial service in the discussions, that the declaration of principles adopted at the close of the convention was made to cover both ends.

You, the reader, are entitled to the best the editors can give, and the advertisers are rapidly coming around to that point where they realize that they, too, must give you the best they have in order to receive your business consideration.

You are interested in the things that are being done to make your advertising pages more valuable to you—as well as your reading pages—so we print in full the Declaration of Principles adopted by the business press of America.

The Federation of Trade Press Associations in the United States in eighth annual convention assembled at the Hotel Astor, New York, September 19, 1913, made the following declaration of principles:

1. We believe the basic principle on which every trade paper should build is SERVICE—service to readers and service to advertisers, in a way to promote the welfare of the general public.

2. We believe in TRUTH as applied to the editorial, news and advertising columns.

3. We believe in the utmost frankness regarding circulation.

4. We believe the highest efficiency of the Business Press of America can be secured through CIRCULATIONS OF QUALITY, rather than of quantity—that character, and not mere numbers, should be the criterion by which the value of a publication should be judged.

5. We believe in CO-OPERATION with all those movements in the advertising, printing, publishing and merchandising fields which make for business and social betterment.

6. We believe that the best interests of manufacturers, the business press and consumers can be advanced through a greater interchange of facts regarding merchandise and merchandising, and to this end invite co-operation by manufacturers and consumers.

7. We believe that the logical medium to carry the message of the manufacturer directly to the distributor and the user is the business press.

8. We believe that while many advertising campaigns may profitably employ newspapers, magazines, outdoor displays, etc., no well-rounded campaign seeking to interest the consumer or user is complete without the business press.

9. We believe in co-operating with all interests which are engaged in creative advertising work.

10. We believe that business papers can best serve their trades, industries or professions by being leaders of thought; by keeping their editorial columns independent of the counting room, unbiased and unafraid; by keeping their news columns free from paid reading notices and puffery of all kinds; by refusing to print any advertisement which is misleading, or which does not measure up to the highest standards of business integrity.

COAL AGE

Vol. 4. NEW YORK, NOVEMBER 29, 1913 No. 22

Said a superintendent: "When the good ladies of our community decide that they need a new church building or school house, I become interested and offer them encouragement. When they come to me with a request to head the subscription list (and an impression that I am good for at least one-half of the total), I remind them tactfully of the proverb which teaches that 'when an ass bears too light a load, he wants to lie down.' "

Churches are beginning to realize that it is important to have each member contribute something; the person who fails to make a contribution, generally fails to take much interest in the work, or bear any of the responsibility. It's pretty much that way with all organizations, charitable, religious or what not.

Company-maintained schools and churches are far better than no schools or churches, but they cannot compare in enthusiasm and efficiency to the ones that are organized and maintained by the miners and their families, on their own initiative. In any camp where 90 per cent. of the married men contribute to the school fund, you'll probably find at least 90 per cent. of the children attending school. It is seldom that a man will contribute to a school and then help his boy to play "hookey."

Those of you who live in states where public schools are independent of individual subscription, but require strict truancy laws to maintain their attendance, will be agreeably surprised, if you ever have the opportunity to visit some of these mining-camp schools, in less-favored communities. There are other reasons than the money interest to account for the popularity and success of these mining-community institutions

If a state or county maintains a school, or a company builds a school house for its employees and expects the superintendent to look after it, the men become suspicious of its teachings (thanks to our Socialistic brethren) and resent its influence. Miners as a class are somewhat suspicious and the slightest hint that some one is trying to influence them, for better or for worse, meets with instant rebellion.

Recall the opposition met with by the progressive superintendents who attempted to introduce safety explosives without first obtaining the approval of the miners, and you can realize what some of these same superintendents are now up against, who are endeavoring to persuade employees to send children to school houses built at company expense, under company supervision.

The influence of the schools and churches, organized and maintained by workers, is manifested in many different ways. We once knew of a camp where four miners' families persuaded their men folks against moving to another camp, because they had a $25 interest each, in a church organ. If your boy had solicited subscriptions for a school building and raised $150 don't you think he would offer some objection if you wished to move to another camp?

Moral: Encourage the wives and the children, Mr. Superintendent, to solicit your name last.

Theory Regarding Process of Coal Formation

SYNOPSIS—Anthracite is quite usually regarded as a bituminous coal which has been subjected to great heat but Dr. Bergius tries to prove that it is the result of extreme pressure, that it may be formed from bituminous coal at a far lower temperature and in shorter time than soft coal is developed. His tests also show that in the change a large percentage of methane is formed, whereas, where the coals are bituminous, the principal gas distilled is dioxide of carbon, the free hydrogen in each case being about the same. Thus we are advised against regarding anthracite as the ultimate outcome of all bituminous coals, the differentiation only taking place under extreme compression and moderate heat.

⁂

Doctor F. Bergius, of Hannover, Germany, presented at the Convention of Naturalists and Physicians, Vienna, Sept. 22, 1913 (Section of Chemistry and Electro Chemistry), a paper in which he gave an interesting theory of coal formation. The following report is translated from the *Montanistische Rundschau.**

ALL COALS ARE THE RESULTS OF COMPLETED REACTIONS AND ARE NOT TRANSITIONAL

The author, whose papers at former meetings of the Society had already indicated a wholly new theory of the coal-formation process, gave the convention a detailed account of his investigations. They lead to the conclusion that the formation of coal is a thoroughly uniform, comparatively simple, and very characteristic chemical reaction, and that its product, so far as produced from cellulose, is likewise a homogeneous body of permanent chemical composition.

Physical chemistry has reached a point where it is possible to explain this process. This is done by imitating experimentally the extremely slow process of coal formation which has taken place through the geologic ages, carrying it out in a brief time, yet without changing it in essence.

WERE EARLY FAILURES TO PRODUCE ANTHRACITE DUE TO EXCESSIVE HEAT?

The earlier experiments were undertaken to attain artificially a product corresponding to coal by dry distillation at a comparatively low temperature. They led to products containing about 82 per cent. carbon and 4 per cent. hydrogen. Natural coals contain considerably more hydrogen; those, however, that have a low hydrogen content, such as anthracite, have a substantially higher carbon content than this artificial product.

According to Bergius, this failure in agreement is attributable to the fact that in the earlier experiments of Klasen and Stein, the exothermic nature of the carbonization process led to overheatings which do not occur in nature. The heat of decomposition of the cellulose is sufficient, under the nonconducting conditions obtaining in the earlier experiments, to produce a temperature of 2300 deg. Fahr. At this temperature the carbonization naturally becomes a coking process.

In order to make the actions solely those of carbonization, it was necessary to remove constantly the excess of heat developed, and this was done by heating in the presence of water, which was well adapted to the purpose by reason of its great heat capacity, conductivity and absorbing power in respect to cellulose. To reduce the process of geologic ages to the compass of a few hours, it was necessary, according to the coefficients of temperature, to heat constantly to about 646 deg. F. The heating must therefore take place under high pressure in a bomb. According to the method here described, systematic experiments starting with pure cellulose were conducted and gave the following results:

THE RESULT IS DIFFERENT AT A LOWER TEMPERATURE

Pure cellulose was not changed by long heating up to 158 deg. Fahr. By increasing the temperature and time of the reaction, the carbon content gradually increased, the hydrogen content fell, later it occasionally rose, and finally remained constant. In all experiments, however, the carbon content approximated to a constant final value of about 84.8 per cent., and the hydrogen to about 4.8. The rapidity with which these results were attained depended on the temperature.

These values are far closer to the average composition of coal than those of Stein (81.3 per cent. carbon, 3.8 per cent. hydrogen) and Klasen (82.5 per cent. carbon and 4.1 per cent. hydrogen). The attainment of such concordant values under the different conditions of the experiments certainly shows that the same process has taken place.

Of special interest, naturally, is the question of byproducts from the reaction. In spite of the difficulties which the method employed opposes to removal of gaseous products, a way was found of determining their composition. There was obtained in all cases a gas of about 78 per cent. CO_2 and 20 per cent. H, which was entirely free of hydrocarbons. Investigation of the reaction quantitatively led with reliable uniformity to the following formula:

$$25\ (C_6\ H_{10}\ O_5) = 6\ (C_{21}\ H_{14}\ O_2) + 24\ CO_2 + 65\ H_2O + 18\ H_2$$

COAL IS A UNIT HYDROCARBON NOT A MIXTURE OF UNLIKE MOLECULES

The result of the so called "incarbonization" (*Inkohlung*)* is not, therefore, as formerly assumed, a conglomerate of amorphous carbon and organic substances but a uniform, stable, chemical compound produced by thermodynamic auto-decomposition of the cellulose.

There arises also a question concerning the production and substance of that coal which contains most carbon, the anthracite. It is generally assumed that we are here dealing with older products of the "incarbonization" reaction in which this reaction has progressed farther.

In the light of Dr. Bergius' observations, this idea is not tenable. Neither by further raising the reaction temperature nor prolonging the time was it possible to depart from the value for carbon content obtained by thermodynamic auto-decomposition of the cellulose.

---

*Translated for "Coal Age" by E. P. Buffet.

*The meaning of this word is uncertain, the difficulty being that it has been invented by the author and cannot be determined from its use in contemporary literature. Inkohlung may mean the reactions by which the carbon percentage is increased by driving off hydrogen and oxygen as opposed to reactions of true carbonization in which the body is carbonized from without. Or it may mean that the expulsion of hydrogen and oxygen takes place within an inclosed space and subject to the pressures created by the gases formed by reaction.—Ed.

EXTREME PRESSURE PRODUCES ANTHRACITE

There was finally found, however, another method of attaining products still richer in carbon—the employment of very high *pressures,* of about 5000 atmospheres. If the products previously obtained were subjected, with a simultaneous moderate increase of temperature, in a suitable experimenting apparatus, to pressures of the magnitude stated, there finally resulted products of about 88 per cent. carbon and 4 per cent. hydrogen, corresponding to natural anthracites.

This process runs its course much more rapidly than the former one, or it can be completed at far lower temperatures if the duration of the action be sufficiently extended. The gas arising from it, which naturally is much more difficult to sample and analyze, possesses a very different composition, that is, about 6 per cent. CO_2, 18 per cent. H_2 and 75 per cent. CH_4.

This result agrees remarkably well with the fact that "lean-coal" mines are those in which firedamp develops abundantly. But also the obvious explanation of anthracite formation from the foregoing experiments, through the effect of high pressure on the "younger" coals, agrees perfectly with geologic experience, according to which lean coals are always produced where heavy rock or folding pressures are exerted.

The course of the coal-formation process according to the experiments of Dr. Bergius was as follows:

EFFECT OF TEMPERATURE, TIME AND PRESSURE ON CARBONIZATION

Temperature (Fahr.)	Time Min.	Per Cent. C	Per Cent. H	
644	18	83.1	5.1	"Incarbonization"
631	117	84.7	4.8	
644	19.5	84.9	4.8	
644	24	84.6	4.8	
644	72	84.8	4.8	
356	64	87.4	4.4	Pressure of 5000 atmospheres
644	20	87.0	3.9	

TWO SEPARATE COMPOUNDS FROM CELLULOSE, WHICH ARE NOT TRANSMUTABLE

It is found, therefore, from the observations made, that the formation of mineral coal takes place according to two different processes. One of them, a process of free decomposition, leads from the cellulose to a stable uniform chemical compound $C_{21}H_{14}O_2$, which is the basis of coals of the fat type, and which may be characterized as "ideal coal."

The other leads from this product, under influence of higher pressures, to coal of the anthracite type. Differences in composition, structure and behavior of the various coals are, generally susceptible of being accounted for by the substances that are decomposed along with the cellulose or are held in it, such as organic (albumen, resin) or inorganic mixtures.

Moreover, since the percentage composition of the "ideal coal" has been determined, it is perhaps possible also to investigate the constitution of actual coal. When this is known, we may be able to utilize coals in other ways than by burning them.

⁂ ⁂

Tennessee's State Coke Plant at Petros

BY A. W. EVANS*

SYNOPSIS—Brief description of coke operation owned by a state government. The plant is located in the Brushy Mountain field. The author gives some valuable cost data both on construction and operation.

⁂

The state of Tennessee owns 14,000 acres of coal land in Morgan County, in the geographical center of the Brushy Mountains coalfield. The mountain series in this immediate vicinity are known as the Palmate. Their salient characteristics are long narrow spurs with intervening valleys, ranging approximately north and south. The valleys have fairly moderate gradients presenting favorable conditions for railroad construction.

GEOLOGY

The measures of this vicinity belong to the Carboniferous system. All three of the subdivisions are present. The upper measures are only partially represented, but the middle division is apparently complete, and both of the coal seams in the lower or conglomerate division are also present. The upper measures carry the greatest number of workable coal seams, both in Tennessee and Kentucky. The middle measures are the poorest, but

TENNESSEE'S STATE COKE PLANT. TIPPLE BINS AND WASHER ON THE LEFT AND POWER PLANT ON THE RIGHT have one valuable seam, the Brushy Mountain. The aggregate thickness of the Carboniferous system in this section is approximately 3400 ft., being subdivided as follows: Upper measures, 800 ft.; middle measures, 1400 ft.; the conglomerate measures, 1200 feet.

---

*Petros, Penn.

In a general way the structural geology of Tennessee is comparatively simple. The measures rise steadily from the Kentucky State line as they approach the boundaries between Tennessee, Alabama and Georgia. This field was first opened in 1868, General Wilder, who served as a colonel in the civil war, having heard of the mineral wealth while on a military expedition into the region.

THE STATE PLANT

Doctor Safford says of this plant:

The state of Tennessee constructed its mining plant in the Crooked Fork Valley where it is working two seams, the Brushy Mountain at an elevation of 1625 ft. and the Pioneer at an elevation of 2095 ft. In 1896, one hundred coke ovens were constructed on the property at Petros, Tenn. The ovens are of the ordinary beehive type, 12x7 ft., and are built on a 1.5 per cent. grade to expedite the charging which is done by means of rope haulage.

Some years later 40 additional ovens were constructed in a parallel bank. These latter are 12x8 ft., and are what are known as the Rockwood type which embodies something unique in door construction. The brick work of the ordinary beehive oven is supplemented by a matted cast-iron arch, together with seven cut arch stones and two skew backs. There is also a change in the main door casting, the top being made at the proper angle to receive the crown brick.

The eight heavy jambs in the old-type oven are replaced by 20 small ones which conform with the radial lines of the oven, and the thickness of the ringwall brick. The construction of the retaining wall permits the coke puller to get closer to the oven so that shorter tools can be used. The sloping hearth in this type of oven prevents breakage although it makes it hotter for the coke puller.

DETAILED COST OF OVENS

I have found that these walls withstand the hard service remarkably well. The following is an estimate of the cost of construction of this type of oven:

Estimate

1 ring or trunnel head	$2.00
1300 r.w. brick at $18	23.40
2850 crown brick at $18	51.30
95 skew backs at 20c.	1.90
124 bottom tile at 8c.	9.92
24 jambs at 8c.	1.92
1 c.i. door frame	7.00
1 matted c.i. arch 1100 lb. at 2½c.	27.50
1 ton of fire clay	3.50
1½ yd. of sand at 60c. (under bottom tile)	0.90
15 ft. 70-lb. rail to carry larry track, 350 lb. at $30 per ton	10.50
14 ft. 70-lb. rail, larry track, 326 lb. at $30 per ton	9.78
14 ft. c.i. water pipe, 434 lb. at 2c.	8.68
14.5 cu.yd. mortar wall at $2.75	39.87
Building oven	19.00
125 cu.yd. excavation at 40c.	50.00
220 cu.yd. of dry wall at $2.75	55.00
Filling around oven	5.00
440 common red brick at $7 (brick for piers)	3.08
6½ bbl. lime at 60c.	3.90
4½ yd. of sand 60c.	2.70
Laying yard tracks at 10c. per ft.	2.80
Laying larry track at 10c. per ft.	1.40
Laying water pipe at 10c. per ft.	2.80
1 coke oven lid, 75 lb. at 2c.	1.50
Valves, hose, etc.	5.00
112 railroad spikes, 5½x$\frac{9}{16}$-in.	2.00
1 bridle bar for holding track in gage	1.00
28 railroad ties at 45c.	12.60
28 ft. 70-lb. rail for yard tracks, 653 lb. at $30 per ton	19.59
	$385.54

The cost of coke making at this plant will not vary materially from the cost sheet as herewith presented:

Accounts	Free Labor and Materials	Convict Labor Days	Convict Labor Rate	Convict Labor Amount	Total Amount	Cost per Ton
B. & M.	$4,424.14				$4,424.14	$0.0865
C. D. ovens	1,310.53	10,152	$0.4546	$4615.68	5,926.21	0.1158
C. O. repairs	1,110.97				1,110.97	0.0217
C. O. supplies	446.99				446.99	0.0088
Gen. exp.	1,486.17				1,486.17	0.0290
Loading coke	484.75	6,490	0.4546	2905.20	3,389.95	0.0663
Salaries	3,031.63				3,031.63	0.0592
W. coal	1,378.12	3,243		1494.32	2,872.44	0.0561
Coal coked	48,008.86				48,008.86	0.9388
Totals	$61,682.16			$9015.20	$70,697.36	$1.3822

Yearly output (tons)	51,148.25
Shipments (tons)	51,225.40
Average price	$2.5489
Coal coked (tons)	102,578.00

The cost of coal entering into the manufacture of coke, will range from 46 to 60c. per ton.

The coke shipped from the Brushy Mountain Coal Mines finds a market at the Roan Iron Co. furnace at Rockwood, the Dayton Coal & Iron Co. at Dayton, and the Citico Furnace Co. at Chattanooga, Tenn.

The coke has been subjected to chemical analysis with the following result:

Water	0.06
Volatile matter	2.17
Fixed carbon	83.39
Ash	14.38
Sulphur	1.77
Phosphorus	0.008
Real specific gravity	2.00
Apparent specific gravity	1.06
Per cent. coke substance	53.00
Per cent. coke cells	47.00
Shatter test over 2-in. screen	64.40
Shatter test over 2½-in. ring	76.60

The coke made from the Brushy Mountain seam has a bright metallic luster and is quite firm when freshly drawn from the oven; when mixed with a purer coke it makes a first-class furnace fuel.

To determine the best method of treating the coal and to decide as to the proper size to which it should be reduced to obtain the best results in washing, the following float and sink tests were made:

1½-In. to 1-In. Mesh	**% of Sample**	**% of Ash**
Float on 1.35	18.51	3.05
1.35—1.55	No sample	No sample
Sink in 1.55	1.88	81.30
	20.39	
1-In. to ¾-In. Mesh		
Float on 1.35	16.63	3.50
1.35—1.55	2.78	19.10
Sink in 1.55	1.21	84.00
	20.62	
⅜-In. to ¼-In. Mesh		
Float on 1.35	8.79	4.50
1.35—1.55	1.05	19.52
Sink in 1.55	0.68	69.29
	10.52	

Note—Solutions having specific gravities of 1.35 and 1.55, respectively, were used in making these tests.

The percentage of ash in the total product 1½ in. to 0 in. of coal that floated on a liquid of 1.35 specific gravity would equal 3.64 per cent. and a recovery of 79.97 per cent. The percentage of coal floating on the specific gravity of 1.55 would equal 8.7 per cent. and carry a percentage of ash equal to 20.5 per cent. This quality of coal is termed "bone coal" and shows that in order to maintain a low ash content in the washed product, it must be drawn off with the refuse.

The coal for coking is washed on a Jeffrey-Robinson washer, then carried by elevators to a retention bin of 1000 tons capacity. The washed coal is charged into ovens by two 7-ton larries, connected in tandem. These larries are circular and of the double-discharge type; they run to the oven by gravity, pulling the rope after them and after the oven is charged the clutch on the drum is engaged and the cars drawn back to the bin.

Shaft Sinking under Difficulties

By Charles A. Hirschberg*

SYNOPSIS—In the western part of the Pocahontas field great difficulty is experienced in reaching the coal measures on account of the amount of water encountered. This article describes how some of the principal obstacles were overcome and a good rate of sinking attained.

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The undeveloped area of the Pocahontas coal field lies at considerable depth under water level, necessitating deep shafts to reach and develop these rich measures. Extensive development, in this territory, and likewise the deepest shafts were undertaken by the Carter Coal Co., at Coalwood, W. Va., during the present year. This development and all problems and methods for overcoming the various difficulties encountered were worked out and prepared under the direction of William B. Crawford, consulting engineer for the company.

The main or hoist shaft is 16x30 ft., rectangular, timber-lined, having two hoistways and a compartment for stairway, pipes and wires. The depth when completed will be 650 ft. to the Pocahontas No. 4 seam of coal, and the development is planned for a production of 5000 tons of coal per day. The air shaft is 15x22 ft., rectangular, timber-lined and divided into two compartments, one for air and the other equipped with a geared electric hoist for materials and men.

To hoist the required tonnage from this depth, using single-decked cages, hoisting one 4-ton car per trip, presented an unusually difficult problem. To meet these requirements and conditions, a double conical-drum hoist was designed, coupled directly to a slow-speed, direct-current motor, driven by a motor-generator set having flywheel equalizer and Ward-Leonard control. This hoist will be the largest and most efficient of its type, so far installed in the United States, and is now being built by the Westinghouse Electric & Manufacturing Co., at Pittsburgh, Penn.

Success of Sinking Thought Doubtful

The success of shaft sinking in this territory has been considered a doubtful proposition, owing to the enormous volume of water to be passed through at various depths, and several companies have abandoned such projects, or carried them through, only at enormous cost. This company while fully realizing the magnitude of the undertaking decided after careful investigation and study that the work could be done in an economical manner, and the various streams of water excluded permanently, as well as during sinking, by forcing cement grout into the fissures and crevices of the water-bearing strata, in advance of the sinking, and thus cementing off the water over a considerable area on all sides of the shafts.

Ransome-Canniff grout mixers are used for this work and the grout placed under about 100-lb. air pressure. The grouting holes are drilled with a Sergeant 3¼-in. rock drill. The results obtained have been highly satisfactory, making the work of sinking reasonably dry. This company also proposes, at its second pair of shafts which are to be started in the near future, to shut off all water by grouting, before actual sinking is begun, thus making the work dry and rendering much greater speed possible when the shaft is sunk.

After the work of sinking had progressed some 200 ft., it was decided that the ordinary type of air drills mounted on shaft bars and tripods, was neither giving the best results nor making the progress desired. The space required to operate these drills interfered seriously with continuous mucking, and the delays necessary in lowering and hoisting equipment, setting columns and mounting drills were considerable, and seriously affected the average sinking speed.

After several experiments, six Jackhamer drills, of the self-rotating type, made by the Ingersoll-Rand Co., were installed and a different method of drilling and shooting was adopted. With these drills and system, each shift is required to drill, shoot and muck out, giving an average gain of 3 to 4 ft. per day in each shaft. This is considered good progress, taking into account the adverse character of the formation, and the delays on account of grouting and water, and has more than doubled the speed of the old system using the other type of drill.

The method of working and drilling is shown in the accompanying sketch. The shaft is divided into two sections *A* and *B*, each being drilled and shot alternately, so that each section in turn becomes the "bench" and the other the "sump." This method of sinking permits drilling and mucking operations to be carried on simultaneously by restricting the muck to alternate sides of the shaft. This sump is kept clear of water by means of two Cameron sinking pumps.

The Arrangement of Holes

The sketch also shows the position of the various holes. The round averages 24 holes, 6½ ft. deep for each section, 8 being drilled for cut holes and 14 for squaring, while the two marked *X* are drilled last and fired with the squaring holes to act as lifters.

The average drilling time for the round, using the Jackhamers, has been reduced to from 3½ to 4 hours.

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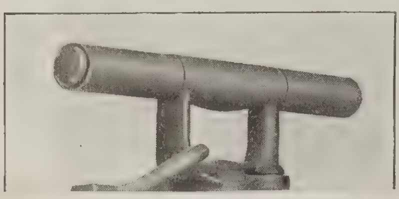
*11 Broadway, New York

The steels advance in 1-ft. changes from 2 to 8 ft., with bit sizes as follows:

No. 1—2-ft. steel, 2¼-in. six point, or rose bit.
No. 2—3-ft. steel, 2⅛-in. six point, or rose bit.
No. 3—4-ft. steel, 2-in. cross bit.
No. 4—5-ft. steel, 1⅞-in. cross bit.
No. 5—6-ft. steel, 1¾-in. cross bit.
No. 6—7-ft. steel, 1⅝-in. cross bit.
No. 7—8-ft. steel, 1½-in. cross bit.

This gives a gage variation of ⅛ in. and the steel being ⅞ in. hollow hexagonal, provides ample clearance for the cuttings to be expelled.

This is greatly aided by the hole-cleaning device, or throttle placed on the exhaust *A*, see Fig. 2. The operator closes the throttle forcing the air down through the hollow steel to the bottom of the drill hole, and assists the cleaning action



the Appalachian Power Co. from one of its numerous substations. A pressure of 100 lb. is maintained at the drills, and the explosive used is 1-in., 60 per cent. gelatin, fired with electric batteries.

I am indebted to Mr. Crawford, also to J. J. Renehan, superintendent of sinking, and George E. Kerivan, for much of the foregoing information.

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Power-Plant Depreciation

Depreciation of power plants is often a puzzling question to the colliery engineer. A recent issue of *Power* offers some good advice on this problem. We quote as follows:

> A power plant uses up engines as well as coal and oil. If an engine costs twenty thousand dollars and lasts twenty years, the plant has used up, on an average, one thousand dollars worth of engines a year, and this must be taken into account in making up the cost of power just as certainly as the cost of the coal, labor, repairs, etc., for which money is actually paid out each year.
>
> It is usual to charge the plant with a certain percentage of "depreciation," diminution of value, used-upitiveness each year. A common figure is 5%, which assumes that the plant would need to be entirely renewed in twenty years.
>
> Charles M. Ripley has collected some data bearing upon the life of plants in and about New York. He furnishes a list of plants of which one has been running 30 years; two, 29 years; two, 25 years; two, 23 years; five, 22 years; two, 21 years; one, 20 years; six 19 years, etc. An increasing number can naturally be found for the shorter ages. Most of the plants enumerated were put in by Pattison Brothers, a firm of consulting engineers, with which Mr. Ripley is identified.
>
> The significant point is that these plants, even the oldest of them, are running along nicely, and there seems to be no good reason why any or all of them may not be in active and efficient service after a number of more years of use.

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The Everyday Hero

By Berton Braley

There's a Dago wife in Italy
  Who's dreary an' lone an' sad,
There's a couple of kids in Italy,
  Keep askin' about their dad;
An' the money that Joe Pinazza sent
  It never will come again,
While Joe's insurance is fought in court
  By Yankee insurance men.

It was down in the West Colusa mine
  Which may be known to you,
That John Lubik had gone to his room
  As the pit-boss told him to;
But the damp got thick an' his light went out,
  An' he fell in the darkness there,
An' Joe Pinazza brought him down
  To the drift an' the good, clean air.

"I get him," he said as he laid him down,
  An' that was all he said,
Fer without a gasp he swayed a bit
  An' fell in a huddle, dead;
So we took him up on the rattlin' cage,
  An' we buried him down on the flat,
An' I reckon his soul is up above
  Where the souls of the brave are at.

Now Joe he didn't know Lubik's name
  An' he never had seen his face,
But he saved his life as a matter of course
  An' gave his own in its place.
So Lubik lives and Joe is dead
  —They said that his heart was weak—
But he went the route fer his feller man
  An' he hadn't no yeller streak.

Well, Joe was insured, but it come to light,
  That the company wouldn't pay,
An' Joe's friends sued fer the sake uv the kids
  An' the wife that was far away,
But the company said, in a legal form,
  When the doin's in court began,
That Joe he took a "needless risk,"
  In savin' his feller man.

Now I don't know much about law an' such,
  An' I don't want to know no more,
But I reckon when them insurance men
  Gets up on the judgment floor,
The last great judgment floor I mean,
  That plea of theirs won't stand,
When met by the sobs of some Dago kids
  An' a widow in Dago land.

he Cape Breton, Nova Scotia, Coal Fields

NOPSIS—Coal was probably found in Canada sever rs before it was discovered in the United States and actually shipped to market over a century before h shipments took place in this country. The fields Cape Breton were those which were first exploited. e coals have about the same fuel ratio as those of the irmont, W. Va., coals. The recent lowering of the coal iff raises the question whether this Nova Scotia coal y not regain its former place in the New England rket.

⁂

The fact that the Cape Breton coals were located by sea accounts for the fact that they were discovered ore those of the United States and because they burn ily, they were much sooner brought into practical e than the anthracites which were among the first coals t into use in this country. The first anthracite coal s shipped down the Susquehanna in 1776* and about e same time there was some coal-mining activity in e Clover Hill district of Virginia. The first recorded scovery of coal in the United States dates back to 1679 en Father Hennepin recorded the find in his diary.

Discovery of the Sydney Fields

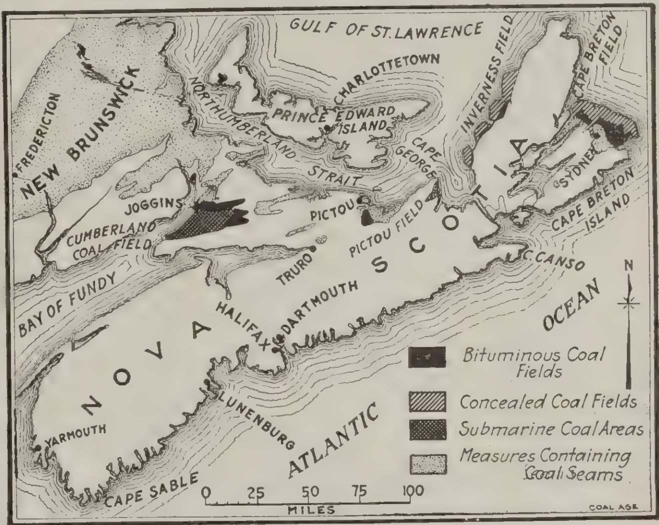
According to Joseph G. S. Hudson in his "Sections of e Sydney Coal Fields, Great Breton": The first inted notice of the existence of coal near Sidney apared in 1672 when Nicholas Denys published in Paris A Geographical and Historical Account of the Coasts of orth America. Eighteen years earlier, in 1654, Denys ad obtained from Louis XIV, a concession granting the ght to explore and work mines of gold and other minrals; for this privilege he agreed to pay the King a oyalty of one-tenth. In 1677, M. Duchesneau, the Inendant of New France, issued a proclamation, exacting royalty of 20 sous (20c.) per ton, from all persons aking coal from Cape Breton. In 1711, Admiral Walker, ho commanded an expedition to reduce Quebec, menions in his journal, that he procured a supply of coal rom the cliffs, with crowbars.

The initial attempt at systematic mining was made in 720, when it was found necessary to procure a supply of uel for the men who came from France to lay the foundaions of the fortress of Louisburg. The pit openings then nade can be seen even at the present day, at Port Morien, Table head and other places. During the next 100 ears, very little work was done, the coal mined being sed almost exclusively by the garrison at Halifax.

In 1820, however, when Cape Breton island became part of the province of Nova Scotia, a considerable tonnage of coal was being mined. In 1827 all the mines were transferred to the company known as the General Mining Association by the London firm of goldsmiths (Rundle, Bridge and Rundle) who had secured the mines and minerals concession for the entire island province of Cape Breton, from the Duke of York. The new owners immediately organized, opened out, and systematically operated, mines in Cape Breton, Pictou and Cumberland counties. A formidable agitation had been started in the province for some years previous to 1858, claiming that the monopoly of the coal lands by the General Mining Association was seriously retarding the legitimate expansion of the coal trade; this agitation eventually resulted in the whole subject being referred to the Privy Council of Great Britain for equitable adjustment.

How Nova Scotia Reduced Unreasonable Royalties

In 1858, the Mining Association surrendered its claims to the provincial government of Nova Scotia. The government in return agreed to abolish the fixed rental of 3000 pounds sterling or $14,600 per annum, together with the royalty on slack coal; to reduce the royalty on all screened coal up to 250,000 tons, to 4.80 pence or 9.6c. per ton; and to reduce the royalty on all coal sold over 250,000 tons to 3.20 pence or 6.4c. per ton. To the association, however, was reserved the exclusive right to 20 square miles in Cape Breton, and to 4 square miles each in Pictou, Joggins and Springhill counties respectively. Under this new regime, mining developed to such magnitude that, in 1865, the provincial government appointed an inspector of mines, John Rutherford, M. E., the first on this continent.



Map of Nova Scotia, Showing General Location of Coal Fields

Reproduced with some changes from "Coal Resources of the World."

In 1854, the Government of the United States removed the duty on coal. This "open-door" policy greatly increased the trade with the New England States; in 1866, the exportation of coal thereto amounted to 404,252 tons. However, in the year of confederation, 1867, the United States once again discriminated against Canadian coal, and imposed a duty of $1.25 per ton. This duty was maintained at this rate until 1872, when it was reduced to 75c. per ton; at which figure it remained until 1894. During this latter period, the exports fluctuated from 228,132 tons, to 13,883 tons.

During the period 1894-97, the tariff was reduced to 40c., but in 1897 it was advanced to 67c., at which figure it remained till this year. Despite tariff barriers, the exportation of Nova Scotia bituminous coal to the New England states continued to increase, and in 1903 the shipments reached a maximum of 968,832 tons. There has been a gradual decrease since that date, and in 1912 the shipments were 412,531 tons. The total production has, however, increased enormously; in 1912 it was 6,-

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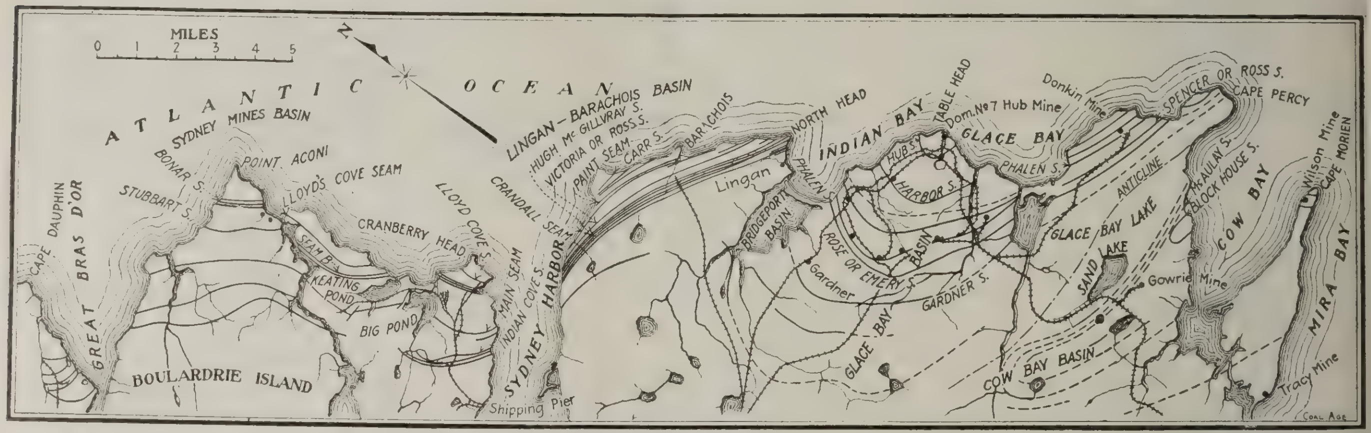
*William Griffith, "Beginning of Anthracite Coal Trade," "Coal Age," Vol. 2, p. 40.

802,997 tons (of 2240 pounds). Of this production 5,197,601 tons are to be credited to the coal fields of Cape Breton.

A Tariff War Redistributes Markets

This marked increase in the production is due in part to the increased market offered by St. Lawrence ports. In 1877 a select committee of the Dominion Parliament, appointed to inquire into the condition of the coal trade, recommended the imposition of a duty on United States coals; this duty has had the effect of opening up the markets of the St. Lawrence to the Nova Scotia coal trade, and in 1912 the St. Lawrence market alone purchased 2,159,005 tons, most of which came from Cape Breton.

On Feb. 1, 1903, the Dominion Coal Co. was organized with a capital of $18,000,000 by a special act of the legislature of Nova Scotia. This corporation amalgamated the principal interests in the coal areas on the south side of Sydney harbor, Cape Breton. These included the Caledonia, International, Gardner, Old Bridgeport, Glace Bay, Reserve, Gowrie, Victoria and Ontario mines, also the Sword areas, in all comprising 70 square miles; the areas controlled have now been extended to 142 square miles. With the advent of this great industrial organization, a new era in Nova Scotia coal mining began; new mine workings, railway extensions, new shipping and discharging facilities were developed, old coal markets were expanded, and new ones opened out, so that the whole coal trade was revolutionized. In the first year of its operations (1893) the coal mined was 834,019 tons; in 1912, the production amounted to 4,332,320 tons; or an increase of nearly 520 per cent. in 20 years.



The Coal Fields Near Sydney, on Cape Breton Island, Nova Scotia, Canada

In 1900, the Nova Scotia Steel & Coal Co. acquired all the mining rights still held by the General Mining Association. In addition to operating the existing collieries, they have opened out new mines, erected iron and steel works, and built a modern coke-oven plant, all in close proximity to the working collieries. Their Princess Pit—now known as Sydney No. 1—was, in 1873, the first submarine mine in North America, the coal being won from workings under the sea. The shafts are of unique construction, consisting of metal cribbing or tubbing. The total length of metal tubbing is 842 ft. 9 in. and weighs some 776 tons. Here, also, was erected the first Guibal ventilating fan in Cape Breton.

The most important of the Cape Breton coal fields is that known as the Sydney field. It is an extraordinarily rich tract of coal-bearing rocks, having an area of approximately 250 square miles. It extends along the northern coast of Cape Breton island for a distance of about 35 miles. Geologically the coal-bearing strata are bounded by the outcrops of the Millstone Grit, as seen at Mira Bay, and they terminate at Cape Dauphin, where the intrusive syenites of the Ste. Anne hills form the northern boundary of the Great Bras d'Or lakes. The Sydney field is divided into four main basins, as follows:

(1) *Cow Bay or Morien Basin,* defined on the east by the Millstone Grit and on the west by an anticlinal fault that dips seaward at Cape Percy.

(2) *Glace Bay Basin,* bounded by the Cape Percy anticline on the east, and by the Bridgeport anticline on the west.

(3) *Lingan-Barachois—Victoria Basin.* This basin has not so well defined boundaries as the two preceding basins, but it extends from the Bridgeport anticline, passing the eminence known as David head, to a submerged fault which exists midway in Spanish bay and Sydney harbor.

(4) *Sydney Mines or Bras d'Or Basin.*—This basin extends from the submerged fault in Spanish bay to the western termination of the coal measures at Cape Dauphin.

Seams Are Thick and Numerous

Richard Brown, the well known author of "The Carboniferous System of Cape Breton," states that the thickness of the productive measures of the Sydney field will not exceed 6000 ft. This measurement is taken from Burnt head in the Glace Bay basin, where the highest known bed occurs, down to the Millstone Grit.

The thickness of seams is approximately as follows: Bonar Seam, 6 ft. 10 in., Stubbart, 7 ft. 6 in.; Lloyd's Cove, 8 ft. 1 in.; Seam B, 4 ft. 2 in.; Sydney Main, 3 ft.; Edwards, 5 ft. 5 in.; Paint or Barachois, 12 ft. 1 in. to 13 ft. 4 in.; Crandall, 7 ft. 11 in.; Victoria, Ross or David Head, 6 ft. 7 in. to 8 ft.; Hugh McGillivray, 6 ft. 3 in.; Carr, 6 ft. 6 in.; Lingan Main, 8 ft.; Hub, 9 ft. 5 in. to 9 ft. 10 in.; Harbor, 5 ft. 3 in. to 6 ft. 1 in.; Phalen, 8 ft. 3 in. to 8 ft. 7 in.; Rose or Emery, 1 ft. 8 in. to 5 ft. 6 in.; Gardner, 5 ft. 9 in.; Block House, 9 ft. 2 in.; McAulay, 4 ft. 11 in. and Spencer or Ross, 3 ft. 9 in. Of course many of these seams are listed twice under different names. Which of them occur in the same section can be determined by inspection of the map above. Thinner beds exist but are not here recorded.

Discussion of Miners' Compensation Laws

(Continued from Last Issue)

YNOPSIS—Features of the Oregon and Washington ws discussed in relation to the need in Montana, and ompared with the experience in Illinois. Relation of ompensation to the insurance plan. Disadvantage of he general-fund idea. The compulsory feature of compensation—its need and objections thereto. Efficiency of he Alabama system as practiced by the Tennessee Coal, ron & R.R. Co. How the law helps the inspector; its ffect on small operations. Does compensation reduce the eath rate?

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Mr. McDermott (*Montana*)—I want to ask a few questions of Mr. Moses regarding some points in connection with compensation laws we, in Montana, are trying o solve. The question of compensation has interested Montana for some few years past; and, at a recent session of the legislature, we had four different measures drafted for submission; but, while there were several points of difference, it was quite evident that they wnated to adopt some form of compensation law that would provide just and equitable compensation for accident.

Features of the Oregon and Washington Laws

One of the measures submitted was patterned after the Oregon law; in fact, was a facsimile of the Oregon and Washington law. The idea of the Washington law was to classify the different working classes, according to the hazard of the risk of the industry; and a certain per cent. was collected from the payroll sufficient to meet the accidents incident to the business; and it seemed that was what we wanted. One of the points raised was, whether it would be just to compel companies to pay into an insurance fund, or to adopt some form of compensation law; as they claimed that they were already making satisfactory adjustments and settlements in the cases of persons injured in mines, mills or factories.

Now, to get a little more light on the subject, I want to ask Mr. Moses, first: To whom, in the absence of the state commission, is application for compensation made, and who decides just how much should be paid, under the operation of the Illinois law? Second, what per cent. of the coal mines operating in Illinois elected to come under the compensation law? Third, what objection would there be, from the operator's standpoint, to raising a common fund for compensation? As I understand the Illinois law, each individual company takes care of its own cases.

Mr. Moses—In answer to the first question that Mr. McDermott asked I would say the amount of pay is determined by the number of defendents. I cannot give you the exact rate per child, but it is, for each child, a certain percentage of the earnings of the man while in the employ of the company. If he is a recent employee of the company, then they go to some other company or individual, and ascertain his previous earnings. The application for compensation is made to the company by which he was employed. The law is mandatory that a stipulated sum must be paid for certain injuries, such as the loss of an arm, leg, hand, finger, toes, etc.

In regard to the second question I will say that, based on the number of operators the percentage of those who elected to operate under the law is small, something like 8 or 9 per cent., I believe; but, on a tonnage basis, it is something like 35 per cent. of the entire output of the state.

Replying to the third question, the objection to a common compensation fund is the same that is made to the insurance-company plan. If I contribute one cent and a half per ton or any stipulated amount per ton, I would not make every possible effort to keep my mine in shape, and to keep down accidents; and the same reason applies to the plan of having a common fund. The best idea is to lay the responsibility on individual shoulders and every operator then will do what he can to reduce accident. In other words, operating on a common plan, an honest operator, anxious to reduce accidents and thus lower the rate of compensation, would do everything in his power to make conditions safe in the mines, while the dishonest operator would not do anything; but he would get along just as well as the honest operator, possibly a little better, and the honest operator would be paying for his risk. There is the same objection to the common fund as to insurance companies.

The Common Fund Method

Mr. McDermott—In coal mining in Washington 3 per cent. of the payroll was collected for all coal reported throughout the state. This was held as a fund by the state government, and handled and disbursed by commissioners appointed or elected for the purpose. Some in Montana favored the idea of a common fund, and this was thrashed out for ten days, in public hearings, in Helena. All of the large operating companies were willing that some sort of compensation law be enacted that would insure against accidents; but they were unwilling to have laws passed that would do, as Mr. Moses has suggested, and make those companies who were taking every precaution to safeguard their property and the lives of their employees, pay for the other man's accidents. In Illinois, as Mr. Moses has stated, each one pays for their own accidents. There is no common fund or anything of that kind. If Montana had such a law we would have to safeguard our mines better. It seems to me that under the Illinois law a man should show a certain financial responsibility, before he is able to operate. But with a common fund the poor man would be able to operate because he is helped by the extra precautions and safeguards of the larger companies.

There is no difference in opinion among mine workers as to whether a compensation law would be good or absolutely necessary, but what system will give the best satisfaction seems to be the stumbling block. As far as I have heard the argument, I would rather favor a fund, handled by a state commissioner. There are several objections that might be raised against making application to local superintendents for injuries that may or may not be entitled to compensation. For example, if Tom Jones happened to come two or three times a year with little trivial claims for accidents, a superintendent would ignore his claims. On the other hand, I realize that, in a great state like Illinois, with a large number of employees, it would keep three or more commissioners busy, to investigate every accident that occurred. But I believe we have reached a stage now that compensation is coming whether we want it or not. I believe that West Virginia is modeled more after the German plan. I am greatly in favor of compensation laws.

Mr. Moses—I want to say that the question raised by Mr. McDermott was thoroughly discussed in Illinois, and there is a firm stand by both employer and employee against the general fund idea; and I believe they are right. I am not a convert of the general fund idea, for the reason that, as I said before, it is open to the same objection as the old system of insurance companies. We might just as well leave it in the hands of insurance companies as to establish a general fund. The fund would have one of two things happen to it; it would either be imposed on by the dishonest operator and dishonest employee, to the detriment of the honest operator and honest employee; or the delay in legitimate claims would impose upon the needy. You have created exactly the same feature that characterizes an insurance adjuster who works to adjust every claim for the least possible money that would be accepted. When everybody is responsible for his own protection, he is interested in preventing accidents, which is the real purpose of compensation. We shall find that it is cheaper to prevent accidents than to pay for them; and that should create ideal conditions in coal mines.

Mr. Adams (*Pennsylvania*)—Did you discuss the idea, in Illinois, of making all companies pay compensation?

Mr. Moses—I feel, personally, that it should be compulsory; but to get the law through at all, we had to submit to the amendment, and make it elective with the companies. We are still fighting for the compulsory compensation law, and hope to win out finally.

The Assessment Plan

Mr. Flynn—I want to say, in conection with these two plans, that probably the plan of Montana would be the better plan for compensation; but the question we are most interested in is: What plan will best serve to reduce accidents in coal mines? I will say that the T. C. I. have tried out several plans. When they first undertook compensation they inaugurated the plan of levying an assessment of so much per ton on the whole output, regardless of any division. After trying that for about two years, it was found that some superintendents were not as active as others in trying to prevent accidents, claiming that the same amount was charged to them, regardless of whether they had any accidents or not, and the mine that had a large number of accidents did not pay any more into the general fund than where they had none.

Then the plan was changed and each division was charged with its own accidents. If one division had no accidents, they didn't pay anything; and if another division had ten accidents, their output was charged accordingly. The superintendents then got busy; because if the accident assessment was four or five cents per ton, at one mine, and only one-half of a cent or one cent per ton at another mine, the management would ask at once, why one division has to pay so much more for accidents than another division, where conditions are practically the same. I want to say that the system worked more successfully than we dared to hope; and all superintendents are now trying to keep the cost of accidents down to a minimum, while under the old system they were not interested. Now, if that applies to a company, how much more would it apply to a state where there are a number of companies. It may be argued that in the mines operated by one company, condition would be much the same, but they are not; and, since changing the system, we have reduced our accidents to a marvelous extent. I am, therefore, strongly in favor o making each individual company stand for its own accidents.

Claims for Pretended Injuries

Mr. Bolt—I would like to ask Mr. Moses: To what extent have employees of your company attempted to impose on their employers, under the compensation law, or tried to extend the time of idleness for injuries or attempted to collect compensation for imaginary injuries?

Mr. Moses—I will say that it would be impossible for me to state off-hand the exact number who have tried to lengthen the time of injury by pretending inability to return to work or claimed compensation for injuries not received; but I can state assuredly that out of the 3200 men we have employed, such cases would not exceed ten or thereabout.

Mr. Flynn—How do you decide as to when a man is able to go back to work?

Mr. Moses—We require every injured person to be examined by our physician and if he refuses we pay him nothing; but if the person injured elects to have some other doctor or a number of doctors, he can do so; and we will send him to any hospital he desires, and pay his expenses; but he must submit to examination by our physician, who will say when he is ready to return to work. He must get an order from our physician to the manager of the mines where he was formerly employed, before he can return to work. I will say that we have had more trouble with men wanting to return to work before our physician thought they were able, than with men not wanting to go back to work; and it is more burdensome to the compensation plan for men to go back before they are fully able, than to stay out a few days longer than is actually necessary.

Mr. Flynn—The T. C. I. Company have a similar plan, but if a man elects to have an outside physician, we require that physician to make a report of the accident, and give the man a "return-to-work" slip, which he must have before he is allowed to go back to work. Many insist on going back to work immediately. A broken finger they don't think amounts to anything; but the doctors fear infection and hold them out till that danger is past. A few insist on staying out longer than the doctor requires. Wrenched and strained backs are accidents that will fool the very best doctors. There are more impostures in this class than actual injuries. A fake injury such as a sprained or wrenched back is hard to determine.

Mr. Moses—I will say that our experience is much the same as Mr. Flynn has described. We expect, under the compensation law, to be cheated by some; but we still think it is the best plan of operation.

Comparative Cost under Compensation Act

Mr. Flynn—Have you any data comparing the cost of accidents prior to the compensation act, and since operating under the act?

MR. MOSES—The only available data previous to operating under the compensation act was the sheet showing the total cost of labor, which included many men of no value whatever around the mines. Owing to the practice of giving easy jobs to a certain number, which had been in operation and was a burden, we had no accurate way by which to obtain figures showing the cost of accidents. It was only possible to compare the total cost of accidents and labor now with the total previous cost of accidents and labor. By this comparison, the total cost appears to have been materially reduced; but it is not entirely on account of compensation; because we have renovated the mines and put them in good shape; and installed new equipment, which would tend to reduce the cost without compensation. The claim I make for compensation is that it has enabled us to accomplish this result better than could be done without the law.

MR. SYLVESTER (*Tennessee*)—I thoroughly agree with Mr. Moses in the conclusion that we must put the liability on the individual employer, in order to cut down the accident list. I would like to ask: To what extent have the small mines, working on a limited capital, adopted this proposition?

MR. MOSES—I don't think that I can answer that question at all, but perhaps Mr. Bolt could answer the question as to the number of operators that have come under the law.

FROM THE INSPECTOR'S STANDPOINT

MR. DUNLOP (*Illinois*)—I would like to say a few words about the Compensation Law, from the inspector's standpoint. I have not regarded this law for the compensation given to the injured employee, or to the family of a man who is killed; but as a means of reducing mine accidents. Few of our operators have elected to work under the compensation act; but the largest operators have done so. Looking more to the prevention of accidents than anything else, the inspectors have met the commissioners frequently, for the purpose of securing what we call "face bosses," for the purpose of supervising the work of the miners and preventing accidents.

One year ago on the first of May, when the Compensation Act first took effect, a coal company that employs something like 1300 men, in two mines, and which, prior to that time had just one face-boss, put on four extra bosses, the very day the act took effect. Some of these men look after the working face only; others see that the men timber their places properly. The records show, however, that they have had more accidents since putting the four men on, than they ever had previous to that time; although it is true that the men were reporting more accidents than they did before.

There is one feature about the Compensation Law, as far as the inspector is concerned; it is better than insurance. Insurance companies, as a rule, simply comply with the statutes and no more; and if an accident occurs, the insurance company makes the settlement. Under the Compensation Act, the operators go further; they do more than the law requires, which is, to me, one of the best features of the law. When the operator is willing to do more than the law requires, it makes it easier for the inspector. The law, in its present form, is hard on small operators, many of whom cannot operate under its provisions. They are required to file a bond, showing that they are responsible and able to take care of any accidents that may occur. That provision will deter many who would be glad to work under the law. * * * * *

I want to say, it was stated that twenty years ago we had good, practical, English-speaking men in the mines; and today 70 per cent. of the miners in Illinois are foreign-speaking men; but with all that, the number of accidents is no greater, but remains the same. The death rate seems to be fixed, as we have not been able to reduce it; but I believe that the Compensation Law is going to be the means of reducing the number of accidents at the face, due to falls of coal and rock. Fifty per cent. of mine accidents occur at the face; and the Workman's Compensation Act is the only thing that will help us. We are not having any more accidents on account of non-English-speaking men in the mines. For every 250,000 tons of coal mined in Illinois, there is a man killed; and that is true of nearly every state.

COMPARATIVE RESULTS

MR. WILLIAMS (*Pennsylvania*)—How do present results compare with those under the supervision given in the face twenty years ago?

MR. DUNLOP—The present law only took effect one year ago; and, as Mr. Moses stated, we are now having reported more accidents than were ever heard of before. I will refer, in reply to your question, to a mine that has been worked with face-bosses, now, for the last six years. The year before the Workman's Compensation Act took effect, the company paid out $1000 for compensation, in one mine alone where 600 men are employed. This last year, under the Compensation Act, when all of the men knew they were entitled to compensation, it cost the company $1800 for accidents. That is the lowest estimate that I have gotten from the district. Another feature is: The injured miner does not know how much he is going to get until he is laid off and the cause of the accident is learned. I will say that the operators are very reasonable and pay what they consider a fair compensation. Viewed from the standpoint of preventing accidents, it is what we want, and I hope it will accomplish that purpose.

EFFECT OF LAW ON FATALITIES

MR. BOLT—In discussing fatalities in Illinois, Mr. Dunlop said the death rate in the last twenty years has remained about the same. I don't know that he is quite correct in that statement, but, if he is, there is something the matter, because anyone who has been in Illinois during the last twenty years knows that conditions have improved wonderfully in the mines, in that time: Ventilation is 100 per cent. better; efficiency in the management has improved by 100 per cent. or more; conditions under which the men are working have improved all around. I hold and have always held that the reason accidents have not been reduced was because of the influx of foreign labor, and I would like to have Mr. Dunlop tell me why, with all of these improvements, the death rate and the rate of accidents have increased, if it is not due to the cause I have stated. With all of the improvements the accidents should not show the same ratio of increase that the tonnage did. I repeat, it is because of the influx of foreign labor in the mines—men who know barely enough to use the pick, and don't know how to protect themselves.

MR. DUNLOP—In looking over the reported fatalities and investigating accidents, I find that it is not the green men that are being killed. It is the men who have been working in the mines for years. The green man—the foreigner—takes better care of himself than the man of experience. In my opinion the reason for the great number of accidents is careless neglect, growing out of familiarity with the conditions, and taking chances. They gamble on it. It is the experienced men among the non-English-speaking men who are killed.

Mr. Back (*Illinois*)—In the district that I represent (the sixth), the large companies are working, not exactly under the Compensation Law but something similar, while the smaller companies set aside a certain amount as a sort of trust fund, to take care of accidents. The large mines employ face-bosses. In the last year we have only had two nonfatal accidents and but one fatal accident. I have asked what it cost to insure, and the reply was about $44 on each $1000 carried on the payroll. What does it cost under the Compensation Law? The answer is: Less than one-half, after paying all costs of injuries from accident.

I find, also, that when companies are carrying insurance a great many of them do not attempt to keep their mines in good condition; they neglect passageways, driveways, etc. I am heartily in favor of the Compensation Law, and I don't have to ask whether they are working under the law or not; I can see it. Companies working under the Compensation Law are more careful and particular than those where the insurance companies pay the bill. * * * * *

Pertinent Questions

Mr. Paul (*Pennsylvania*)—The discussion on this subject has been both interesting and profitable, although some of the discussions have wandered some from the main subject. I would suggest there are a few questions that it would be well to have answered in order to complete the records; so that other members who could not attend the meeting may have the information. I will ask Mr. Moses to kindly answer the questions as I ask them.

Ques.—Under the Compensation Law, of Illinois, have the fatal accidents increased over and above the accidents prior to the operation of the law; or does the increase mentioned apply to mostly nonfatal accidents?

Mr. Moses—I could not answer that question for the entire state of Illinois, because such a small percentage of the operators are acting under that law. I can only answer relative to our own operation, that the fatal accidents have decreased, while the nonfatal accidents have increased.

Ques.—What provision is made for the protection of miners who come under the Compensation Law, at a small operation that may subsequently go into bankruptcy or into the hands of a receiver, or be closed down by reason of a mine fire, if at that time there is standing against the operator a number of claims for the payment of compensation for total or partial disability?

Mr. Moses—It would be the same if that property owed the miner wages; the obligation would rank in the same class as any debt for labor.

Ques.—Do the operators who are now operating under this law carry liability insurance to compensate them in case of accident?

Mr. Moses—Not to my knowledge. I have understood, however, that there were, at the first, some operators who took out a form of insurance against large accidents; but, so far as I have been able to learn, no operator under the law is now carrying insurance.

Ques.—At those mines operating under this law, has there been noted any increase of efficiency on the part of the men, by reason of their being given treatment and being made perfectly well before returning to work; has the production of coal per man increased?

Mr. Moses—Yes, the increase has been about a ton per man per month; but all of that, in my estimation, cannot be attributed to the working of the Compensation Law. Good ventilation and better working conditions and equipment would have some bearing on the increased output per man.

Mr. Dunlop—The new law requires that all operators that elect to come under the law must file a bond.

Mr. Beddow (*New Mexico*)—My understanding of the Illinois Compensation Law is that it is not compulsory on the coal companies to operate under that law; but part have chosen to so operate and part have not. I would like to know if these companies that are operating under the law, are exempt from personal damage suits, i.e., personal damage suits under the general law, in case of any of their men getting hurt; or are they exempt from such damage suits?

Mr. Dunlop—It does not exempt them from lawsuits; if a miner is not satisfied, he can enter suit, but he then loses his rights of fellow servant plea, etc.

Mr. Martin—In West Virginia, the law states that when the party injured was injured on account of the operator not complying with the state mining law, that party has the right to apply to the courts.

Compensation in Pennsylvania

Mr. Adams—Pennsylvania is now considering the matter; it is before the legislature. We have now something of the form of the Illinois law and some of the good features of other laws, but we want to make that compulsory upon all companies large or small. Such a bill passed the House but when it came to the Senate they started the same discussions as they had in Illinois. It is now in the hands of the conference committee. It is a measure in which the state officials have taken much interest. They want to have a law that will mean something; a law that is possible not only to one party of the coal-mining industry, but equally to both. They want to make it compulsory for all companies to go under this act and not make it elective. I think that ultimately we will get a good compensation law, one possibly superior to those of other states, because we have considered all the other laws. The bill will not come out of that conference committee until it is right and just to all. I am glad that we have, in Pennsylvania, the power to say to legislators that we must have everything just and right. The House has done a grand work and the Senate has made certain changes, but more must be done by the working people. There is a way and a method of arriving at that which will be just to all; the large operator and the small operator alike.

As it stands at the present time, the small operator, if compelled to pay this compensation, would be forced out of the business. That is the worst feature of the measure. An explosion in the mine of a small individual operator would wipe out his life savings in a day.

Program of Coal Mining Institute of America

Winter Meeting Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5, 1913

First Day

10:30 a.m. .... Business Session

1:30 p.m. .... Address
"Efficiency of Bituminous Coal Mining." Harrington Emerson, Consulting Engineer, The Emerson Co., New York City.

2:30 p.m. .... Question Box
Conducted by John I. Pratt, State Mine Inspector, Pittsburgh, Penn.

3:30 p.m. .... Paper
"Safeguarding the Use of Electricity in Mines." Clyde G. Brehm, Electrician, Oliver & Snyder Steel Co., Uniontown, Penn.

4:30 p.m. .... Address
Jesse K. Johnston, Creighton, Penn.—"A Study of the Wages and Selling Prices of Coal in the Pittsburgh District."

6:30 p.m. .... Institute Banquet
Fort Pitt Hotel
Announced Speakers: Dr. W. J. Holland, Director Carnegie Museum, Pittsburgh; H. M. Wilson, Engr. in Charge, U. S. Bureau of Mines, Pittsburgh, Penn.

Second Day

10:00 a.m. .... Paper
"The Relative Effect on Men and Small Animals of Small Amounts of Carbon Monoxide." G. A. Burrell, Engr. U. S. Bureau of Mines.

10:45 a.m. .... Paper
"Basic Coke." J. R. Campbell, Chief Chemist, H. C. Frick Coke Co., Everson, Penn.

11:30 a.m. .... Paper
"What is a Proper Method of Sampling the Beehive Coke Ovens for Analysis?" F. C. Keighley, Gen. Mgr. Oliver & Snyder Steel Co., Coal Dept., Uniontown, Penn.

1:30 p.m. .... Paper
"Stray Electrical Currents." W. F. Elwood, Consulting Chemist, Greensburg, Penn.

2:30 p.m. .... Picture Show
Illustrating Coal Mining Fields and Transportation Problems in Alaska. Dr. W. R. Crane, Dean Mining Dept., Pennsylvania State College.

3:15 p.m. .... Address
"Portable Electric Mine Lamps." H. H. Clarke, Electrical Engr., U. S. Bureau of Mines.

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The Wilkes-Barre District Mining School

This school, conducted jointly by the Wilkes-Barre Y. M. C. A. and the Wilkes-Barre District Mining Institute, is just entering on its fourth year, the first session having been held Tuesday evening, Oct. 14. The sessions will close Apr. 17, 1914. The courses of the school embrace practically every subject in the mining of coal. The work has the indorsement of all the leading mine officials in the vicinity. The course covers two years of practical study in arithmetic, mensuration, geometry, trigonometry, logarithms, mine gases, mine ventilation, mine surveying, mechanics, air compression, electricity and the anthracite mining laws of Pennsylvania.

Charles Enzian, mining engineer of the U. S. Bureau of Mines, is supervising principal. Mr. Enzian was the first instructor in this school, having conducted a class in mining, in the Y. M. C. A., during the winter of 1907-08. The following year the work was carried on under the auspices of the Wilkes-Barre District Mining Institute.

In 1910, it was decided to extend the course of study and a graded school was started, four instructors being employed. The reception accorded the school by all classes of mining men made it a pronounced success, and it was found necessary to start a day class for those men employed on night shifts. This departure required the employment of another instructor, making five in all. Last year, 1912-13, there were 64 students enrolled in the classes; and it is gratifying to report that six members of the school passed the examinations for mine foremen and assistant mine foremen, held in the spring and were awarded certificates of competency.

This year the day class is taught by Richard Lewis, assistant mine foreman, Lehigh & Wilkes-Barre Coal Co. The night classes are taught by W. D. Thomas, mine foreman, Kingston Coal Co., and Robert Johnson, mine foreman, E. C. Lee, mining engineer, and E. B. Wagner, electrical engineer, all of the Lehigh Valley Coal Co. The classes meet every Tuesday and Friday evening, and remain in session from 7:30 to 9:30 o'clock.

The officers and directors of the Wilkes-Barre District Mining Institute are: Thomas H. Williams, president; H. G. Davis, first vice-president; James J. McCarthy, second vice-president; F. M. Devendorf, secretary-treasurer; Thomas R. Evans, A. L. Williams, Charles Enzian, John T. Thomas, Gilbert Jones, P. H. Devers, M. J. Flaherty, Thomas H. Price, Thomas Martin, Thomas J. Williams, Samuel R. Morgans, Gwilliam Edwards, J. S. Hammonds, E. J. Newbaker, Lewis J. Davies and Thomas Thomas, directors.

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Alabama & New Orleans Transportation Co.

By B. M. Starnes

That the Alabama & New Orleans Transportation Co. will take a leading part in the coal business in the South, especially along the gulf coast, is very evident. New Orleans uses nearly three million tons of coal yearly, a large portion of which comes 1500 miles from the Pittsburgh district, on account of the low water rates in comparison with the rail rates from Alabama.

The Alabama & New Orleans Transportation Co. has already completed four barges and is building eleven more, each of 1000 tons (equal to 25,000 bu. as they figure it in Pittsburgh) capacity. The barges, which are an innovation in American watercraft, were designed by General Manager John H. Bernhard on the lines of the boats so successfully used in both Germany and Holland. These barges, constructed in the company's own plant at New Orleans, are self-propelled by producer-gas engines, and the cost of operating amounts to only about $1 per day per barge, exclusive of labor. When completed and put into service, not only will they be able to compete with the Pittsburgh coal, but on account of the much shorter distance, the Alabama coal will be delivered and sold at a lower price than the Pittsburgh product.

The company has bought some three thousand acres of high-grade coal lands on the banks of the Black Warrior River above Tuscaloosa, Ala. Numerous openings are being made and the mines will eventually have an output of more than 2000 tons per day. Even this may have to be increased after a few years. The company has a great advantage in that the coal is weighed, screened, washed and loaded direct from the mine cars into the barges.

SNAP SHOTS IN COAL MINING

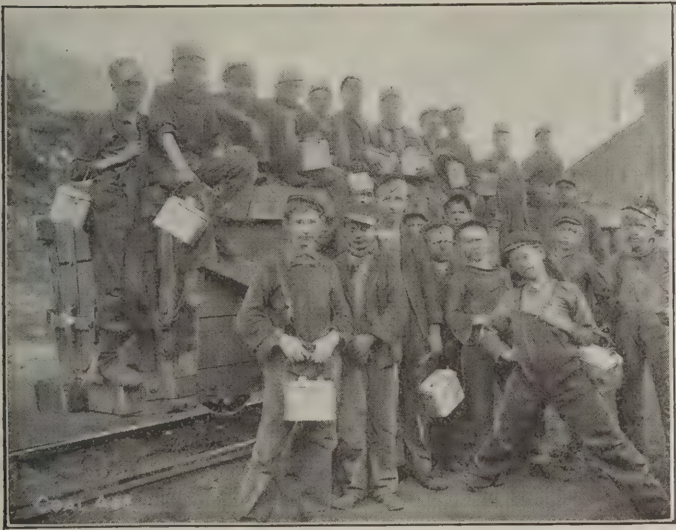
Tipple and Washery of Big Muddy Fuel Co., Marion, Ill.

A Closer View of the Big Muddy Washery at Marion, Ill.

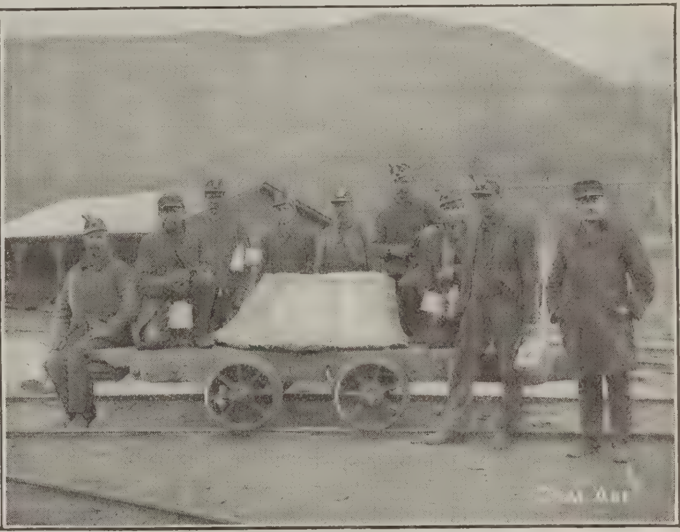
1. Dumping Coal at the Chesapeake and Ohio Pier, Newport News, Va. 2. Briquettes of Pocahontas Coal on Barge Going to U. S. S. S. "Connecticut." Storage Plant of the A. C. Line. One Hundred Thousand Tons of Kanawha and Pocahontas Coals Are Stored in This Yard

SHOWS STYLE OF CONCRETE ARCH USED NEAR FOOT OF AIR SHAFT IN MINES OF MADISON COAL CORPORATION

RESCUE TEAM, FIRST-AID CARS AND 50-GAL. EXTINGUISHER, MADISON COAL CORP., MT. OLIVE, ILL.



A GROUP OF BOYS WHOSE JOB IT IS TO PICK SLATE FROM THE ANTHRACITE COAL AS IT TRAVELS THROUGH THE BREAKER



THIS PIECE OF ROCK WAS TAKEN FROM AN ANTHRACITE COAL SEAM.—NOTE REMARKABLE RESEMBLANCE TO A TREE STUMP

THIS VIEW SHOWS PLAINLY THE CHARACTER OF CAMPAIGN NOW BEING CONDUCTED IN MEXICO BY THE SO CALLED REBELS. THE AUJITA TIPPLE AT COAHUILA, MEXICO, WAS COMPLETELY DESTROYED

A Defense of the Flame Safety Mine Lamp

By E. A. Hailwood*

SYNOPSIS—A modern safety lamp passes flame only under several peculiar conditions, which are most unlikely to happen at one and the same time. A current of air is not likely to be at once both strong and gaseous enough to cause a good lamp to pass flame, nor are a dirty or punctured gauze, or a cracked glass so dangerous as is commonly thought. Even the crushing of a safety lamp in a gaseous mixture is little likely to cause an explosion. The safety lamp has probably been blamed for disasters in which it had no part and other causes of accident have been overlooked to the detriment of the one agent which satisfactorily determines the presence of gas and its quantity.

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Prior to the days of Sir Humphrey Davy, it was no doubt natural to fix upon the naked flame then in common use as the probable cause of coal-mine explosions.

The Davy Lamp was then invented, and was thought to be a solution of the difficulties, but unfortunately it was afterwards shown that under certain conditions, gas when ignited inside the lamp could be blown through the gauze which surrounded the flame and an explosion created in the mine. The Davy Lamp was, however, remodeled, and the present type of bonneted Marsaut safety lamp was evolved.

False Inference from the Davy Lamp

It is, however, somewhat unfortunate that the tricks which could be played on the old Davy lamp have so fascinated professors and many so called Government experts, that they have not been able to realize that the same tricks cannot be played upon the modern safety lamp. These people still devote considerable time to describing and exhibiting experiments on safety lamps, and fail to draw attention to the fact that their experiments and their writings really refer to the Davy lamp and that such discouraging results are not obtained with its more modern successors.

The natural result is that an unnecessary nervousness is created in the minds of miners and coal operators who have not the time or means at their disposal to learn that these tests do not apply to the modern flame lamp, and while I agree that experiments on the Davy lamp are instructive, I contend that it is unfair to the flame-lamp manufacturers not to place more emphasis on the fact that the demonstrations refer only to obsolete lamps.

Explosions Are Charged Offhand to Safety Lamps

One unfortunate result of these records of experiments is that at the inquiries following an explosion in a mine, many practical men and many so called experts calmly state that in their opinion the explosion was caused by a "safety lamp."

From my experience in connection with a large number of tests on safety lamps, and from a perusal of evidence upon which these statements of experts have been based, I am firmly convinced that the persons giving evidence have known little or nothing about the great margin of safety possessed by modern flame safety lamps, or that the person in question has been misled by published tests on the old Davy lamp.

One of the baneful results of verdicts based on such evidence, is that instead of pursuing the inquiry further as should be done, the inquirers overlook the actual cause of the disaster. Perhaps an unnecessary change is made in lamps, and yet the real means for creating a fresh disaster are still retained in the mine.

Several Unlikely Conditions Must Conspire to Cause an Explosion

A white-hot heat is necessary to cause flame to pass from the inside of a well constructed bonneted lamp to the outside. This temperature can only be attained by subjecting the lamp to an explosive mixture containing 8 to 9 per cent. of methane traveling at over 3500 ft. per min. Persons acquainted with these facts will realize that it is a mistake to talk of creating an explosion in a mine by the over-heating of a well designed lamp. Many an explosion has been wrongly charged to this cause.

The majority of lamps now in use are fitted with bonnets or shields, and I have had lamps of this description in explosive mixtures and the gas inside the gauze burning for hours and the gauze red hot, and yet an outside explosion has not occurred. I submit that it will be an extremely rare occurrence to find the following three concurrent conditions: An explosive mixture of gas traveling in a mine at a velocity of 3500 ft. per min., a lamp placed in such a position as to receive the full force of this velocity, and a miner standing by oblivious of the unusual dangers. Such a combination of circumstances is so remote as to be unlikely to happen and may be dismissed as out of the question.

If the velocity be greater than 3500 ft. per min., but if the enormous requisite volume of gas for the passage of flame be absent, then there is no danger. On the other hand, if gas be present but if the requisite excessive velocity be missing the lamp would be unlikely to cause an explosion. Again, the miner would not be disposed to remain in such gas. The danger from "still" gas is furthermore unlikely to occur, as the illumination given out from a dangerous mixture of gas burning inside a safety lamp would be so small that the miner could not continue working by its light.

Are Explosions Likely from a Dirty Gauze or a Cracked Glass?

In another series of tests, the flame was kept burning in a lamp surrounded by an explosive mixture of gas. At intervals coal dust was scattered inside the lamp and also over the outside of the gauze. The lamp was constantly shaken about in the gas, and finally coal dust was allowed to remain on the crown of the gauze for some hours. The gas flame burned immediately underneath the top of the gauze, and had ample opportunity to heat and coke the coal dust.

The lamp had only a single gauze, and the test was carried out at our Pittsburgh factory with natural gas,

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*Manager, Ackroyd & Best, Ltd., Arrott Power Building, Pittsburgh, Penn., and Morley, England.

Note—Paper presented to the American Mining Congress Oct. 22, 1913, at Philadelphia, Penn.

yet despite these unfavorable conditions, the flame did not communicate with the surrounding gas, notwithstanding the fact that the gauze was often red hot. If, therefore, single gauzes will not under such conditions pass flame, it is evident that an explosion is still less likely to occur where the flame is protected by a double gauze.

In other tests, a lighted bonneted lamp was passed so slack that on shaking the lamp, the glass has freely rattled. The glass was split from top to bottom, and a crevice cut right across the top and also at the bottom of the split, the crevice being more than $\frac{1}{32}$ in. wide.

This lamp was placed in a most explosive mixture of compressed gas and kept there for over one half hour with the gas blazing inside the lamp. This failed to cause an outside explosion. In the test, the gas mixture was compressed down to two-thirds its original volume, and the gas therefore was in a most explosive condition.

A Hole in the Top of the Gauze Is Protected by Incombustible Gas

In other tests, a lighted bonneted lamp was passed into an explosive mixture of gas, a hole was pierced in the top of the gauze of not less than ¼ in. diameter, and yet the flame failed to pass through the hole and ignite the surrounding gas. No doubt the reason for this was that the products of combustion from the lamp flame covered the hole in the top of the gauze with a barrier of incombustible gas, through which the flame could not pass to the outside gassy atmosphere.

To users of flame safety lamps, this test will no doubt be interesting as it is the upper part of the gauze which is subject to the most wear and tear, and fortunately the test demonstrated that it is the top part of the gauze which is usually protected by the barrier of incombustible gas.

If the lamp in question be extinguished and the products of combustion escape and if the lamp fill with an explosive mixture of gas, and an internal friction igniter is operated so as to cause a flame to form in the lamp and ignite the gas inside it, then I admit that it is possible that this flame would pass through the hole in the gauze to the outside. But this, of course, only refers to this particular type of lamp, and would not refer to those of the type which must be completely inclosed when being relit.

The Cracking of the Glass by Heat Can Be Avoided and Falls of Rock May Be Harmless

Some authorities have made much ado about the possibilities of the heat from the flame of the miners' lamp cracking the glass. This objection is only a question of a few dollars, as clear glasses can now be supplied for miners' lamps of such quality that they may be heated up to about 340 deg. F. and sprinkled with water from a watering can, and yet fail to crack.

Some people have been afraid that a slab of roof falling on a safety lamp might cause an explosion and ignite the gas; but in all the tests I have so far made, before the lamp was dangerously damaged, the flame was extinguished.

In one series of tests, a lamp was placed upon an iron piston, and the piston moved rapidly upwards into a cylinder containing gas, so that the top of the gauze came into violent contact with the crown of the cylinder and the gauze was crushed down. No outside explosion followed, the light in the lamp apparently being extinguished by the crushing or by the rapid movement of the air. It is unlikely that a lamp would be subjected to so severe a test in the mine as was that just described, for these reasons: If the gas was driven down ahead of the falling rock the rush of air would almost certainly extinguish the lamp before the rock came into contact with it and crushed it. If, however, the rock were to arrive first, the lamp would be crushed and the light snuffed out by the fall before the gas reached it. In any event an immense volume of gas would have to be released, to reach a lamp which was crushed on the floor.

In another test, an unbonneted and lighted lamp was placed in a big jet of explosive gas, and the gauze smashed by a violent blow with a mallet. This also failed to ignite the gas, the blow invariably extinguishing the lamp flame. I, therefore, contend that by using a bonneted lamp of suitable design all fears that physical violence may injure it in such manner as to cause an explosion may be discounted.

While I do not, for one moment, advocate the relaxation of any possible effort to insure the supply and issue to miners of nothing but the best and safest lamp. I am of the opinion that the tests just mentioned have shown that the miners' safety lamp gives a larger margin of protection than is generally supposed.

The Present Test for Gas Is So Simple that Another Test Is Sought

It is somewhat unfortunate that the method of ascertaining gas percentages by the safety lamp is so simple that after only a few minutes' or hours' practice with a simple gas-cap observation machine, practically any mine man can read the percentage of inflammable gas in the atmosphere.

It would, no doubt, appeal more to the present "wise" generation if the lamp could be fitted with a series of levers, switches and indicating dials. The appliance would be even more valuable if when the reading were taken, elaborate reference had to be made to square-, cube-root and other tables to interpret the figures obtained. It would then no doubt, be looked upon as a marvelously clever device, and more attention would be devoted at colleges and mining schools to the elaboration of its mysterious workings.

Now putting sarcasm aside, I would submit that the miners' flame safety lamp is the most simple and most accurate and most reliable device which could possibly be conceived for the practical ascertainment of percentages of gas in the atmosphere of a coal mine.

In recent years the organization of evening mining classes has made great strides in all the coal districts of Great Britain. A very large proportion of both adult and young miners have attended these classes. From conversations I have had with many of the teachers and with men in the mines in various parts of the country, and from observation of the behavior of the mining men who visited the works with which I am connected, I am of the opinion that this course of education will ultimately prove to be one of the biggest factors of safety introduced in recent times into the coal mines.

The Importance of Gas Testing Increases

A few years ago few miners knew how to test for gas and read "gas caps." The consequence was that men have often ignorantly continued working in places so charged with gas as to be on or near the border line of explosibility. No doubt the miner has done things which he would have avoided had he known the dangerous condition of the atmosphere in which he was working.

It has now been established that a severe explosion can be obtained from quite a small percentage of gas if coal dust be present. The present tendency in coal-mining practice is to employ vast numbers of men in every mine on each shift; the number of deaths from an explosion is therefore more appalling (as witness the recent explosion in South Wales, England, where over 400 men appear to have been killed), to employ more electric machinery, such as coal cutters, locomotives, motors, to push the coal face forward more rapidly and risk falls of large quantities of rock roof with the possible bringing down of gas to be ignited by sparks from the grinding rock.

There are also the possibilities of explosions from pipes, cigarettes and matches, so that it is now more necessary than ever to place in the hands of each miner, the means whereby he may ascertain the state of the atmosphere in which he is working.

The best course to pursue will no doubt be to educate the miners more and more into the best methods of using the flame safety lamp and also as to the best manner in which to test for gas.

Some parties have proposed that a flame safety lamp be placed at the entrance to each working place. This is to be given into the charge of the "gangman." This lamp will generally be neglected, however, and as the principal object of the "gangman" is to get as much coal as possible, he will, no doubt, fail to take a lamp into his working place at sufficiently frequent intervals.

On the other hand, if each worker be provided with a flame safety lamp, the early detection of the presence of gas is better assured. Even with the best of ventilation some parts are likely to be overlooked and an explosion of gas may be extended by coal dust throughout the mine.

THE ILLUMINATION AFFORDED BY THE SAFETY LAMP

Many writers who discuss unfavorably the light given by a flame safety lamp appear to forget that the coal miner does not go down into the mine for the purpose of reading the daily newspaper, but rather to hew coal from a generally well defined coal face, and that, with constant practice he gets so that he could do the work almost blindfolded.

They also overlook the fact that, generally speaking, several men work so near each other at the face that they get a large general lighting effect from the several lamps.* A miner's light, may on the surface seem to be a miserable one, yet in the darkness of the coal mine this same light is quite sufficient for the work.

Certain parties blame the flame of the safety lamp for certain diseases of the eyes of miners, but it would now appear that there are some mine workers who have had the benefit of the increased light from acetylene lamps, yet they now complain that this increased light hurts their eyes. This would seem to raise the question as to what is the proportion of miners whose eyes are naturally weak. These would suffer pain whether the light were good or bad. The elimination of these cases will possibly show that the remainder will be quite satisfied with the existing miners' flame lamp; if not, the illumination can now quite easily and simply be increased to 1½ candlepower.

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*This is not true in the pillar workings of the United States. Most of the English workings are longwall.—Editor.

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The Coal Strike in Colorado

SPECIAL CORRESPONDENCE

SYNOPSIS—Conclusions arrived at by the editors of Colorado's leading newspapers, after an extensive and impartial investigation of the labor situation in the coal fields. Four of the six principal demands made by the miners are approved by the press representatives.

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On Sept. 23 the coal miners of southern Colorado went on strike. The next few weeks were marked by unusual acts of violence, which caused Governor Ammons to call out the troops. Thursday, Nov. 13, editors representing 25 of the leading papers of Colorado met in Denver for the purpose of learning all the facts possible in connection with the strike. Governor Ammons told why he called out the troops and what he proposes to do through their operations. Fred Cornwall, Thomas Dennison and A. Lamont, three men on strike, were selected by the strike leaders, and told why they struck and what they are demanding. John C. Osgood, president of one of the large companies gave the operators' side of the controversy, and John McLennan, president of District 15, United Mine Workers of America, told why that organization called the strike. The six addresses occupied six hours. Every speaker was given unlimited time and no interruptions allowed. Following the addresses, the editors went into executive session and adopted the following resolutions, with three dissenting votes:

TO THE PEOPLE AND THE PRESS OF COLORADO, TO THE COAL-MINE OWNERS, AND TO THE COAL MINERS OF THIS STATE:

For the past two months a strike has existed in the coal-mining industry of Colorado. As a direct result of this strike human lives have been sacrificed, many thousands of laboring men thrown out of employment, property destroyed, business conditions have become depressed, the price of coal has been advanced, the reputation and credit of the state at home and abroad is being impaired, and the public at large is being made to suffer beyond accurate calculation. The unfortunate conditions are not in harmony with the peace, prosperity and general welfare that is supposed to be guaranteed to all men and to all institutions alike under the constitution of the state and of the United States.

For the purpose, therefore, of trying to arrive at a method of assisting in terminating this industrial conflict between the miners and the mine owners in a manner which will be in accordance with the laws of Colorado enacted to regulate the coal-mining industry, the newspapers of Colorado represented, acting on behalf of the general public, have met in Denver, and after hearing the arguments and statements of representatives of the coal-mine owners, of the coal miners, and of the United Mine Workers of America, and a statement from the governor of this state, and having given extensive consideration to each and every one of these statements, and having weighed their effect fully and carefully, the newspapers represented have agreed upon a general and united policy of action, to be recommended to the press of Colorado, with reference to the termination of this strike, based upon the authority of the existing state laws.

Before stating our conclusions, we desire first to state the cause of the strike, viz., the demands made by the miners upon the coal-mine owners of Colorado, which are as follows:

The Demands of the Miners

First: We demand recognition of the union.

Second: We demand a 10 per cent. advance in wages on the tonnage rates and the following day-wage scale, which is practically in accord with the Wyoming day-wage scale.

Third: We demand an eight-hour work day for all classes of labor in or around the coal mines and at coke ovens.

Fourth: We demand pay for all narrow work and dead work, which includes brushing, timbering, removing falls, handling impurities, etc.

Fifth: We demand check-weighmen at all mines, to be elected by the miners without any interference by company officials in said election.

Sixth: We demand the right to trade in any store we please and the right to choose our own boarding place and our own doctor.

Seventh: We demand the enforcement of the Colorado mining laws and the abolition of the notorious and criminal guard system which has prevailed in the mining camps of Colorado for many years.

Concerning Recognition of the Union

First demand—Recognition of the union.

With reference to the first demand, we submit the following facts and conclusions:

The question of the official recognition of any labor organization or labor union by any employer or employers of labor is a question not reached or controlled by law, but must be mutually desired by both employer and employee to become a recognized reality. In other words, if employers do not desire to recognize a labor union as an organization in the employment of members of that union, there is no law upon the statute books which can or will compel them to do so.

We have come to the conclusion, therefore, that the first demand made by the miners is not one which can be arbitrated by any body of meditators, for the reason that, as stated above it must be a matter mutually desired and agreed to by employer and employee. However, so long as individual workmen in the employ of coal-mine owners desire to belong to a union, they have a perfect right to do so. This right is guaranteed them by the laws of the state, and, therefore, this first demand for official recognition of the United Mine Workers of America, as such, should not be further pressed by the members of that organization in accepting a declaration on which this strike should now be terminated. However, the right of the miners to belong to a union under the authority of the state of Colorado should be recognized and upheld, and should not be objected to by any employer of labor.

With Reference to a Wage Increase

Second demand—A wage increase of 10 per cent.

Fourth demand—Additional pay for additional and varied work.

In our judgment these two demands should be merged into a single demand, especially as both the second and fourth demands contemplate a higher net income in wages for the miners, and our conclusion is, therefore, that these demands should be consolidated and considered under one general proposition.

With reference to this general wage demand, therefore, our conclusions are as follows:

The amount of money a miner can earn depends on the amount of work he can or is willing to perform. In a published advertisement over the name of the United Mine Workers of America which recently appeared in the Denver newspapers, a statement was made to the effect that all the miners wanted was "a LIVING WAGE and the enforcement of the laws affecting the coal-mining industry."

The question very properly arises, therefore, as to what should be considered a living wage.

The average wage earned by the individual coal miners working in all parts of Colorado, as published in the advertisement of the coal-mine owners, we find to be approximately $4 per day, practically $105 per month, and working eight hours a day or less if they choose. This is said to include the wages earned by good, bad and indifferent miners. The wages of some miners is said to run as low as $2.25 per day while other miners individually earn over $7 per day.

A comparison of the average coal-miner's wages for the entire state, of $4 per day, with the wages earned by other classes of laboring men in Colorado who are equally skilled with a coal miner, shows that if the average wages of all coal miners in Colorado is $105 per month, they are now being paid in our belief what has been referred to as a living wage; in fact, that they are already being paid a wage entirely in keeping with the wages paid for other classes of labor in Colorado.

Present Wages Said to Be Sufficient

Therefore, taking the miners at their published word, we believe that their original demand for a 10 per cent increase over the present Colorado scale, and which was later modified in their advertisements to a demand for living wages, has already been met by the payment of the existing scale of wages for mining coal in this state and which is higher in the net wages earned than in any other state. Therefore, this, the second and fourth demand upon the part of the United Mine Workers of America for living wages is now being given the miners by the coal-mine owners.

Third demand—An eight-hour day for all classes of labor in and around the coal mines and at coke ovens.

This third demand is one which is guaranteed to miners employed in underground mines by the laws of Colorado. If the laws of this state have been disregarded in the employment of labor in the coal-mining industry, it is the duty of the governor to enforce this law, and in this he should be heartily supported.

Therefore, our conclusion with reference to the third demand on the part of the miners employed in underground mines is that it should be guaranteed to them in accordance with the laws of this state.

Fifth demand—Check weighmen at all mines:

This, the fifth demand, is another to which the miners are clearly entitled, and which is guaranteed to them under the law. If this law has not been enforced, or if the miners have not taken advantage of their rights under it, it is the duty of the governor of Colorado to guarantee the enforcement of this law.

Right to Trade Wherever They Please

Sixth demand—The right to trade at any store:

This sixth demand, also, may or may not have been accorded the miners by the mine owners. It is a demand, however, which should be guaranteed to them, for the reason that the laws of Colorado provide that no coercion shall be practiced by any coal-mine owner against any miner in the buying of his household supplies. Therefore, this sixth demand should also be guaranteed to the miners under the provisions of the laws relating thereto.

Seventh demand—General enforcement of Colorado mining laws, abolition of guard system:

This seventh and last demand upon the part of the miners is not open to discussion, so far as that portion of it which relates to a general enforcement of the Colorado mining laws is concerned; for, without question, the miners are entitled to receive the full benefit guaranteed to them under the mining laws of this state.

So far as the employment of police or mine guards is concerned, this practice during periods of peace is maintained solely as a matter of police protection against ordinary disturbances and against possible damages to property in times of petty brawls which are of ordinary occurrence in many mining camps; and so long as these guards or police are maintained upon a company property for the purpose of preserving the peace and to protect that property, there is no good or legal reason for their removal. With the exception of this portion of the last demand of the miners, our conclusion is that the seventh demand, for general enforcement of the mining laws of Colorado, is clearly right, and should also be guaranteed to the miners by the full power of the laws of this state.

Therefore, after mature and careful consideration of all the factors in connection with this strike, we hereby make the following declaration:

That the strike which has prevailed in the coal-mining industry in Colorado should be called off under the following terms and conditions, viz.:

First: That the miners should waive their first demand, which is for a recognition of the union, on the ground that the recognition of any union must necessarily be a matter of mutual agreement and not of coercion, and not being covered by any law; and for the additional reason that the laws of Colorado guarantee to every miner the right to belong individually to any labor organization without prejudice or discrimination on the part of any employer of labor.

Second: That the miners should waive their second and fourth demands for an increase in wages, not only for the reason that the wages now paid to coal miners in this state are larger than in most other states, and are as large as paid in most other lines of industry in Colorado, but also for the reason that the modified demands of the miners, as published in the newspapers, asking for living wages, are in our opinion, already met, being paid by them in cash, twice a month, by the coal-mine owners.

Third: That the miners are entitled to have granted their demands, in accordance with the laws relating thereto, designated as follows:

Third Demand: For an eight-hour work day in all coal mines.

Fifth Demand: For a check weighman in all mines where they ask, to be selected from among the miners by the miners, to be paid by them, and without interference upon the part of the operators.

Sixth Demand: The right to trade at any store.

Seventh Demand: The demand for the enforcement of all laws relating to the coal-mining industry.

Also, that all competent striking miners who have not been guilty of violations of the law while in strike should be taken back by the coal-mine owners without prejudice.

Also, that any coal-mine owner has a legal right to employ any person or persons without interference or threats upon the part of any other person or organizations, as provided by law.

Also, that we declare it to be the duty of the governor of this state to compel the enforcement of the state mining laws, to which we pledge our earnest support ad coöperation; and that, to obtain for the miners every right to which they are entitled under the law, the rigid enforcement of the state laws is alone necessary.

Commend Governor for Sending Troops

We commend Governor Ammons for sending troops into one disturbed district of the state, and express our full confidence in the integrity of his purposes respecting the unfortunate industrial strife that exists there. However, we believe that troops should be adequate in number to become sole protectors of life and property in sections of the state where such strife exists or is threatened, and that the National Guard should be recruited to meet conditions as they may arise. That it is our opinion that until such time as the National Guard may safely be withdrawn from the affected districts and law and order restored that all offenses and violations of law pertaining to the strike should be immediately tried before military courts.

We further request the governor to take such action as will prevent the importation of firearms into this state by any individual or any organization, because we believe that no one has a right to bear arms here except those legally authorized to do so under the laws of the state of Colorado.

Thus it will be seen that we have found in favor of the miners in four of the six general demands they have made and have recognized their right to work as union.

That in declining to side with the miners in the other two demands as stated, we have concluded that the miners are already receiving living wages; and have, at the same time, found for the miners in their first demand, by insisting that one of the conditions under which this strike is to be called off is that all competent miners shall have guaranteed to them under the provisions of the laws of the state the right to belong to any organization without prejudice or discrimination on the part of any employer, which means their right to work as union miners on the open-shop plan.

Therefore, in the interest of the miners, of the coal owners, and of the general public, we hereby declare that this strike should be called off under the conditions stated above, in order to insure the future development of the coal-mining industry of Colorado and the peace and prosperity of its people.

In the carrying out of this policy by the governor of this state, we pledge the support of the editors and papers here represented and ask for the coöperation of all our fellow-editors in Colorado, who could not conveniently come to this conference, in support of such policy.

Also, that a copy of this declaration be furnished to the officials of the United Mine Workers of America, a copy to the coal-mine owners, a copy to the governor of Colorado, and that copies be sent to the press of this state for the purpose of advising the people concerning what we believe to be a just and fair declaration under the terms of which this strike should now be immediately called off and industrial peace restored, and that we pledge ourselves to support this declaration, based on law enforcement, in the editorial columns of our newspapers.

JOHN C. SCHAFFER, H. E. BOWDEN,
FRANK S. HOAG, L. C. PADDOCK,
FRED MARVIN

Coal Operators Accept Editors' Proposition

Denver, Colo., Nov. 14, 1913.

Messrs. John C. Shaffer, Frank S. Hoag, H. E. Bowden, L. C. Paddock, Fred Marvin.

Gentlemen:

The undersigned, coal-mine operators, are in receipt of a copy of the proceedings of the conference of editors held in Denver, Thursday, Nov. 13. In this statement you specify the conditions suggested by the editors under which the coal-miners' strike in Colorado should be terminated. We agree to comply fully and in good faith with the conditions suggested by you in said statement.

When the operators receive the protection from the civil authorities for the men who desire to work and for their properties to which they are entitled; are not interfered with in employing men to take the places of those who are now on strike and who left before the strike was called, and are enabled to operate their mines under normal conditions to normal capacity, on the open-shop principle, which has prevailed in Colorado for more than 30 years, we will put into effect the scale of prices for coal heretofore prevailing.

Sincerely,
COLORADO FUEL & IRON CO.,
J. F. Welborn, President.
ROCKY MOUNTAIN FUEL CO.,
D. W. Brown, Vice-President.
THE VICTOR AMERICAN FUEL CO.,
J. C. Osgood, Chairman
Board of Directors.
OAKDALE COAL CO.,
SOUTH CAÑON COAL CO.,
F. B. Lewis, President.
LEYDEN COAL CO.,
MOFFAT COAL CO.,
F. A. Perry.
Representing operators mining 95 per cent. of the coal produced in Colorado.

Open Letter to Miners and Operators

To the Coal Operators' and Miners' Unions of the United States.

Gentlemen:

As president of the American Mine Safety Association I consider it my duty (as well as a pleasure), to call your attention to this "joint movement" for safer mining in the United States and to invite you to join and support it. This organization is one that should receive the moral and financial support of every miner and operator in the country regardless of any and all other considerations. Associate membership can be secured by any coal company or any organization, local union, or group of mine workers at a cost of $10 per year. Can you afford to fail or refuse to take out such membership? Make your application now to H. M. Wilson, 40th and Butler Sts., Pittsburgh, Penn., who is secretary-treasurer.

Hoping this appeal will not be in vain, I beg to remain,
Yours for safer mining,
JOHN P. REESE,
President, American Mine Safety Association.
Gillespie, Ill., Nov. 17, 1913.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

An International Exposition on Safety and Sanitation will be held Dec. 11 to 20, at the Grand Central Palace, under the auspices of the American Museum of Safety. Dr. Tolman, of 29 West 39th St., New York City, is director general of the exposition.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

Kentucky Mining Institute will hold its mid-winter meeting in the College of Mines building of the State University at Lexington, Monday, Dec. 8, 1913. T. J. Barr, Lexington, Ky., is secretary.

The Second Annual First Aid Contest given under the auspices of the American Mine Safety Association, local union No. 730, U. M. Wof A., and the Superior Coal Co., will be held at the Colonial Theater, Gillespie, Ill., Tuesday, Dec. 9, 1913.

Explosion at Acton No. 2 Mine, Alabama

By a Staff Correspondent

SYNOPSIS—The explosion though severe enough to mutilate frightfully several men, did not even stop the fan, which was allowed to continue circulating the air after the disaster. Fortunately, there was no fire, as a result of the explosion, so the passage of air only assisted the work of rescue which was completed in 12 hr. The mine was not dry and the explosion is to be attributed to the use of black powder in excessively heavy shooting from the solid.

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Twenty-four men lost their lives in an explosion which occurred at Acton No. 2 mine, of the Alabama Fuel & Iron Co., on Nov. 18, at about 3:45 p.m. The mine is located in Shelby County, about 24 miles south of Birmingham, Ala. Only 29 men were in the mine at the time of the explosion, and this alone accounts for the low death list. Monday was payday and, following the usual custom in Alabama, most of the men loafed the day following. Of the killed, 13 were Americans; 2, Italians; 1, a Greek and 8 were negroes.

The explosion occurred at firing time. Several of the men rescued report that they heard two shots in quick succession and following the second shot, the explosion occurred. The exact point where the explosion originated, or its cause, have not yet been determined, but much evidence points to a windy shot having set off a small pocket of gas or dust in the 8th left heading.

Not a Dry or Gassy Mine, But Coal Was Shot from Solid by Black Powder

The mine has never been considered dangerous, as it generates very little gas and only an average amount of dust; besides this, the mine is naturally damp, drops of water always standing on the roof, near the working face, and some of the haulageways being rather muddy. The danger lay, however, in the manner of shooting the coal, solid shooting with black powder. For this condition, the Alabama Fuel & Iron Co. cannot be censured, as practically all the mines on the same seam are operated under similar conditions. No explosive has been found to give as effective results, from the miner's standpoint, as black powder, and until a state law prohibits solid shooting with this explosive, no single company can take a firm stand. Another dangerous practice, which is also common to most Alabama mines, may have had some effect on the force of the explosion; namely, the presence of nearly full kegs of black powder in several of the entries. As against this, however, little evidence of flame was discovered, and the coked particles usually found sticking to mine props, after explosions, seemed to be absent.

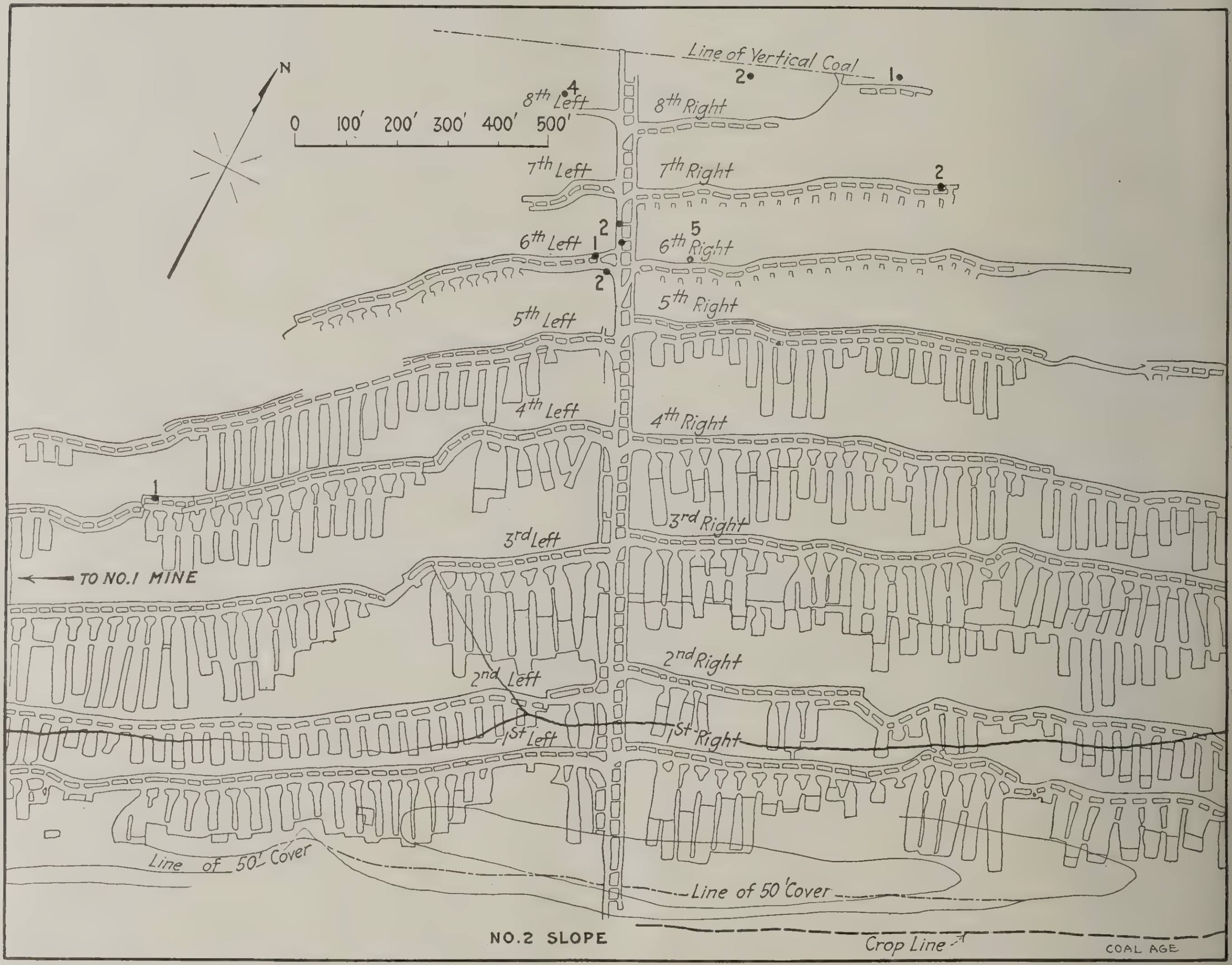
View of Tipple at the Acton No. 2 Mine

Immediately after the explosion occurred, Chief Mine Inspector Nesbitt was notified by telephone, also the government mine-rescue station and the Tennessee Coal, Iron & R.R. Co.'s rescue crews. E. B. Sutton, in charge of the federal station, was absent, at the time, but H. H. Hamilton, of the DuPont Powder Co. took charge of the government's automobile rescue car and hurried to the scene, piloted by an automobile carrying Chief Mine Inspector C. H. Nesbitt and Charles DeBardeleben, vice-president of the Alabama Fuel & Iron Co. The rescue car of the Tennessee Coal, Iron & R.R. Co., accompanied by 18 trained helmetmen, was started out as a special, by the Louisville & Nashville R.R., at about the same time. The automobile arrived a few minutes ahead of the railroad car and within a few hours of the time of the explosion.

The Fan Was Not Stopped by the Explosion and Was Kept Running

The three helmet crews of the Tennessee Coal, Iron & R.R. Co., composed of five men each, under the direction of J. W. Groves, instructor, formerly of the Bureau of Mines, and John Meagher, general superintendent of mines, J. R. McCue and Angus Brown, immediately took charge of the exploratory work, inside the mine. This work was less difficult than in any previous explosion in the state, due to the fact that the mine fan was not injured by the explosion and did not even stop running, and very little damage was done to the inside of the mine. Another aiding condition was the air connection through to No. 1 slope, which remained unobstructed. In fact, the explosion was not felt in No. 1 at all.

No men were found alive in the mine, by the helmet crews, four, of the five survivors of the explosion having walked out unaided, before the arrival of the rescue crews, and the fifth man was rescued by a party formed under the leadership of Ed. Husband, of Eureka mine, after the arrival of the helmet crew, but before they had entered the mine. The connection to No. 1 mine through the 4th left of No. 2, made it possible for this crew to explore that heading, and it was in this entry that the fifth survivor was found.



Map of Acton No. 2 Mine. The Black Dots and Numerals Show Location of Bodies and Number of Men Killed

The Rescue Crews Worked Only 12 Hr., and Found All the Bodies

The rescue crews remained on the scene only 12 hr., and in that time penetrated practically the entire mine and found all the bodies. It would be hard to conceive of greater possible efficiency than that displayed by these trained men. Crews under the direction of Supt. J. G. Steele, followed behind the helmet crews and brought the bodies of the victims to the surface and restored the brattices along the haulageways. E. B. Sutton, in charge of the Birmingham federal mine-rescue station, who was deprived of the honor of accompanying his car on its first trip, arrived a few hours after the car and remained on the scene offering assistance, until the car was no longer needed. Edwin Ball, manager of mines of the Tennessee Coal, Iron & R.R. Co., and Robert Hamilton, chief engineer, also hurried to the scene and proffered aid. C. H. Nesbitt, chief inspector, remained on the scene, directing the work until all the bodies were recovered.

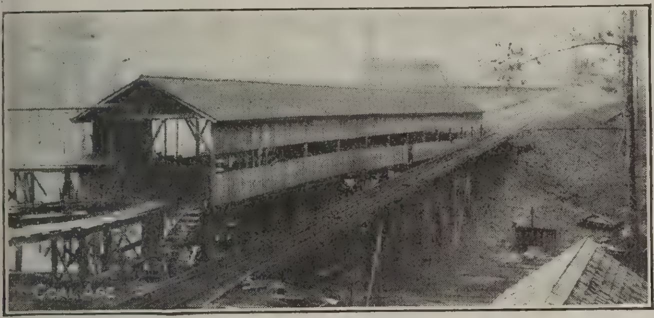
As Usual, More Succumb to Afterdamp Than To Violence

Apparently 15 of the killed owe their death to afterdamp; the balance met death instantly and several of the bodies were frightfully maimed. One of the men who survived the explosion, owes his life to the fact that he became confused and wandered into an air course, while his companions attempted to travel the main haulageway and were overcome. Three mules were in the mine at the time of the explosion and two of them were killed.

The bodies of the dead miners were found at points in-icated on the map: One on 4th left, two on 6th left, four n 8th left, five on 6th right, two on 7th right, one on 8th ght, two on 9th right and seven along the main slope and ir course. The map was last posted July 1. Since that ime, the headings have progressed at the rate of about 00 ft. per month.

A High-Volatile Coal on a Steep Pitch

The coal at Acton is being mined from one of the ahaba seams, which averages about 4 ft. thick and itches at an angle of about 20 deg. As indicated by the map, the mine is worked on the room-and-pillar system, the coal being loaded out of the rooms by means of chutes. The coal is hauled to the surface on a single-track slope. The average analysis of the coal is as follows: Fixed carbon, 58.87%; volatile matter, 34.35; ash, 5.34; moisture, 1.44; sulphur, 0.51.



Showing Approach to the Acton No. 2 Tipple

The mine has a fairly good slate top and is similar in every way to most of the mines in the Cahaba basin. The coal is noncoking and is used largely for domestic and steam purposes. Ordinarily, the mine employs about 75 men and produces a daily output of 300 tons. In 1912, the mine produced 87,859 tons of coal.

Commissary at the Acton No. 2 Mine

All the officials of the Alabama Fuel & Iron Co. extended every courtesy to newspaper men and all others who asked for information. They also exerted every effort to alleviate the sufferings of the widows and orphans. The mine will resume operation, as soon as chief inspector Nesbitt completes his examination into the cause of the explosion. Most of the brattices and overcasts will have to be rebuilt.

Program of Winter Meeting, Kentucky Mining Institute

Meeting Called to Order at 1:30 P.M., Monday, Dec. 8, 1913.

ADDRESS OF WELCOME:
By Judge Henry S. Barker, President of the State University.
RESPONSE:
By W. L. Moss, President of the Institute.
PAPERS:
"The Clinkering of Mixed Coals Under High Temperatures,"
By R. D. Quickel, Fuel Agent of the Cincinnati Southern Railway.
"Problems Encountered in Mining Coals in the Western Coalfield of Kentucky.
By Newell G. Alford, Assistant Engineer of the St. Bernard Mining Company, Earlington, Ky.
"The Use of Gasoline Motors in Coal Mines,"
By W. C. Whitcomb, General Manager of the Geo. D. Whitcomb Company, Rochelle, Ill.
"The Oil Fields of Northeastern Kentucky,"
By Dr. S. R. Collier, West Liberty, Ky.
"Safeguards in the Use of Electricity in Mines,"
By Prof. W. E. Freeman, State University of Kentucky.
"The Bearing of Coal Mining on Local History,"
By Otto A. Rothert, Louisville, Ky.
ADDRESS:
"The Importance of the Coming Session of the Legislature to the Mining Industry of the State,"
By Senator Joseph F. Bosworth, Middlesboro, Ky.

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Coal in the Ancient Lake Beds of Montana

The presence of coal in the tertiary lake beds of verdant valleys in western Montana, has been known locally for many years. Some of these localities have experienced short coal booms, most of which, however, died before the mineral was developed. At the present time, however, systematic mining is being carried on near Missoula.

Coal of the type found in this region has, until recently, been thought worthless, because only such fuel as would coke or stand shipment without slacking was considered of commercial value. In this part of the West where high-grade coal is scarce, where the cost of wood has reached $6 or more per cord, and soft coal imported for domestic use, sells for about $8 per ton, the demand for cheaper fuel is great, and the development of these heretofore unused low-grade coals is becoming profitable.

That these low-grade coals may furnish gas of good quality at a moderate cost, and briquettes suitable for domestic fuel is suggested by the result of experiments with coal of a similar type recently carried on at the University of North Dakota by E. J. Babcock. For this reason an investigation of the resources of parts of Missoula, Ravalli, Granite, Powell, Deer Lodge and Silver Bow counties, in western Montana, has been made by the U. S. Geological Survey in order to obtain data for the classification of the public lands in this area, and to supply the public with information about the coal.

Though a local demand for cheap domestic fuel will cause some further development of these Montana coals, anything like a rapid future for them will depend on an increased use of producer gas for the generation of power, for which these coals seem suited, or the introduction of briquetting machinery which will convert the easily slacked coal into briquettes that may be shipped and stored without deterioration.

EDITORIALS

The Formation of Coal

In another part of this issue we give Doctor Bergius' theory of the formation of coal. He states that anthracite is formed from bituminous coal by extreme pressure accompanied by heat, and that heat without compressive stress cannot convert "soft" into "hard" coal in any period of time, however great. All this he attempts to prove by exposing cellulose to suitable temperatures and pressures.

It is but fair to regard as essentials to the acceptance of his conclusions, certain other positions, some of which he does not take, but which are absolutely to be ascribed to him for they are essential premises to his argument. He may shirk to state them, but if he does not admit that he gives them credence, he vitiates his whole argument and makes his conclusions quite unconvincing.

First, he must either assume that cellulose must be so large a constituent of peat that its reactions are representative of the chemical changes which peat is likely to undergo or else he must affirm that the other bodies in peat despite their dissimilarity of composition must, after certain changes in the earlier stages, eventually pass through the same chemical reactions as if in the first instance they had been cellulose.

We are not disposed to regard cellulose as such a predominant constituent of peat, and we question, moreover, whether that carbohydrate was not already considerably changed by the slow action of ferments before it was materially heated. That this is a fact can be seen by comparing the composition of cellulose with the revised percentage compositions of the following peats from which the ash and nitrogen are supposed to be removed.

Materials	Hydrogen	Carbon	Oxygen
Thèsy peat	6.30	55.45	38.25
Camon peat	6.82	52.41	40.77
Hör in Schonen peat	6.96	55.07	37.97
Cashmere peat	6.31	57.41	36.28
Average of 10 peats	6.57	56.46	36.97
A heavy brown peat (J. Websky)	6.91	63.43	29.66
Cellulose ($C_6H_{10}O_5$)	6.17	44.45	49.38

It will be seen that peat contains a trifle more hydrogen, much more carbon and much less oxygen than cellulose. And in passing let it be remarked that any investigation of the metamorphism of coal is lacking in completeness and therefore in accuracy if it does not consider all the five elements entering into the coal substance, viz: Carbon, hydrogen, oxygen, nitrogen and sulphur. They are evidently not inert to the chemical changes and the last two are not uncombined with the first three and must, therefore, hold some of those elements outside the cellulose bond.

As for the alternative that all is grist coming to the mill of Nature and that resins and humic bodies in the end become like cellulosic bodies under similar treatment, every evidence shows it is not true, and Doctor Bergius has not tried to meet the allegation with refutal by experimenting on other bodies beside cellulose.

The second difficulty is that granting he has produced bodies from cellulose with the same percentage of carbon, hydrogen and oxygen as is found on determining these elements in dry and ash-free coal, then how are we to know that he has not obtained merely an isomer of that fuel and not the coal itself? Nor can we know that this similarity in composition is not the result of the existence in coal of a multiplicity of bodies such as Doctor Bergius tries to deny. Because the product of cellulose is one and indivisible, the learned doctor would have us say, if he has been correctly quoted, that "the formation of coal is a thoroughly uniform, comparatively simple and very characteristic chemical reaction." While this may be true of the cellulosic imitation of coal, yet it is most untrue of that fuel as we find it.

The third difficulty with which Doctor Bergius is beset arises from the fact that his theory rests on the mistaken idea that in bituminous coals there is a certain proportion of hydrogen and carbon and that for anthracite there is another definite relation between these elements. Doctor Bergius claims he has made bituminous coal and anthracite. In the table below we show how uncertain are his evidences. If soft coal contained just 84.8 per cent. of carbon and 4.8 per cent. of hydrogen, and anthracite 87 per cent. of the former and 3.9 to 4.4 per cent. of the latter, we could feel that perhaps Doctor Bergius had lighted on a remarkable coincidence. But his success is not so obvious when the following tables are considered, based on the Bureau of Mines bulletin, entitled "Analyses of Coals in the United States." The figures in this bulletin we have modified so as to exclude sulphur and nitrogen from the analyses and yet bring the total up to one hundred by raising the percentage of carbon, hydrogen and oxygen in due proportion.

Place	State	Fuel Ratio	Hydrogen	Carbon	Oxygen
Lignites					
Tesla	N. D.	0.87	6.21	76.00	17.79
Williston	N. D.	1.06	4.99	73.51	21.50
Sub-bituminous					
Lafayette	Colo.	1.16	5.41	78.05	16.54
Bituminous					
Mineral City	Ohio	1.17	6.19	83.14	10.67
Pittsburg	Okla.	1.32	5.38	85.42	9.20
Blossburg	N. M.	1.60	5.67	86.55	7.78
Bruceton	Penn.	1.61	5.56	87.28	7.16
Dr. Bergius' incarbonized cellulose		....	4.80	84.80	11.40
Semi-bituminous					
Greenwood	Ark.	4.90	4.09	94.60	1.31
Paris	Ark.	5.00	4.42	93.82	1.76
Semi-anthracite					
Bernice	Penn.	9.05	3.83	93.96	2.21
Anthracite					
Scranton	Penn.	10.22	3.23	93.98	2.79
Tower City	Penn.	25.81	3.14	94.41	2.45
Minersville	Penn.	33.13	2.30	95.08	2.62
St. Nicholas	Penn.	76.52	1.80	96.03	2.17
Cranston	R. I.	14.97	0.80	95.92	3.28
Portsmouth	R. I.	28.07	0.38	95.08	4.54
Dr. Bergius' artificial anthracite		....	4.4 to 3.9	87.00	9.1 to 8.7

Perhaps we do not agree with Doctor Bergius as to what constitutes anthracite, and some coals which we term bituminous, he would not so regard. But our greatest difficulty has been to find a fuel having the percentage composition he gives for anthracite or bituminous coal, and as will be noted, we have calculated a number of samples in order to test their values with his. True Stein's and Klasen's results are wider from the mark than those of Bergius, but we must confess that to our mind even the latter has sent his shaft so wide of the target that his conclusions cannot be accepted.

Those who would sweep away the evidence that coal is complex body and matures with time must produce better proof than Doctor Bergius has adduced. As opposed to his belief that the carbon, hydrogen and oxygen content of coal is a unit carbohydrate, we have the fact that several solvents will dissolve parts of it and not inconsiderable parts either. Carbohydrates in the original peat mass may become other specific carbohydrates in the coal, but we cannot admit that the coal itself or the peat from which it comes can be cast into a common unit molecular formula. To an analytic chemist, the unity described by Doctor Bergius, as seen through a synthetic window seems to be entirely lacking.

The belief that coal is maturing is favored by the gas found occluded in it. The surrounding conditions under which coal is now found are the same under which to all intents and purposes it has existed thousands of generations, yet it is still full of gas. If the coal has been stable for those centuries, the gas cannot have been formed during that time and would surely by this time have leaked away. The gas which comes from the coal in the Appalachian regions, Doctor Bergius would have us believe, was manufactured some time in the Carboniferous, Cretaceous or Tertiary ages, and has been bottled up since that time, the more recent erosions not being deep enough in places to permit the gas stores to escape. How much easier is it to believe that the gas is more recent and is the result of reactions now taking place, because most of the deposits are comparatively shallow?

Of course, it is conceivable that the writer of the abstract in the *Montanistische Rundschau* may have misrepresented Doctor Bergius and converted an hypothesis into a proof and the closing remarks in the article tend to assist in that conclusion, but, look at the statements as we may, we face always the difficulty that, on Doctor Bergius' finding, not even a surmise along the lines he indicates could permissibly be based.

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Mining Classes and Schools

It is gratifying to note the work that is being done in a humble and practical sort of way, in different mining districts, by superintendents and mine foremen who are earnestly endeavoring to improve the conditions and increase the knowledge of the men in their charge. Most of this work is being done without compensation or reward, further than what comes from the increased efficiency of the worker.

Word has just come to us of another effort of this kind, known as the Camp Bulah School of Mines. This school has been taught for 1½ years by Mine Foreman Jonathan Foster, at Camp Bulah, near Midland, Ark. Mr. Foster is a graduate in the coal-mining course of the I. C. S. system. He has had 28 years of practical experience, in the coal field in which he is located; and has served in every capacity from trapper to mine foreman. He knows the field thoroughly and his men.

The Camp Bulah school is located in the heart of the district. The miners have become so interested in the work that they have bought a nice library for the use of the students; and the work of teaching the theory and principles of coal mining is meeting with admirable success. Mr. Foster teaches five nights in the week free of charge.

Another school of which we have been recently advised is that taught by Prof. J. F. Drummond, at Filbert, W. Va. Professor Drummond is employed, for this purpose, by the United States Coal & Coke Co. The school is well attended by the miners, and the results thus far accomplished have been very encouraging. There is no charge made for tuition, and the interest that is taken in the work by all classes of employees in and about the mines is remarkable. It is stated by one of the students that Professor Drummond "is an able instructor."

Supt. W. W. Harding, who is responsible for the establishment and work of the school, is reported to have said that he expects to make this one of the best schools of its kind in the state.

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The Underpaid Miner

It appears to be a popular misconception that the coal miner is the most poorly paid and most grievously oppressed mortal existing upon this mundane sphere.

However much of truth there may have been at one time in this hallucination, the fact remains that many a man of only reasonably good physique who can and does work at loading coal in the mines, earns wages which make the "salary" of many a clerk, bookkeeper, minister and other "professional" man appear like the proverbial "thirty cents."

In many regions of West Virginia, for instance, miners who work in what might be termed good average places receive from $5 to $10 per day, and not a few men are highly disgusted when their day's earnings fall below $8. In these mines almost any man who will "pitch in and shovel" can make anywhere from $125 to $200 per month, the amount depending almost entirely upon his own industry.

There are two standards by which compensation for services rendered may be measured. The first of these considers only the man's earning capacity, while the second takes cognizance of his savings. Other things being equal, he who earns $50 per month and is able to save $10 therefrom, is in better shape financially than he who, while earning $150 during the same period, is able to save only a lesser amount.

Compared with the average man who barters his time and his talents for a monthly stipend, the coal miner is as fortunate in the matter of expenses and living conditions as he is in that of his wages. In many, perhaps most mining towns today, the living conditions and expenses compare favorably with the average of those of the big cities. Rents, lights, water and fuel may be had for prices which are merely nominal.

With reasonably good economy and thrift, the miner who is willing to eschew strong drink and work regularly and efficiently, even though he may support a large family, is enabled to lay by for the inevitable rainy day a tidy little sum, ranging from $10 to $50, or even more, each month.

A comparison of the incomes and savings of miners and that of teachers, preachers, clerks, bookkeepers and the like—in fact the majority of that large class of people who consider all manual labor as degrading and look upon the white collar as a mark of distinction and their vested right—cannot fail to reveal the balance in favor of the coal digger.

SOCIOLOGICAL DEPARTMENT

An Important Factor in Modern Industry

By Fred H. Rindge, Jr.*

This is a bit of philosophy which I like to call the theory of the five "C's": "Commerce is dependent upon Capital, Capital is supplemented to a large extent by Credit, Credit in turn is based upon Confidence, and Confidence in the last analysis depends upon Character." There we have the full quintet—Commerce, Capital, Credit, Confidence, Character—and I am writing this article because industry and the Young Men's Christian Association have a common basis in character. One needs and the other produces character. What produces character is bound to promote efficiency, which is one of the leading demands of the age.

What Causes Well Meant Schemes to Fail

With this "economic apologetic" for the work of the Young Mens' Christian Association in industrial fields, it is interesting to note the remark of a prominent manufacturer, who says "The financial interests of my corporation require that I shall do everything possible to improve the workers' character, efficiency and friendliness." Realizing the importance of these things, many employers have wisely decided to put money into welfare work, and the improvement of working, living and recreative conditions surrounding their operatives. Some of these schemes have been very successful, others have failed. If we analyze the failures, however, we will always discover some fundamental reason.

Some companies, for example, have put thousands of dollars into welfare work, apparently without any very lasting result, and have had severe strikes on their hands. Why? Because the employer has probably gone at the work in the wrong way; he has been too paternalistic. Every box of "output" which has gone out of the factory has had a label on it, "We do so and for our men." Workingmen resent this sort of thing. As one workman has well put it—"I would rather have self-respect and some dirt than to be advertised under improved conditions." I heard one labor leader illustrate the point very well, though rather inelegantly, when he said: "The trouble with some of the so called welfare work is that the employer gives his employee no choice in the matter but rolls the whole thing up into the form of a pill and says 'Here, damn you, take it.' "

Betterment Work Should Be Co-operative

Nevertheless, attempts such as the ones described are worthy even though unsuccessful, and have had their place in the present great industrial betterment movement. The truth is, as many experienced employers testify, that to be truly successful, welfare work must be coöperative. The employees themselves must be given a share in it. The Young Men's Christian Association in industrial communities furnishes one admirable basis for welfare work, in which the vital principle of coöperation is given due regard.

Employees pay down their own money for membership privileges, the employer contributes his share, and the men elect their own board of directors. The Y. M. C. A. belongs to the employees as well as to the employer. A carefully trained secretary is provided to supervise and promote the work. The local association derives the great advantages resulting from its relation to the State and International Committees and from the more than 2100 other branches in North America. The association is operated and supported by the employers and employees of the cotton, lumber, coal and other industries, and is also effectively at work on railroads representing 80 per cent. of the railroad mileage of the United States, in the construction camps, and even in those built by the Government Reclamation Service.

An Extension School of the Scranton Y. M. C. A. at Greenwood, Penn.

The scheme above outlined works. It builds character. It promotes efficiency. It makes right relationships. It yields dividends. One coal operator says: "By actual statistics the output of coal from our mines dropped 10 per cent. every Monday after the dissipation of the men on Saturday and Sunday. Since the putting up of the Y. M. C. A. building, the men have had a decent place in which to spend their leisure time, and the output has been greatly increased." That's the kind of "religion" that appeals to every employer.

What Has Been Done

Regardless of creed or religious affiliation, note the following from prominent employers:

Judge Elbert H. Gary, chairman, Board of Directors, United States Steel Corporation, says: "I am glad to declare my belief in the advantages of having a Young Men's Christian Association in an industrial community as tending greatly to the building up of the character of the men, and, therefore, increasing their efficiency.

Frederick Lewisohn, president, Tennessee Copper Co., states: "I am greatly impressed with the manner in which the Young Men's Christian Association, of Ducktown, Tenn., has established itself and from what I have observed it is very gratifying to all concerned as it helps very much in banding the employees together in good fellowship."

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*Secretary, Industrial Department, Y. M. C. A., 124 East 28th St., New York City.

Dr. J. A. Holmes, director of the Bureau of Mines, says: "I am interested in the Y. M. C. A. work because during the last twenty-five years as I have passed up and down through the great mining camps of Pennsylvania, I have seen the great work which the Y. M. C. A. is doing. I have seen places transformed through its work."

C. A. Cabell, general manager of the Cabin Creek Coal Co. and Carbon Coal Co., writes: "The results obtained by establishing the Young Men's Christian Association at Decota, W. Va., for the benefit of the employees and families in the service of the Cabin Creek Consolidated Coal Co. and Carbon Coal Co., have far exceeded my expectations. It has raised the old men as well as the young from low and injurious amusements to those of a higher and more cultivated character.

"The consumption of spiritous liquors has been reduced more than 50 per cent. So far as I am able to ascertain, gambling among the whites has practically been eliminated. It has raised the standard of good citizenship, the bad element have left because they could not stay and prosper. The Sunday school, Bible classes and entertainments wherein the entire family participate have unquestionably created a desire on the part of all for cleanliness. This applies especially to the children.

Teaching English to a Class of Foreigners by the Roberts Method

"If we were starting a new operation today such an institution as is now located at Decota would be one of my first considerations."

Practical Improvements Introduced by Association

Such a testimony certainly tells the story, and many others might be given if space permitted. The activities of coal-mining associations are exceedingly practical; therefore, the results are seen in practice. In one mine an explosion of gas seriously burned two men. Two others who attempted rescue were overcome by the afterdamp. A miner trained in the Y. M. C. A. first-aid class crawled into the entry with his face close to the ground and dragged out the four men one by one. He then showed his friends how to administer artificial respiration, dressed the burns and saved the men's lives.

The association has taken an active part in the "safety-first" propaganda. In the National Mine Safety Demonstration in Pittsburgh, sixteen of the forty teams coöperating were organized and prepared for the contest by the mining department of the Pennsylvania State Y. M. C. A. The association also coöperates with the American Red Cross Society and the U. S. Bureau of Mines in the constant extension of first-aid training and English instruction to foreign miners.

Other lines presented which are of great practical value are educational classes of all kinds, Bible classes, illustrated lectures, clean moving-picture entertainments, indoor and outdoor games, campaigns against tuberculosis, flies, mosquitoes, etc., "Clean-up" campaigns, village fairs and picnics, "safe and sane Fourth of July celebrations," boy scouts, promotion of flower gardens and home beautifying even in barren surroundings, thrift and savings features, etc. In all this work the employer usually provides the building and an annual maintenance contribution and the employees voluntarily pay about the same amount in small membership fees. The only place where the scheme has failed is where it has not been tried.

What Collegians Do for Association and Their Adequate Returns

One of the most interesting developments of the past five years has been the Industrial Service Movement of the Association, which has enlisted during the past year alone 3500 college students, mostly engineers, in volunteer service for industrial workers. This movement is growing rapidly and already reaches from coast to coast, banding 160 college industrial communities in many kinds of helpful service.

Perhaps the most significant part of this movement is the benefit which these coming engineers themselves derive from the service they render—and as one employer expressed it—"They surely need it." A general manager said to me the other day, "The college graduates in my employ are a confounded nuisance. They come to us with a special knowledge of theory and materials, but when they begin to deal with the men of the shop they make a mess of it. They don't understand the men and don't handle them right."

Thus we are again reminded of the importance of this human factor in industry, and the Industrial Service Movement helps to meet this very need in the life and training of a coming engineer. As these students teach foreigners English, lead educational classes, and do any one of forty different things which bring them into close personal contact with industrial workers they learn to know the men, to understand them, to get a vision of their needs and a sympathy which will make for larger humanity after they graduate from college and get into positions of industrial leadership.

How the College Graduate Wears off His Exclusiveness

Thus we are constantly receiving letters from many of the 3000 interested engineering graduates which breathe this spirit of larger service. Let me quote from a few:

> When I got here in the construction camp, I treated my men with due consideration and was amazed at their response. Other foremen had labor difficulties, but my men went out of their way to say good night and good morning to me and at the close of the job they thanked me for the way I treated them and wanted to work for me always.
>
> As a student I got interested in industrial service and resolved then that any men whom I might later control should get a square deal. I have just investigated the living conditions of my men out here in the lumber camp and found them sleeping on old vermin-producing wooden bunks that had not been changed in six years. I had the whole outfit burned up and an iron cot put in for every man in camp.
>
> Enclosed please find my personal check. I want to put English classes in my steel mill.
>
> We have put in a fine welfare club for our men with reading, writing and smoking rooms. No gambling or liquor allowed. It certainly pays and I am delighted with my share in it.
>
> A few of us have signed up 800 working men for a Y. M. C. A. membership and are anxious to have a building and secretary as soon as possible.

These are perhaps not *big things* but they are significant of the great good that will be accomplished as hundreds of these engineers graduate from college each year with a larger vision and a determination to serve.

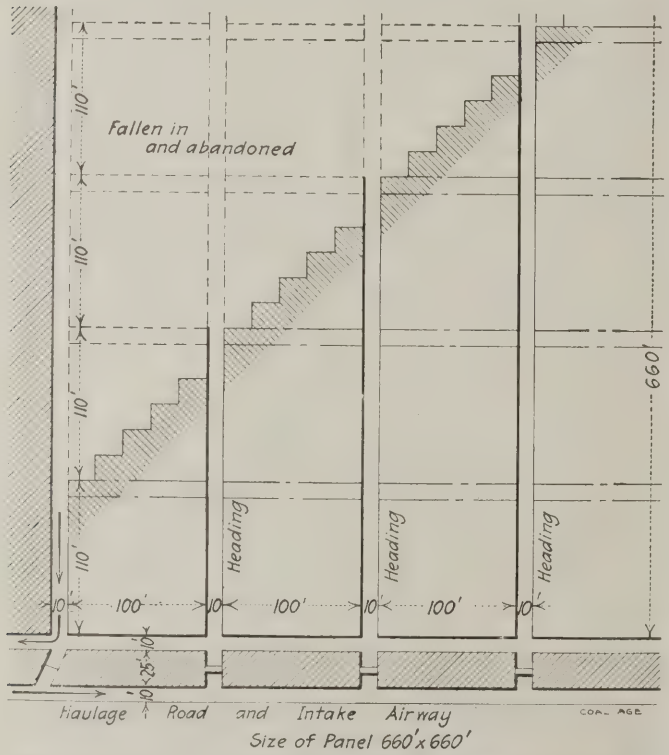
DISCUSSION BY READERS

Working Coal under Sandstone Cover

Letter No. 1—In reply to the request for suggestions, in reference to the best method of working coal under a hard sandstone cover, Coal Age, Nov. 15, p. 745, I would say that the conditions described in these inquiries are peculiarly difficult to counteract, in the mining of coal.

Unless a suitable method of working is adopted and the mine laid out in accordance thereto, much trouble is liable to be encountered by reason of "squeezes" or "creeps." This is especially liable to occur in the case mentioned, where the cover varies from 400 to 1000 ft. in thickness and the coal is underlaid with a soft stratum of fireclay that has a tendency to heave.

Under these conditions, unless sufficient precautions are taken in the start, there is bound to result a loss of thousands of tons of coal and much timber and iron will be buried beneath heavy falls of roof, and a large expenditure of money will be required for special cribbing. The case presents the combined difficulties of a hard roof that will not break readily and a soft bottom that tends to heave when the weight comes on the pillars. Exposure to air and water always softens a fireclay bottom, which is forced upward by the pressure on the pillars.



Retreating, Longwall-Panel System of Mining

In my opinion, the best system to adopt under these conditions is the "block system" of mining, better known, perhaps, as the "panel system." This system is illustrated by the portion of a mine shown in the accompanying figure. Butt headings are driven to the rise of the cross-entries. These headings are driven on 110-ft. centers and made 10 ft. wide, so as to leave pillars 100 ft. wide between the headings. The pillars are crosscut, each 110 ft., the crosscuts being, also, 10 ft. wide. In this manner, the entire panel is divided into square blocks of coal 100x100 ft. The entire mine may be thus divided into panels, say 660 ft. square. Each panel should be worked out separately, and each heading should be driven one block in advance of the succeeding heading.

As shown in the figure, the headings are driven to the limit of the panel, and the blocks of coal worked out successively, on the retreating system. It is important to keep the line of pillar work uniformly straight, so as to avoid any undue pressure being thrown on the pillars. In the figure, the pillars are shown as being worked in steps; but this will depend largely on the nature of the coal, in reference to its cleavage planes. The method has proved successful, under like conditions, many times in the past; and there is no reason but that, with proper precautions, it can be successfully applied under the conditions described.

George Stockdale.

Percy, Penn.

Letter No. 2—I noticed the inquiry, Coal Age, Nov. 15, p. 745, in regard to the best method of working under a hard sandstone roof when the bottom is soft, in order to secure the largest possible recovery of coal.

For the past 12 years I have been operating under a condition of this kind, and find that the best method of handling the same is to leave pillars of a thickness sufficient to avoid any possibility of squeeze. I have found that the best plan, in the room-and-pillar method, is to take out not more than 30 or 35 per cent. of the coal, in the first working. This leaves from 65 to 70 per cent. of pillar coal to support the roof, and makes it almost impossible for a squeeze to occur.

When this plan is adopted, the coal taken out in the first working is, at least, sufficient to cover the cost of operation; but the greatest profit is realized in drawing back the pillars. The system is somewhat after the longwall-panel system of mining; but differs from that in the fact that when a break occurs, in retreating, and the working face is lost it is more easily regained than in the longwall system. It is important to keep the line of pillar work straight; that is to say, one pillar should not advance more quickly than the other.

Another plan I have found to work very successfully whenever the conditions will permit, is the following: A pair of double entries are driven directly up the pitch, where this does not exceed a 4 or 5 per cent. grade. Rooms are turned to the right and left of these entries, on the strike, of with a slight rising grade of, say 1 or 2 per cent., if desired. The butt entries should be turned from 650 to 700 ft. apart, so as to give ample space for breaking the hard roof. About the same percentage of coal is taken out in the first working as before, and the rooms are driven until they meet those turned off the next pair of headings. They should meet about midway between the two pairs.

When a sufficient number of rooms have been driven up to insure a good break, the pillars are crosscut at the face, and the work of retreating is begun. As before, it is necessary to keep the line of pillar work straight, so that no pillar will project under the roof and retard the break. I have found this method even more successful than the one first described, in respect to economy of working and ventilation. It provides two good airways for the intake and return currents; and, as the rooms "hole" through into each other, the course of the air is shortened.

MINE FOREMAN.

⁂

Education and Training of Mining Men

Mining men who have the interest and safety of their men at heart, and who value their safety above a few tons of coal, are earnestly seeking for means and methods of operating coal mines that will produce the greatest degree of safety, and render the mines more immune from accidents. These mine officials have their eyes open to the fact that safe and sanitary conditions in mining, are paying investments. The growing demand for safer methods in mining, coming as it does from men of experience and intelligence, enlists the best talent and efforts of men to produce the measures demanded. Brains and practical experience working in harmony, will finally solve the problems and produce the safer measures required. Development in the mining industry has progressed rapidly, until the problems and conditions that confront the operator, today, are of greater magnitude than those of any period in the history of mining, and require more thought and greater effort for their solution. In proportion as safe and practical conditions in mining are demanded by mine officials, to that extent will they be produced and maintained in daily practice.

In an editorial, COAL AGE, Oct. 18, p. 585, this statement is made: *"Today, the recognized cornerstone of all effort for improving conditions in coal mining is the practical training and education of mining men."* A greater truth relative to the problem of improving mining conditions was never uttered. In that direction, the active student will find the key that will unlock for him the door to many mining problems; and, as a result, the more practical methods for safe mining will be better known and more extensively used.

Mining knowledge has made rapid advancement in recent years. Improvements in mining machinery and many plans and methods for the prevention of accidents in coal mines have been developed. But all knowledge of mining has not yet been achieved, nor all possible improvements accomplished, or safety methods and measures in mining perfected. Not far back in the history of mining, little was known of many factors and conditions confronting the operator that are now better known and understood.

Formerly all explosions occurring in coal mines were attributed to gas, as this element was known to be explosive. But explosions would occur at times and under conditions precluding the theory of gas explosions. Common sense dictated that the cause must be assigned to something else. What could it be? Research soon revealed the startling fact that dust was a very dangerous factor in coal mines, and would produce a disastrous explosion, under favorable conditions. Is research and investigation to stop here? Are gas and dust the only elements that will produce explosions in coal mines? Are there other causes and conditions in mines that will produce disastrous results, at times? We must not sit down satisfied with achievements already attained, but must earnestly and persistently endeavor to ascertain whether agitated and disturbed atmospheric conditions in coal mines, will produce violent results, in the absence of both gas and dust.

The question of safety in mining when solved or better understood, will not consist in some new and wonderful discovery yet to be made, as some mining men seem to think, but will be attained mainly by a better use of the knowledge we have already acquired, and by the strict observance of means and methods already known. If we will judiciously use the knowledge we have acquired as the result of experience, education and training, we will have gone far toward the solution of many problems of danger in mining and will discover measures of greater safety.

It is said that "eternal vigilance" is the price of safety in any occupation; but it is certainly true in coal mining. The superintendent, who is aware of his limitations, and realizes how little he realy knows of things that affect the safety of mining and help to make the mine immune from accidents, is a safe official, and one who is generally on his guard against disaster. Too great confidence in means and methods pursued, or an overestimation of the safety plans adopted relaxes the attention and may frquently be the cause of mine disasters that, with greater care and vigilance, could have been prevented. The more practical mining men continue to weigh and consider the unsettled question of means and methods for reducing mine accidents to the lowest possible degree, the more prudence and discretion they will possess; and as these essentials in mining increase, presumption will decrease and order and system prevail.

Others cannot know things for us as well as we can know them for ourselves. Miners who think and know for themselves, are better enabled to enlarge their circle of knowledge by the experiences and researches of others whose opportunities for acquiring knowledge have been greater than their own. In proportion as miners know and understand the causes producing dangerous conditions in mining, and the means of neutralizing and arresting these dangerous conditions as they arise, the more interest will they take in the farther research of these things, and the more value will they place on the knowledge attained.

To the degree that miners value their lives and the lives of others about them, to that extent will accidents in coal mining grow less. The miner who places a high value on life, takes few risks and is the safe miner. The uneducated and reckless miner is the greatest source of danger in mines. The education and training of miners will result in many improvements in mining conditions, and prove to be the cornerstone on which systems of safety in mining will be erected, and great mine disasters will then become matters of history.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

To Prevent Gas and Dust Explosions

I was interested in the excellent article of A. G. Hahn, Coal Age, Nov. 8, p. 709, relating to the prevention of gas and dust explosions. It reminded me of a little incident that occurred where I worked some years ago and which shows the careless manner in which places generating gas are often safeguarded.

The fireboss who examined the place and found a dangerous quantity of gas, simply put an empty powder keg in the road and placed a small piece of dirty wooden rail on top of it, with a rather doubtful mark "gas." This was the only caution placed there to prevent anyone from going unwarned into the gas. The ventilation throughout the mine was poor, the fan being taxed to the limit of its power. This condition, later, caused an explosion, which would not have occurred had the company provided sufficient power to properly ventilate the mine.

My plan is always to have a good current of air passing, especially in the winter season. The quantity of air circulated in a mine should fulfill the requirements of the mining law. The thermometer is an important factor in determining the quantity of air. Regard should always be had to the temperature, in order to properly regulate the air current, in a dry and dusty mine. When the zero point is reached in the outside atmosphere, the air current in the mine always has more drying power; and it is necessary, at such times, to use greater precaution.

It is also important to observe carefully the reading of the barometer and to observe whether the atmospheric pressure is increasing or decreasing. A falling barometer presents a condition that is generally accompanied by a greater inflow of gas into the workings than when the barometer is rising; and at such times greater precaution is necessary in regard to the use of safety lamps.

Besides these conditions, there are some practical points that should be carefully borne in mind. When driving headings in solid coal (virgin territory), as when developing a new area, it is important to keep a careful watch for gas. The same or even greater caution should be used in rooms opened off such headings. Faults of any kind, either in the top or bottom of the seam, such as "slips," "spars," "clay veins," etc., generally yield a fresh supply of gas. A good current of air should be maintained, in driving all such places.

In working a very gaseous seam, it is often a safe precaution to keep a drill hole in advance of the heading, so as to drain the gas from the face of the coal as much as possible. A good water system should be maintained at the working face, in all gaseous mines.

Robert W. Lightburn.

Adelaide, Penn.

Study Course in Coal Mining

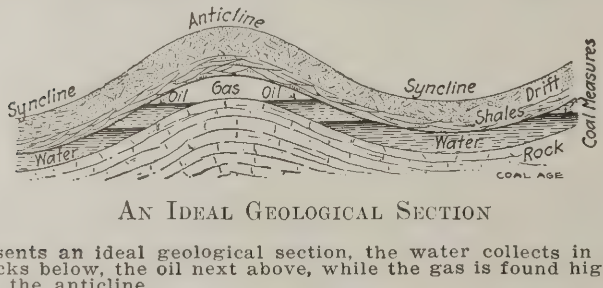
By J. T. Beard

The Coal Age Pocket Book

Natural or Feeder Gas—All gas formed and contained in the strata is called "natural gas," in distinction from gas manufactured in the industries. Natural gas commonly occurs in large volume, in coal formations, where it accumulates in cavities or pockets and in crevices in the strata. The gas coming from such pockets and crevices is termed "feeder" or "blower" gas.

GEOLOGICAL CONDITIONS

Gas, Oil and Water—The strata of the earth's crust form a great natural reservoir for gas, oil and water. These collect in the formations, in the order of their relative densities. As illustrated in the accompaying figure, which represents an ideal geological section, the water collects in the rocks below, the oil next above, while the gas is found higher on the anticline.



An Ideal Geological Section

This condition is only true, however, in a general way, depending on the nature of the strata and their power to absorb and hold these elements. Water, and oil to a less extent, find their way by gravity to a "hard-pan" or stratum impervious to them; while gas drains to the surface and escapes, unless confined by an overlying stratum of clay or impervious rock. The subterraneous drainage of water and oil, from the overlying rocks into the synclinal basins, creates enormous pressures, which are exerted more or less equally on the water, oil and gas.

Water Level—In every geological section, there is a more or less defined "water level" or depth at which water is found in quantity. Wells or boreholes sunk to this general level strike a usually abundant supply of water. The same is true, but to a less extent, of oil, in oil regions. The flow of oil, in oil-bearing rocks, however, is not as free as that of water, owing to its viscosity and limited supply.

The water level is not constant, but varies according to the changing supply or surface drainage, being higher in wet seasons and lower in seasons of drought. As the oil floats on the water any change in water level is accompanied by a similar change in the oil supply. It is due to this fact that exhausted oil wells often become productive in a season of flood, and producing wells frequently cease to flow in a prolonged season of drought.

The Coal Age Pocket Book

HYDROCARBON GASES

General Formulas of Hydrocarbon Gases—Carbon (C) and hydrogen (H) unite in different ways to form groups of compounds, having certain distinct characteristics. Such are the "paraffins," represented by the general formula $C_nH_{2n} + 2$; the "olefines," C_nH_{2n}; the "acetylenes," $C_nH_{2n} - 2$; and other compounds of less importance in mining, as the "benzenes," "naphthalines," etc.

Occurrence and Formation—Methane (CH_4) and ethane (C_2H_6), which will be described later, belong to the paraffin or fatty group, while olefiant gas (C_2H_4) belongs to the olefine or oily group. These are all products of the destructive distillation of organic matter. Methane is often seen bubbling up from the bottom of stagnant pools, in marshes, which fact suggested the name "marsh gas." It is the result of the slow decay of the vegetable matter (in the presence of water), at the bottom of the pool.

On the other hand, olefiant gas is the result of the dry distillation of gas from organic matter, which takes place less frequently in the strata, owing to the almost invariable presence of moisture. The character of these hydrocarbon gases, moreover, varies, also, with the kind of organic matter that undergoes decomposition.

Of the hydrocarbon gases, the paraffins (methane and ethane) are the ones chiefly occluded in the coal measures; while olefiant gas, belonging to the olefine group is rarely found even in minute quantity. Beside the hydrocarbon gases occluded in coal, as has been stated, varying quantities of nitrogen, oxygen and carbon dioxide have been absorbed.

Condition of Gas Confined in Coal—The results of careful experimental study of coal indicate (Chamberlin) that gas may exist in coal in three different ways: 1. The gas is occluded, in a true sense, or absorbed (possibly condensed) by the coal. 2. The gas is entrapped or held mechanically in the cavities, cracks or pores of the coal. 3. The gas may result from chemical changes going on in the coal.

Escape of Gas from Coal—Experiments made by the Bureau of Mines, by crushing weighed samples of different coals in closed vessels of known capacity, show that coal continues to give off gas for a long time after it is mined. The gas is liberated more freely during the crushing of the coal, which would indicate that much of the gas is held mechanically within the mass. It is also shown that the coal continues to absorb oxygen from the air, during the same period.

Composition of Feeder or Blower Gas—A large number of analyses of gas issuing from coal seams as "feeders" or "blowers" have been made. Gas has also been obtained by drilling holes several feet into the face of the coal. These analyses show a wide variation in the composition of the gas in different localities. Moreover, since the rate of emission of gases varies, the composition of feeder gas is only suggestive of the contamination of the mine air from this cause. An analysis of gas taken from a 10-ft. borehole in the Dorrance Colliery, near Wilkes-Barre, Penn., gave: CH_4, 94.2; N, 3.3; CO_2 1.1; CO 0.1; C_2H_4, 0.4; O, 0.9.

EXAMINATION QUESTIONS

Elementary Questions

(Suggested for Beginners)

ARITHMETIC

Ques.—What is the daily output of a mine under the following conditions: Time of hoisting, 8 hr. per day; coal hoisted per trip, 5200 lb.; time required per hoist, 50 sec. and, changing cars, 22 sec.?

Ans.—The total time per hoist is $50 + 22 = 72$ sec. Making no allowance for delay, during the day, the total number of hoists is $(8 \times 60 \times 60) \div 72 = 400$. The weight of coal hoisted per day is, therefore, $400 \times 5200 \div 2000 = 1040$ short tons.

Ques.—If 12 men mine 720 tons of coal in 20 days, working 9 hr. a day; how many tons of coal will 9 men mine in 25 days, working 8 hr. a day?

Ans.—The weight of coal mined is proportional to the number of men working, the days worked, and the hours per day. Therefore, the ratio of the weight of coal mined is equal to the ratio of the men, times the ratio of the number of days, times the ratio of the number of hours per day; or, in this case, calling the required weight of coal mined x

$$\frac{x}{720} = \frac{9}{12} \times \frac{25}{20} \times \frac{8}{9} = \frac{5}{6}$$

$$x = 720 \times \frac{5}{6} = 600 \textit{ tons}$$

GASES

Ques.—What is a gas?

Ans.—A gas is an aëriform fluid, distinguished from a vapor only as being invisible, while vapors are visible, appearing as a fog, mist or cloud.

Ques.—Name the important mine gases, giving the symbols of each.

Ans.—Methane, or carbureted hydrogen, commonly called marsh gas (CH_4); carbon dioxide, formerly called carbonic-acid gas (CO_2); carbon monoxide, formerly called carbonic-oxide gas (CO); hydrogen sulphide, or sulphureted hydrogen (H_2S); olefiant gas, called also ethylene or ethene (C_2H_4); ethane (C_2H_6); besides the nitrogen (N_2) and oxygen (O_2) of the air.

Ques.—Describe briefly the different "damps" known to miners.

Ans.—"Firedamp" is any inflammable or explosive mixture of marsh gas and air, containing frequently varying quantities of other mine gases. "Blackdamp," called, also, "chokedamp" or "stonedamp" is any mixture of incombustible gases heavier than air, the mixture consisting chiefly of carbon dioxide and nitrogen. "Whitedamp" is generally understood as referring to carbon-monoxide gas. "Stinkdamp" is a term used by the miners in reference to hydrogen sulphide. These damps are all more or less mixed with air.

Ques.—Write the chemical equation expressing the reaction that takes place when methane, or marsh gas, burns in oxygen; and show the relative volume of oxygen and methane required for complete combustion; also the volume of carbon dioxide and water vapor produced by the combustion.

Ans.—Following is the equation expressing the reaction that takes place:

$$\begin{array}{lcccc} & CH_4 + & 2\,O_2 = & CO_2 + & 2\,H_2O \\ \text{Relative volumes} & 1 & 2 & 1 & 2 \end{array}$$

Two volumes of oxygen are, therefore, required for the complete combustion of one volume of marsh gas; and there are produced, as a result of this combustion, one volume of carbon dioxide and two volumes of water vapor.

Ques.—If two volumes of oxygen are required for the complete combustion of one volume of marsh gas; find the relative volume of air consumed for each volume of marsh gas burned.

Ans.—Since oxygen forms 20.9 per cent. of air, the relative volume of air, per volume of marsh gas burned, is $2 \div 0.209 = 9.57$; or, practically, 9½ volumes of air are required for the complete combustion of one volume of marsh gas.

Ques.—What effect has carbon dioxide on a firedamp mixture?

Ans.—Carbon dioxide is an incombustible gas and, by diluting the firedamp mixture, reduces its explosiveness. It is generally stated that if carbon dioxide is added to a firedamp mixture at its most explosive point, the volume of carbon dioxide required to render the firedamp inexplosive is about $^1/_7$ of the volume of the firedamp.

Ques.—What effect has coal dust on a firedamp mixture?

Ans.—The presence of fine coal dust floating in the air has the effect to render the firedamp mixture more easily ignitable and widens the explosive range. Mixtures of methane and air that would not otherwise be explosive, therefore, become explosive in the presence of fine coal dust floating in the atmosphere.

Ques.—Why is coal dust dangerous when allowed to accumulate in mine workings?

Ans.—Under the drying influence of the air current, moisture is absorbed from the dust, which is then easily blown into the air by any consussion, such as a blownout shot or fall of roof. Dust is also raised in large quantities by the ordinary operations of the mine, such as the movement of cars, the passing of men and animals in the traveling ways, etc. The fine dust of the coal, also, readily absorbs oxygen from the air, which increases its inflammability. A sufficient quantity of fine dust floating in the air is often highly explosive without the presence of gas, especially if the coal is inflammable. For these reasons, accumulations of coal dust are dangerous.

Ques.—Are all coal dusts alike inflammable, and what kind of dust is generally the most inflammable?

Ans.—The fine dust of bituminous coal is more inflammable than that of anthracite, because of the larger percentage of volatile combustible matter contained in the coal. The soft bituminous coals also disintegrate more rapidly under the influence of the air than is the case with the harder anthracite.

COAL AND COKE NEWS

Washington, D. C.

Active proceedings before the Interstate Commerce Commission with reference to the proposed 5 per cent. increase in the rates of railroads in official classification territory were opened before the Interstate Commerce Commission on Nov. 24, and bid fair to continue a good while. The first addresses were made by Daniel Willard of the Baltimore & Ohio R.R. and F. A. Delano, receiver for the Wabash R.R. Both men laid especial stress on the financial situation of the roads in official classification territory. Mr. Delano analyzed the classes of freight originating in the section under consideration, and he developed a specially interesting argument with reference to the coal roads, declaring that they could not be classed with other lines operating in the same territory.

The Coal Roads to be Separately Considered

Mr. Delano said: "We have excluded the Pittsburgh & Lake Erie, Bessemer & Lake Erie, Hocking Valley, Kanawha & Michigan, Toledo & Ohio Central, and Wheeling & Lake Erie R.R. These roads are located in a comparatively small area between the Great Lakes and the iron furnaces and coal mines of Ohio, and their traffic is not of a general nature but substantially confined to the products of mining; these products during 1912 forming 78.6 per cent. of their entire tonnage. But the exceptional feature of their situation lies, not only in the volume of this mineral traffic, but in the fact that by reason of hauling iron ore in one direction and coal in the other they have a balanced traffic, which produces an unusually favorable operating condition. While these lines are within the boundaries of the territory, they do not enter into the general railroad situation and cannot be included in a group of roads fairly representative of all the railroads in the territory."

Mr. Delano, however, made no attempt to exclude consideration of the eastern coal roads, although he called attention to the fact that "the combined tonnage of products of mines carried by the Pennsylvania R.R., proper, the New York Central proper, and the Baltimore & Ohio system in 1912 was approximately ten times the same class of tonnage carried by the two principal railroads of New England." It is believed that there will be much controversy with reference to the exact status of the coal roads in the application for rate advances, and as to the extent to which the statistics and experiences of these roads may be taken as typical.

The Paint Creek Investigation

Practical agreement has been reached by the committee which investigated the "Paint Creek & Cabin Creek disturbance in West Virginia" and it is understood that within a week or two a public report will be furnished to the Senate. The information now available is that the committee will assert that American citizens were tried and imprisoned contrary to law, and that martial law was invoked too early. This may lead to a very severe indictment of the Supreme Court of West Virginia.

It will also be found that the mails were interfered with in the coal fields and that the state militia prevented men from getting their mail. The shipment of firearms into the Paint Creek region will also be complained of, and it will be asserted that in taking bodies of strike breakers to the coal fields, peonage was practised.

Coal Lands Restored to Public Entry

The President has restored 242,500 acres of coal land to public entry in Montana and 14,500 in Utah. As a result the coal-land withdrawals have been reduced to 58,000,000 acres. Up to the present 84,000,000 acres have been classified as to their coal value. Out of this area 18,500,000 acres have been declared coal land and valued at $761,000,000, the average price being $41.13 per acre.

HARRISBURG, PENN.

The Interstate Commerce Commission's investigation into the rates and practices of the anthracite coal roads, which was being held at the Bellevue-Stratford Hotel at Philadelphia, was on Thursday adjourned indefinitely owing to the sudden illness of Commissioner John H. Marble who had been presiding. Mr. Marble was seized with an attack of acute indigestion on Wednesday night, the effects of which caused his death at Washington, D. C., on Friday, Nov. 21.

Silas H. Smith, attorney for the commission, announced to witnesses that the investigation would probably not be resumed for two or three weeks, as the hearing of the 5 per cent. advance in the freight-rate case, which begins in Washington on Monday, Nov. 24, may be protracted. Meantime the coal inquiry will wait.

Geo. H. Ross, vice-president of the Susquehanna Coal Co., a subsidiary of the Pennsylvania R.R. was prepared at the time of adjournment to continue his story of the relations between the coal company and the railroad, which he had not completed at the close of Wednesday's hearing.

Representatives of the coal dealers' associations in Ohio, Indiana and Michigan were also prepared to testify. They came to protest against differentials on freight rates, which they claim are against their district.

The counsel for the commission sought to show by witness after witness that anthracite had to pay higher rates than other freight, and operating officials testified in endless repetition of the methods employed in handling coal cars at the various terminals. They told how many locomotives were used, how many empty cars were returned to the region, where the concentration points were and so forth.

It was brought out at the investigation that the Susquehanna Coal Co. has paid but one dividend (4 per cent.) in 12 or 15 years. It owes the Pennsylvania $6,000,000 on which it has given the railroad company no security, but on which it pays 5 per cent. interest. It was also brought out that the Mineral Railroad and Mining Co., another subsidiary of the P. R.R. Co., leased from the Northern entral Ry., another Pennsylvania-controlled railroad, 4900 acres of coal land, on which it has never paid the royalty of 28c. a ton called for in the lease. Mr. Ross further testified that the Susquehanna company makes up the deficits of the Mineral Railroad and Mining Co., and other companies owned by the Pennsylvania.

O. H. Hagerman, shipping agent of the Reading at Port Richmond, Philadelphia, testified that 90 per cent of the cars dumped at Port Richmond are sent away from the docks empty; the other 10 per cent. leave the port with iron ore.

The following are the principal facts appearing in the testimony of the witnesses examined:

Summary of Principal Testimony

That the abolition of free storage has reduced the number of standing cars in the Perth Amboy and South Plainfield yards of the Lehigh Valley by more than one-half.

That the Reading Ry. is in need of more coal cars, but does not get an additional supply because it has no room for storage during slack time.

That only Reading coal is stored in the Clearfield storage plant of that road, although it is supposed to be open to every coal shipper for such purpose.

That only such coal as is ordered is allowed to enter the yards of the Reading at Port Richmond, all other anthracite being detained at the Woodlane yards.

That actual demurrage is charged upon cars not yet placed, though the law states distinctly that such charges cannot be made until the car is in actual placement.

That coal shipped to Buffalo pays $2 a ton freight, the buyer receiving a rebate of 25c. from the railway-owned coal companies, in order that the rate of $1.75 by all-land routes may be met.

That the independent coal companies cannot afford to do this and that in consequence they withdraw from the Central States field almost every winter thus producing an artificial coal famine.

That the railroad-owned coal companies send out a monthly circular fixing prices at identical figures.

Mine Caves

In a test case filed in Scranton, the supreme court will probably be called upon to decide whether a coal company is responsible for injury to person caused by a disturbance of the surface. It is the first suit of the kind to be instituted.

Mrs. James Kirwin, of Scranton, states in her petition that on September 12, 1913, a foreman for the Lackawanna Coal Co. rushed into her house and told her to get out quickly, as they were going to let the house down. She asked him to delay the work for a short time, but in the meantime a shot was fired in the mine and the building sank. The kitchen stove exploded and the castings were hurled about the room, injuring and disabling her. She asks that she be compensated to the extent of $25,000.

The courts have decided that where property is damaged by mining the owner can have no redress, in case he waived his right to collect damages, but no case is known where such caving resulted in personal injury. The outcome of the suit will be awaited with great interest.

The State Highway Department has joined with the Water Supply Commission and the Department of Mines in an effort to check the trouble caused by the washing of culm into streams, in the anthracite region of the state. Great losses have been caused in the past by the constant washing of the culm. Getting into the streams it causes them to fill up, and as this changes the level of the water it makes necessary the constant altering of the roads and bridges along the line of the water courses. Aside from this there is the pollution of the water.

With the idea of finding a way in which a remedy could be applied, an inspection of Shamokin Creek, from Sunbury to Mount Carmel was made by representatives from the three departments recently.

The Lehigh Canal, between Mauch Chunk and Easton, had to be closed for the season, due to the culm and other pollution in the canal, which was washed in by the severe storm of last Sunday. It was deemed advisable to take this course so that the water could be drawn and the bed properly cleaned.

PENNSYLVANIA

Anthracite

Nanticoke—Concrete walls have been erected in a section of the Auchincloss colliery of the Delaware, Lackawanna & Western R.R. Co., coal department, where a mine fire has been raging since last Monday. It is thought that with the erection of the wall the fire will be smothered within a few days.

Pittston—The Pennsylvania Coal Company is about to build a dozen or more homes along the river bank to be occupied by the foremen at No. 14 colliery.

Edgar C. Weichel and George V. O'Hara, foremen for this same company, have commenced their work at the Y. M. C. A. in preparing young men to take the examinations as mine foreman and assistant mine foreman, next spring.

Scranton—Orders have been issued by the Delaware & Hudson Coal Co. to all monthly hands who keep expense accounts that hereafter they will have to dispense with their chickens, cows, pigs and other animals if they want to remain on the company payroll. Various reasons are assigned for the order, but the one most generally accepted is that the expense accounts of such employees have been increasing regularly during the last year or two.

Wilkes-Barre—A miner who has been in jail for several days on a charge of changing tickets on mine cars and having them credited to himself was given a habeas corpus hearing before Judge Fuller on a charge of larceny, and although the evidence of witnesses was strongly circumstantial it was not sufficient to confine him and he was released on his recognizance to appear at the next term of Court.

The defendant was employed in the Dorrance mine and was charged with having his tickets on 30 cars, while it was claimed that he had only been furnished with 16 cars. The arrest was made at the instance of Charles Lahr, check docking boss for the Dorrance local of the U. M. W. of A.

Bituminous

Nant-y-Glo—Fire destroyed the plant of the Springfield Coal Co., on Nov. 15, doing $10,000 damage and throwing 200 men out of employment. Rebuilding was commenced immediately.

Du Bois—The miners of District No. 2 of the U. M. W. of A. declare that the next agreement will require the operators to deliver cars at the face. Seven hundred miners have gone out at the Tyler mine of the Cascade Coal & Coke Co. to compel the rest of the men to join the union.

Burgettstown—The Wabash Coal Co., of Carnegie, has sold all its holdings comprising 3700 acres lying between Hickory and this town to J. A. Bell, of Carnegie for $20 an acre. The principal stock holders are H. J. Verner estate, W. F. Sossong, T. Beadling, F. and M. Bruening, Dushane & Lewis.

Waynesburg—A deed was placed on record in this county during the week transferring 395.04 acres of land in Jefferson Township. The consideration of the deal was $274,000. The property was purchased by the H. C. Frick Coke Co. from the Pittsburgh-Buffalo Co. and comprises the coal underlying 12 tracts of land, part of which faces the Monongahela River. The H. C. Frick Coke Co. also placed of record a deed for 4.05 acres of coal in the same township purchased from the Johnetta Coal Co. for $1000. Both deeds bore the date of Oct. 31, 1913.

WEST VIRGINIA

Mabie—At the request of the stockholders of the Brady Coal Co., Judge Warren B. Kittle, of Elkins appointed A. N. Humphries, of Philippi, receiver for the coal company.

Charleston—Following a conference between representatives of the Kanawha and New River coal operators and President George W. Stevens of the Chesapeake & Ohio R.R., held at White Sulphur Springs, M. T. Davis, John Laing and G. H. Caperton, a committee of the operators left for New York to appear before the board of directors of the railroad to urge immediate action in the improvement of car facilities.

MARYLAND

Cumberland—Surveys are being made for a new railroad through the mountains of Pennsylvania and the little hamlet of Cook's Mills, eight miles west of Cumberland. It is to be known as the Buffalo Coal & Lumber R.R. The line is to open up for development a big section of timber and coal land hitherto untouched by a railroad.

ALABAMA

Gadsden—Captain J. M. Elliott, who for six months has been investigating deposits of coal in Blount mountain, twenty-five miles west of Gadsden, reported that three seams, with a total of 11 ft., have been uncovered at the outcrop and that extensive driling will be undertaken at once.

Birmingham—The only specially equipped motor mine rescue car in the service of the government, arrived in Birmingham recently. This car is built especially for mine rescue work, and can be used to convey injured persons to the hospital. Alabama is practically the only mining section where every mine can be reached by automobile. This car has been attached to the West End rescue station operated by the government, and a trial trip was made recently, to Tuscaloosa and back, a distance of 120 miles, which proved satisfactory in every respect. Accompanying the Engineer in charge, E. B. Sutton, were Chief Mine Inspector C. H. Nesbitt, several assistant mine inspectors, and representatives of the various newspapers. If the car proves a success, it is probable that the government will supply them to their other mine rescue stations in other sections.

It is stated that the Tennessee Coal, Iron & Railroad Co. has recently received several large orders for steel rails, which means that the rail mill will continue in active operation. Their coal mines must be run at full capacity to keep the rail mill supplied with coal.

OHIO

Columbus—Notification by operators engaged in lake trade has been received stating that the American Marine Underwriters will insure lake vessels sailing in December at 1% up to Dec. 4, and 1½% up to Dec. 8, after which vessels will not be insured. These dates are somewhat later than usual and will permit a larger tonnage to be shipped to the Northwest. The vessel owners in certain cases will lay in their boats about Dec. 1 and will take no chances on another trip.

ILLINOIS

Duquoin—A. R. Byrd & Sons Co. of St. Louis have taken options on 17,000 acres of untouched coal land in Perry County, most of which is southwest of this point. According to the present arrangement, a mine will be sunk on the Birkner Farm west of here and another one on the Smith farm southwest of this point. It is understood that the operating company will be capitalized for $850,000.

Belleville—The largest judgment ever paid in the Circuit Court at Belleville was that in the case of Patrick Grannan against Donk Bros. Coal & Coke Co. for $15,000. Grannan suffered a broken back in a mine accident, and at the trial was brought into the court room on a stretcher.

The bursting of the cylinder of the hoist at the Massie mine a week ago has finally caused the operators of this property to install an entirely new hoisting apparatus, and the mine will be shut down for two or three weeks as a result.

Auburn—The Auburn & Alton Coal Co. and 63 other coal operating companies are testifying before Examiner R. T. Eddy of the Interstate Commerce Commission, seeking to obtain an order from the commerce court directing the railroads, chiefly the Atchison, Topeka & Santa Fé, and 48 other connecting lines, to establish a rate for transporting coal from points north of the southern boundary of Christian County to Peoria, Chicago and other gateways to the west and northwest, which will be 15c. a ton less than the rates from points south of that line. The railroads have quite an array of talent to oppose the petition.

INDIANA

Princeton—The Princeton coal mine is tied up by the walkout of the 14 operators of the coal-digging machines. The machinemen asked for a guaranty of $3.34 a day, which has been cut off because the company says some of the men are not giving a full day's work. The men had resumed work several days previously pending arbitration but walked out again, adding to their other demand one that the company furnish a bit carrier to deliver the bits to each machine. The company contends there is no contract for this and it is not customary. Conference between operators and miners was arranged to take place at Terre Haute to consider these grievances. The mine is owned by the Deep Vein Coal Co. of Terre Haute, but is leased and operated by the Princeton Coal Co. About 250 men are employed.

ARKANSAS

Spadra—All the semi-anthracite mines in this section have settled their labor troubles with the exception of one, and it is expected that their controversy will be settled by the first of the month.

KENTUCKY

Morganfield—The Jackson Coal Co., of Fort Branch, Ind., has purchased the old Thomas mine near here, and has announced that it will resume the operation of the property as soon as possible.

Louisville—Suit for damages of $33,290.50 has been filed by the Schwind Brothers' Coal Co. against the Continental Fuel Co., the retail concern alleging that the defendant company failed to comply with its contract to furnish coal to the plaintiff according to orders. It is alleged that shipments were less than ordered to the following amounts: July, 1080 tons; August, 2120 tons; September, 4040 tons; October, 3360 tons.

WISCONSIN

Milwaukee—This year's receipts thus far are the largest on record. About all the dock property suitable for the coal transshipping trade has been absorbed and until harbor development yields more dock frontage, there is little chance for expansion. The last remaining dock site on the South Menominee Canal, which is in the heart of the coal-shipping district, has just been purchased by the Northern Coal & Dock Co., a subsidiary of the Youghiogheny & Ohio Coal Co., an independent producer in the bituminous field. The tract has a frontage of about 275 ft. on the canal and nearly 1000 ft. on a slip adjoining the property on the west. The new dock will be equipped with the latest and best hoisting machinery and ample railway trackage. The Y. & O. Co. now occupies dockage belonging to the Milwaukee Gas Light Co., on the north bank of the Menominee River.

MISSOURI

Whiteside—Arrangements are being made here to establish a fireclay plant taking fireclay and coal out at the same time. The project has been undertaken by James Kelly, representing St. Louis capitalists, and P. M. Modisett, of Hannibal and W. D. Dent, of Oakwood, Mo.

OREGON

Josephine County—The decision of the General Land Office as regards about 9000 acres of coal land entries, in the Squaw Creek section, is awaited with much interest. Representatives of the U. S. Geological Survey have been in the field all summer and fall, having recently completed their work. They found a good grade of coal, some of the samples being of a first-grade coking product. Local men that worked with the Survey state that there is no question but that the land will be allowed to go under the coal act, and if that is the decision of the Land Office it means a new coal field for Oregon. Railroad surveys have been made into this section, to get the land open to entry.

FOREIGN NEWS

Paris, France—Forty-five thousand coal miners are on strike in the Lens district, having responded to the call of the union. The government, fearing serious disturbances, has ordered a regiment of infantry to the vicinity. To end the strike an 8-hr. workday bill was passed by the Chamber of Deputies, Nov. 24, and also another bill making overtime optional.

Halifax, Nova Scotia—An agreement involving 10,000 men employed by the Dominion Coal Co., and represented by the Provincial Workmen's Association, has been reached. The agreement renews the present understanding for three years, or until Dec. 31, 1916. The company has granted an increase of 6 per cent. to all workmen in and about the mines working under $2 per day, making a minimum rate for mine laborers of $1.70 instead of $1.60 per day, and an increase in the minimum rate of the shift men from $1.75 to $1.85 per day.

RECENT COAL AND COKE PATENTS

Gas Producer—H. F. Wallmann, Chicago, Ill., 1,072,536, Sept. 9, 1913. Filed July 21, 1906, Serial No. 327,229.

Gas Producer—J. A. Herrick, New York, N. Y., 1,073,124, Sept. 16, 1913. Filed Feb. 4, 1911. Serial No. 606,548.

Coke Oven Door—H. Kickert, Herringen, Germany, 1,072,857, Sept. 9, 1913. Filed Dec. 21, 1912, Serial No. 738,003.

Coal Loader—P. R. Jordan and W. Wright, Adamsville, Ala., 1,072,731, Sept. 9, 1913. Filed Aug. 22, 1912, Serial No. 716,527.

Automatic Traveling Load Scale—Henry Richardson, New York, N. Y., 1,072,500, Sept. 9, 1913. Filed Mar. 24, 1910, Serial No. 551,347.

Traveling Grate Furnace—S. J. Misener, Woodside, Nova Scotia, Can., 1,073,359, Sept. 16, 1913. Filed Mar. 29, 1912, Serial No. 687,244.

Dynamo-Electric Apparatus for Firing Mines—K. Schaffler, Vienna, Austria-Hungary, 1,072,511, Sept. 9, 1913. Filed Feb. 4, 1913, Serial No. 746,200.

Improvements in Machine for Charging and Discharging Gas Retorts. Riter-Conley Manufacturing Co. 15 Exchange Place, Jersey City, U. S. A., 17,855 of 1912.

Water Cooled Furnace Door Frame—L. L. Knox, assignor to Knox Pressed and Welded Steel Co., Niles, Ohio, 1,073,144, Sept. 16, 1913. Filed Aug. 4, 1911, Serial No. 642,339.

Improvements in the Treatment of Gases from Coke Ovens and of Like Gases and the Recovery of Products Therefrom. W. H. Coleman, 3 Redclyffe Road, Withington, Manchester, 20,900 of 1912.

PERSONALS

Irving R. Gard, for between two and three years with the Canadian Collieries (Dunsmuir) Limited, Victoria, B. C., has retired from that company's employ, the important hydroelectric system and other construction work on which he was engaged being now practically completed.

Official announcement was made from the offices of the Berwind-White Coal Mining Co. at Philadelphia, relative to the resignation of Walter R. Calverly as general superintendent of the mines in this vicinity as follows: "The duties of the position formerly held by Walter R. Calverley at Windber have been divided among the present employees, and the office of general superintendent, as held by him, has been abolished.

John W. Swift, special disbursing agent of the United States navy with the Matanuska coal mining expedition, was in Seattle about the middle of October buying horses, sleds, and other equipment needed for the transportation to a shipping port of some of the coal taken out last summer from the government's experimental mine, in the Matanuska field. It is expected the whole winter will be occupied in hauling the coal to Cook inlet, where it will be loaded on barges.

CONSTRUCTION NEWS

Johnstown, Penn.—The Sunnyside Coal Co. will put electric haulage and machines in their mines.

Carroltown, Penn.—Logan Coal Co. is making extensive improvements at its mines at Beaverdale.

Two Rivers, Wis.—Wisconsin Dredge & Dock Co. have been excavating for the new coal-dock extension here.

Milwaukee, Wis.—The Youghiogheny & Ohio Coal Co. is to expend half a million dollars in the construction of new coal docks.

Rockwood, Penn.—The Consolidation Coal Co. has comenced erection of a new coal tipple at its mines at Wilson reek.

Belle Vernon, Penn.—A new coal crusher is soon to be in-talled at Somers No. 4 mine of the Pittsburg Coal Co., at ricedale.

Carbondale, Penn.—Alterations will be commenced at the ew breaker of the New England Coal Co., which is being rected on the tract formerly owned by the Salem Hill oal Co.

Wellsburg, W. Va.—The Carmichael coal mine, on Bethany ike, about four miles from Wellsburg, will be completely eëquipped with electrical mine machinery, the work to be tarted in a few days.

Birmingham, Ala.—The Tennessee Coal, Iron & R.R. Co. is bout to add to its equipment a 40,000-cu.ft. motor-driven entrifugal air compressor. This unit was recently ordered rom the General Electric Co.

Pruden, Tenn.—The Pruden Coal & Coke Co. expects to install in its power plant a 200-kw. alternating current General Electric generator with 7-kw. exciters, 150-kw. motor-generator set and the necessary switchboard.

Duquoin, Ill.—The Forester Coal & Coke Co. has contracted with the Roberts & Schaefer Co., of Chicago, for coal handling equipment for a new boiler plant at the mine where a Marcus tipple is now under construction.

Vancouver, B. C.—New York capital has been raised for the completing of the Portland Canal & Northeastern Ry., building of which was started three years ago as a private enterprise of Sir Donald Mann. The line will be extended a hundred miles to tap the anthracite coal fields of the Ground Hog Mountain.

McDonald, Penn.—The American Zinc & Chemical Co. is preparing to sink a shaft and operate a coal mine about two miles from Burgettstown. George S. Baton & Co., of Pittsburgh, are the mining engineers. It is believed that this mine will be ready for operation about June of the coming year.

Birmingham, Ala.—The Sloss Sheffield Steel & Iron Co. will build 300 coke ovens of the beehive type at their Bessie mine, in Jefferson County. These ovens will take the place of the battery of ovens at their city furnace in the heart of Birmingham, which the Sloss company has agreed to abandon operating to abate the smoke nuisance.

Rossiter, Penn.—The Clearfield Bituminous Coal Corporation recently purchased from the General Electric Co. equipment for its mine, consisting of two 750-kv.-a. Curtis turboalternators with 17.5-kw. motor generators and 15-kw. turboexciter sets, three 300-kw. motor-generator sets, three 250-kv.-a., three 30-kw., and three 25-kw. transformers, switchboard apparatus, etc.

Columbus, Ohio—The Sunday Creek Co. has started to make new openings at mine No. 301 at Congo, Ohio, which was damaged by a disastrous fire recently. The officials of the company announce that the production of 3000 tons daily has been curtailed for some time. When the fire was discovered another mine known as No. 302 across the creek was sealed and thus saved.

Salt Lake City, Utah—The Utah Fuel Co. expects to add soon to the power-plant equipment at Castle Gate, Utah, a 625-kv.-a. Curtis turbo-generator, a 200-kw., two-unit, three-bearing motor-generator set equipped with Tirril regulator, switchboard, etc. The contract for the above machinery has been awarded to the General Electric Co., both as to furnishing the machines and their installation.

Sandusky, Ohio—Ground was broken recently on the Lower Lake Dock Co.'s premises in West Sandusky, for improvements, which, when completed, will cost nearly, if not quite, $1,000,000. Additional coal-loading facilities are to be installed before the opening of the 1914 navigation season.

In order that it may reap the full benefits of the additional facilities the Pennsylvania R.R. will enlarge its West Sandusky yards so that twice the amount of coal received daily from the mines in southern Ohio and West Virginia at the present time may be stored.

Hudson, Penn.—Plans are underway for the erection of a breaker along the main line of the Delaware & Hudson R.R. The structure will be built for the Wolfe Coal Co. A lease has been secured by this company on a tract of land situated between the Delaware colliery of the D. & H. Co. and Laflin Borough.

The breaker will be equipped with modern machinery. The output of the colliery will be transported from the breaker to market over the D. & H. R.R. and the work of construction will commence as soon as a branch track has been laid.

INDUSTRIAL NOTES

Brazil, Ind.—The American Coal Mining Co. of this city has increased its capital stock $30,000.

Sharon—The Knox Pressed & Welded Steel Co., was recently granted a license to manufacture and sell coal pulverizing equipment.

Hazleton, Penn.—The Harleigh-Brookwood Coal Co. operating mines near Hazleton, has notified the State Department that it had increased its debt from $155,000 to $1,500,000.

Milwaukee, Wis.—The Northern Conveying Machinery Co. has changed its name to the Maniere Engineering & Machinery Co. Its new offices will be 709-10 Manhattan Bldg., Milwaukee, Wis.

Buffalo, N. Y.—J. N. Sechrest & Co., brokers, will finance the proposed railroad and coal mines of the Manchester Mining & Manufacturing Co., the road to extend 65 miles from Barboursville, Ky., to the line of the Louisville & Nashville R.R. at Beattyville.

Bellaire, Ohio—A syndicate of Columbus, Zanesville, and Mount Vernon capitalists are looking over the available coal lands in Belmont County, for the purpose of developing and mining. It is reported that very little available coal land in that section can be found.

Columbus, Ohio—An entry in the state to have the ownership of the Sunday Creek Co. now held by the Hocking Valley Ry. and the Toledo & Ohio Central R.R. Co. dissolved, is expected to be put on the court records soon. At that time steps will be taken to have the stock sold in some manner agreeable to the court.

Hartford, Conn.—The Terry Steam Turbine Co. has just started operating on a 23-hour per day basis, the one hour of idleness being from six to seven in the morning. It is found necessary to do this in order to clear the shop from the present crowded condition, due to congestion of orders during the past few months.

Bangor, Penn.—The S. Flory Mfg. Co. has erected temporary buildings at their works at this place, equipped the same with improved high-grade machinery, and is now ready to take care of orders as in the past. The business will be continued, and permanent buildings erected as soon as possible. The temporary plant was made necessary by the burning of the plant a short time ago.

NEW INCORPORATIONS

Coeburn, Va.—The Litz Coal Corporation, Coeburn, Va., has ben incorporated, with a capital stock of $100,000, to develop coal lands.

Chattanooga, Tenn.—The Pineville Coal Co., of Chattanooga, Tenn., has been incorporated to develop coal properties. Capital stock is $300,000.

Newark, N. J.—The Manufacturing Coal Co. is about to be incorporated. Capital stock will be $50,000, and John T. Harland, Newark, is incorporator.

Farmersburg, Ind.—The Farmersburg Coal Co. has been incorporated with $10,000 capital stock to mine and deal in coal. The directors are Bert Wood, M. McNeely and Ira Drake.

Frankfort, Ky.—Articles of incorporation have been filed by the Independent Ice & Coal Co. Richard Callissi, Mabel McCabe and George W. Steinhauer are the incorporators. Capital stock is listed at $5000.

Akron, Ohio—The Summit Coal & Supply Co. has been incorporated, with a capital stock of $10,000, to deal in coal, grain and feed. The incorporators are Francis Sieberling, J. B. Huber, W. E. Slabaugh, S. A. Allen and James C. Engleman.

Glen Campbell, Penn.—A charter has been granted to the Superior Coal Co., of Glen Campbell, Penn. It is capitalized at $50,000, and the incorporators are H. E. and J. O. Clark and H. J. Ehrlich, of Glen Campbell, and C. S. Hampton and Harry T. Rodenberry, of Philadelphia.

Clarksburg, W. Va.—The Norwood Coal Co., with its chief works in Harrison County, has been incorporated for the purpose of owning land and operating coal mines. It is capitalized at $10,000. Carl L. Horner, C. B. Stout, J. L. Horner, W. H. Wolverton and C. B. Johnson, all of Clarksburg, W. Va., being the incorporators.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite strong with the circular being well maintained and some grades commanding substantial premiums. Bituminous moving well on contracts. Prompt market dull but sellers in control. Weather conditions favorable to a large movement and adverse to consumption. Car supply easy in all parts of the country.

Anthracite is strong all along the line with prices generally well maintained and some premiums in effect. Stove coal is the feature of the hard coal market; it is in short supply all over the East, and commands a good price at all points. Production in the mining regions is heavy, but consumption is keeping pace with the output, and no important accumulations are noticed. It is essentially a weather market in anthracite, and indications point to a brisk business shortly.

The bituminous market is stationary but holding moderately firm with prices on a profitable basis. The conservatism of operators in closing contracts when a period of high prices seemed inevitable has left a rather abnormal amount of free coal in the market. In addition to this the bituminous consumers have been threatened so often with a shortage that they are well stocked as a rule, while comparatively mild weather has decreased the consumption. A brisk export business on the Atlantic Coast is helping to relieve the situation, but the general trend is undeniably toward softer conditions, and most agencies are quietly canvassing for orders.

The combined effects of the reduced lake shipping, due to the derangement in vessel movement as a result of the unprecedented storm, a slowing down in iron and steel, as well as general industrial manufacturing and a full car supply permitting uninterrupted operations has resulted in developing a surplus in the Pittsburgh market. Instead of asking a premium on the October circular, most operators are now prepared to shade these prices on spot business. While the market is holding relatively firm, the demand is light; dealers are of the opinion, however, that they can maintain prices providing the warm weather does not continue well into December. Consumers are making every effort to control the market, but no important break has occurred as yet.

Steam business in Ohio continues as active as ever. Retail trade as a rule is flat, but stocks are not heavy, and many dealers are trying to accumulate surplusses. There is still a heavy demand from the Northwest, and lake shippers are making every effort to get all the possible tonnage off before the closing of navigation, Dec. 1; arrangements are being made for continuing some shipping even after this date. The movement at Hampton Roads has been unusually heavy; some of the larger operators are having difficulty in getting sufficient coal to meet their contracts, and there is little in the way of free tonnages to be had.

A continuation of the warm weather has created a soft market in the Middle West, and mines are being forced to reduce operation; steam prices are lower and a cut is threatened in domestic coal. As a rule, however, requirements on contracts are being maintained at a good average, and the situation hinges greatly on the appearance of some winter weather.

EASTERN MARKET

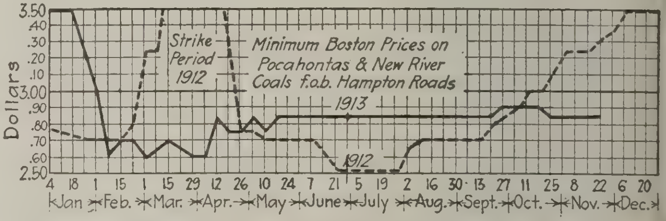
BOSTON, MASS.

Bituminous generally quiet and no near prospect of change. Georges Creek in ample supply but firm in price. Best Pennsylvanias offered freely for spot delivery and this is regarded as significant. Anthracite strong with the lack of stove still the main feature.

Bituminous—This is a listless market and Hampton Roads coals especially are facing a quiet season. New England consumers have more than once this year been induced to buy against threatened shortage and now they find themselves thoroughly well-stocked, in many cases much more so than they wish. There are also signs that some of the agencies are quietly canvassing for orders and there is likely to be an abundance of free coal for several weeks ahead. Some of the shippers were extremely cautious over the amount of contract business they would take in the spring and hence there is probably a larger volume of winter coal available than would otherwise have been the case. There is a more brisk call for export just now and this will help materially to keep the coastwise market steady in the face of light business here.

Georges Creek is moving regularly on contract, but for spot shipment there is only a moderate inquiry. The usual volume of this grade is on hand at all the piers but with no sign of any wavering in price.

Some of the higher grade Pennsylvanias that ordinarily at this season are rigidly confined to contract are being offered for December delivery. This is regarded as significant, and it will not be surprising if soon there is not a slight decline in prices. Coal from districts in Clearfield have been offered at 5@10c. less than a week ago, and although only for prompt shipment, it is probable that extended delivery could also be secured. The trend is toward softer conditions on all the Pennsylvanias and unless something occurs to shorten up the output they will probably continue well into December. All-rail trade is only from hand-to-mouth, with a general lack of interest on the part of buyers.



Anthracite—The market continues strong all along the line, the shortage of stove being still the commanding feature. New York shippers are particularly dry of this size and some pinch prices are likely to be heard when the weather turns cold. It was reported here that 50c. premium had been declined for a straight cargo of stove, but the other sizes are continuing at about the company circular. Little or nothing has developed here with respect to individual coal but a change will come if more stove is not to be had from the regular shippers. The territory East of Cape Cod is still drawing its major supply from Philadelphia. The points farther East have probably been earlier cared for than has been the case in recent years and most dealers away from the cities are going into the winter with comfortable stocks. Tows are moving quite regularly now and the summer temperature has let up on the demand from the consumers.

Quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New River
Mines*................	$1.00@1.55	$1.25@1.60	$1.67@1.77	
Philadelphia*...........	2.25@2.75	2.50@2.85	2.92@3.02	
New York*............	2.55@3.05	2.80@3.15	3.22@3.32	
Baltimore*............			2.85@2.95	
Hampton Roads*........				$2.85@2.90
Boston†............				3.72@3.82
Providence†...........				3.72@3.87

*F.o.b. †On cars.

NEW YORK

Soft coal unchanged but rather dull. Mining continues at full rated capacity and car supply adequate. Anthracite dull on tidewater business but active all-rail; stove coal in short supply.

Bituminous—The soft coal market remains quiet, with the demand light but prices moderately steady. There appears to be a fairly good supply of coal at tidewater, although by no means an abnormal amount. An encouraging feature of the situation is that consumers continue taking heavy tonnages on their contracts, in most instances up to the maximum specified; it is also noted that there are a few inquiries for new contracts in spite of the fact that this is not the customary season for placing these. The figures quoted in this new business are 15@20c. above last year's prices.

The car supply in the mining region shows a steady improvement. The situation on the B. & O., which was bordering on the acute a few weeks ago, is now comparatively easy, though still spotty and rather uncertain. No restriction in mining is reported, operations continuing at full rated capacity and limited only by the indifference of the men to work and occasional delays due to the car supply. Mines are comparatively full handed, although most operations report that they could use a few more. Prices continue rather weak, as follows:

West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2,85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

Anthracite—The hard-coal market was exceptionally dull on tidewater shipments although all-rail business to Eastern points continued active. Straight stove for all-rail delivery brought premiums of fifty cents through the individuals and some sales for tidewater delivery were made on the same basis.

The companies were all exceptionally short of both stove and nut, which allowed most of the individual shippers to dispose of egg provided stove and nut accompanied the shipments. Many of the local dealers complained of dull business, due undoubtedly to the unseasonable weather prevailing, but if real cold weather occurred there is no question but that a famine in stove and nut sizes would prevail. The companies have no stock on hand in the domestic sizes except egg, and for that reason the daily production on stove and nut would necessarily have to take care of the demand and as this increases, the situation on these sizes will become more acute. The suspension of Lake shipments may help to relieve the situation, but on the other hand the demand on all-rail shipments to other points will probably prevent any noticeable change in the local situation. Considering the small supplies held by the large companies at this time of the year, and the possibility of a severe winter before us, it is the opinion among the conservative element that premium prices will prevail on individual coals before the year is out.

Steam sizes except pea were long on the poorer grades and even high-grade coals found difficulty in prompt disposition. The opinion is expressed by many in the trade that although premiums may be obtained later, on the popular sizes in the domestic coals, there will be no difficulty for consumers to obtain their supplies of the steam cofas at normal prices with a possible exception in the higher grades, which usually are short during a severe winter. However, the contemplated trouble in the bituminous fields this coming year may have a tendency to bring better prices and an unusual demand for all grades of steam sizes, but there is no likelihood of this being felt until February or March.

The local market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular*	Individual
Broken	$5.00	....	$4.95	
Egg	5.25	$5.10@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.75	5.20	5.20@5.70
Chestnut	5.50	5.50	5.45	5.45
Pea	3.50	3.50	3.45	3.50
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.15@2.70
Rice	2.25	2.15@2.25	1.95@2.20	1.70@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.[illegible]0

*An addition of 2½% is required on the prepared sizes in this column to cover the new Pennsylvania state tax.

BALTIMORE, MD.

The soft-coal market remained about stationary, but on a rather poor basis. Slack was a little farther off, and coke was selling very cheap. Little demand for anthracite above immediate needs.

There was little change in soft coal conditions here the past week. The market on the whole remains unsatisfactory, demand being light and prices considerably off what they should be for the season. Efforts on the part of West Virginia producers to get rid of slack in the face of the lessening demand for that fuel, caused it to go off a little more. Sales as low as 85c. were recorded.

As a whole the gas-coal market in West Virginia stood about as last week. Run-of-mine was selling around 95c., and three-quarter anywhere from $1@1.10. Pennsylvania steam fuels sold at various prices from $1.05@1.15, although the market was dull at those figures.

Coke now stands about the worst figure of the market. The lessened demand of the steel industry, as typified here by the closing of the rail mill of the Maryland Steel Co., during the past week, has hit the coke trade hard. First-grade Connellsville cokes were being offered freely at from $1.75@1.80. West Virginia cokes were often going begging at $1.60.

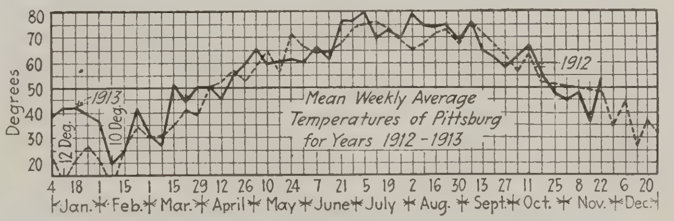
Waterfront business here is not as good as could be desired. A drop off in the number of tramp steamers calling at the port recently has caused a decrease in bunker demand.

CENTRAL STATES

PITTSBURGH, PENN.

Demand reduced. Car supply suddenly becomes plentiful, and prices being cut below the list of October, sometimes to the earlier basis. Lake shipments smaller than expected for November. Connellsville coke soft, with prices quotable 10c. lower.

Bituminous—The market has softened very considerably in the past week, owing to a variety of causes. In the first place, a softening tendency at this season was to be expected, and would in normal circumstances be spread over a period of several weeks. This year, however, a very severe storm occurred, Nov. 9, tying up the railroads quite largely and causing a temporary shortage of coal, which stiffened the market or at least arrested the softening tendency, while now the accumulated effect of the progress of the season is suddenly exerted. Lake shipments have been reduced on account of the storm on the lakes, of unprecedented severity, vessels being lost and the movement of surviving vessels much interfered with, so that the total of lake moved this month is proving much less than expected. Cars, however, have suddenly become quite plentiful, and there is scarcely any curtailment of operation on account of inability to get cars. Iron and steel mill operations have been decreasing rapidly and industrial activity generally has undergone some decrease. All these influences have been felt in the coal market, and prices have naturally suffered. Instead of premiums being secured on prompt coal over the advanced prices put out at the beginning of October there has been a disposition to shade those prices, and in some instances sales have been made at the old season price, based on $1.30 for mine-run. Operations at mines are slightly less than they were three weeks ago, although with the supply of cars and men they could easily be much greater. Demand is now regulating mine operations, instead of the limited supply dictating the price. We quote: Mine-run, $1.30@1.40; ¾-in., $1.40@1.50; 1¼-in., $1.55@1.65; slack, 90c.@$1. per ton at mine, Pittsburgh district.



Connellsville Coke—The market has lost more ground, the temporary stringency in supplies caused by the storm being entirely relieved last week. Coke is in plentiful supply on contracts, and free coke is being offered around, finding hardly any takers. While the majority of operators still adhere to the policy of holding off as to contracts for 1914 and awaiting the initiative of buyers, a few operators have been actively soliciting furnaces to take hold, and have probably named very attractive prices, well under $2, which seems to be the price ordinarily mentioned in the market as likely to be quoted by sellers in opening negotiations for 1914 furnace coke. Foundry coke has softened in consonance with furnace coke, and thus the whole market can be quoted down about 10c. for the week. We quote: Prompt furnace, $1.75@1.85; contract furnace (nominal), $2; prompt foundry, $2.50@2.75; contract foundry, $2.50@2.75, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 15, at 336,162 tons, a decrease of 17,883 tons, and shipments at 333,609 tons, a decrease of 33,870 tons.

BUFFALO, N. Y.

Coal business slow due to the warm weather. Bituminous dealers holding firm, but demand light. Anthracite selling fairly well and independents confident of future.

Bituminous—There is little improvement to be expected in the trade so long as the weather continues warm and cars are plentiful. The consumer is trying to control prices and it is a hard matter to hold the market even in the weak condition that has prevailed for a month or so. Still there are no important breaks reported.

There is a steady increase of labor difficulty in all the mining regions. There is no real difficulty in the mines except that the men are uneasy and are seizing on most anything as an excuse to make trouble. In some instances they are demanding more pay.

The market is still dependent on the weather. Dealers are of the opinion that they can hold it where it is, unless the warm weather should continue away into December. Anyhow, after that the time is not far off when consumers will have to store coal. At present they are laughing at dealers who refer to present labor troubles; it is the old dodge, as they look at it. Quotations remain very weak at $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.25 for slack, with slack quite as weak as sizes, on account of the approach of the close of the lake season. Allegheny Valley coal is quoted at from 15 to 25c. lower than Pittsburgh.

Coke—There is no life to the coke market. Consumers still hold that it is too high and it may be well if they can crowd the prices down till steel can be reduced to prices at which it can be sold more freely. Coke sells on a basis of $4.65 for 72-hour Connellsville foundry.

Anthracite—There is no snap to the anthracite trade, because of the warm weather. As a rule the sellers of independent coal are making the most confident reports. Trade is good with them in all of the smaller sizes. Egg is dull everywhere. The charging of the Pennsylvania state tax is often rebated out of that state, even where the seller has adopted the increase.

TORONTO, CANADA

Normal supplies except on some grades of anthracite, which are short. Market quiet but steady.

Business in the local market has been more quiet than is normally the case during this period of the year, due principally to the rather mild weather. Supplies on hand appear to be about normal with the exception of some grades of anthracite, stove coal for instance, which is behind. The retail market is quotable about as follows:

Anthracite, $8; bituminous (steam), $5.25; bituminous screenings, $4.35; domestic lump, $6; cannel coal, $7.50.

In the wholesale market three-quarter lump is quoted at $3.85 f.o.b. cars, and screenings at $3.

TOLEDO, OHIO

Heavy lake shipments. Warm weather having a bad effect on prices although they have been fairly well maintained as yet.

The weather here has been warm and balmy, which has naturally had a deadening effect on the coal market. Domestic demand has been light although steam coal continues active. Lake shippers are working hard in an effort to get as much coal going up the lakes prior to the closing of navigation, which will take place the first of the month, as possible. Coal and ore vessels suffered extremely during the recent storm and railroads were somewhat tied up so that shipments were more or less delayed.

Dealers here are fearful that prices may not be maintained should the weather remain warm, although at present there is no indication of a break in the market. Prices have been holding fairly close to the list. The car situation has improved somewhat and better working conditions are looked for. Prices as quoted here are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massillon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$2.00	$2.75	$2.25	$2.50	$1.50	$1.40
Egg	2.50	1.35	2.75	1.50	2.50	....	....
Nut	2.00	0.80	2.25	1.75	2.50	1.35	....
⅞ lump	....	0.90	....	....	....	1.30	1.20
Mine-run	1.60	1.50	....	....	....	1.20	1.20
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Some softness developed because of the warm weather. Prices did not suffer on the whole but in some instances lower quotations were given. Domestic lines only ones affected; other departments held up strong.

The coal trade in Ohio during the past week was rather flat because of the higher temperatures. As a result some of the dealers cancelled their orders placed during the recent cold spell. But a large portion of the retailers failed to cancel believing that the coal ordered would come in handy later on. Retail stocks are not heavy in any section and many of the dealers are trying to accumulate.

Prices did not suffer to any great extent. In most instances the circular figures were well maintained and discounts were few and far between. With the exception of domestic grades, prices were about as strong as earlier in the season.

The lake trade is still active and will continue so until the close of navigation. Some vessels will be put in port for the winter about Dec. 1, while others will make the last trip to the Northwest after that date. The demand for fuel there is still strong and practically no congestion at the docks is reported. Dockmen are making every effort to get a large tonnage to the upper lake ports to avoid a large all-rail movement later.

Steam demand is good in every way and manufacturing establishments are taking about their average amount. Railroads are also fair customers for steam grades as their freight movement is good. Some disposition is shown by some of the larger users of steam grades to accumulate stocks for a protection against a car shortage.

Some slight improvement in the car supply is reported from certain mining districts of the state but this is due more to the better weather which permits a freer movement of coal trains than to any other factor. Operations which depend upon the car supply have been about 55 per cent. in the Hocking Valley and Pomeroy bend and about 50 per cent. of the average in eastern Ohio. Other districts have also been hampered by the car shortage.

Retail trade is as active as could be expected under the circumstances. Retailers prices have not weakened under the influence of milder weather.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00 @ 1.90	....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch	1.85 @ 1.75	$1.50 @ 1.40	2.00 @ 1.90	1.85 @ 1.75
Nut	1.30 @ 1.20	....	1.75 @ 1.65	1.40 @ 1.35
Mine-run	1.50 @ 1.40	1.25 @ 1.20	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack	0.95 @ 0.90	....	1.00 @ 0.90	0.90 @ 0.85
Coarse slack	0.85 @ 0.80	1.00 @ 0.95	0.90 @ 0.80	0.80 @ 0.75

DETROIT, MICH.

Car supply causing some anxiety. Contracts for new period will be at higher figures. Anthracite easy and coke soft.

Bituminous—Coal is being moved away from the local yards quite as fast as it comes in, so that there are few or no accumulations and the spot market is firm. The car supply is also the source of some anxiety, producers expressing the fear that it may become so inadequate as to make it impossible to ship full tonnages on contracts. Operators claim that contracts expiring after the first of the year will command a premium of 25c. on the old business when renewed. The cold snap locally has materially stimulated business, and prices are strong and inclined to advance.

Anthracite—Hard coal is in good supply, even the stove size which has been so short.

Coke—Coke is weak, Connellsville foundry being quoted down to $1.95, with Semet Solvay $3 and gas house $2.75.

HAMPTON ROADS, VA.

Shortage with the larger shippers still continues. Dumpings for week heavy. Prices remain firm.

The movement from Hampton Roads during the week has been heavy. This is particularly true as regards the movement from Sewalls Point piers. The Virginian Ry. up to date appears to be running close to the dumpings of the Norfolk and Western Ry. It is hardly probable that the dumpings of the Virginian Ry. will run over those of the Norfolk & Western for the month but it is safe to say that their figures will be close. Some of the largest shippers still continue short of coal and are having considerable difficulty to get coal in the open market to take care of contracted tonnage. Prices on New River and Pocahontas are about the same as they have been for the past two or three weeks. This is also true as regards the high volatile coals.

The Norfolk & Western during the last week made their record for fast loading when they loaded the s.s. "Suffolk" at their pier No. 3. A cargo of 7508 tons was loaded in seven hours which is remarkably fast time considering the old style facilities now in use at Lamberts Point. Cargoes moving foreign from Hampton Roads during the week went to: Coronel, Havana, Genoa, Port of Spain and Canal Zone.

LOUISVILLE, KY.

Business light with dealers due mild weather. Stocks accumulating.. Steam coals in better demand.

In spite of the fact that winter is near, the coal market is as yet strictly a weather proposition. Warm and pleasant weather for the greater part of the week just past has resulted in a poor demand for domestic coal, the price going off in consequence an average of ten cents a ton on all sizes and grades. Dealers have had little chance to move the stocks stored earlier in the season, and are therefore placing no orders for immediate delivery.

While the same cause has produced a little of the same effect in the steam market, the demand for screenings has by no means gone off as much as that for domestic coal. A pronounced car shortage in Eastern Kentucky several days of last week indicates what may happen when the demand for coal is again normal.

Prices for the better grades range from $2.25 for block to 55 to $1.75 for round, f.o.b. mines. Eastern Kentucky nut l slack is selling for 80 and 85c., and Western Kentucky 70 to 75c. The slow domestic movement is largely reonsible for the fact that steam prices are holding up as ll as they are, as the supply of screenings is not overge, and the demand, as indicated, is hardly normal.

SOUTHERN AND MIDDLEWESTERN

NEW ORLEANS

Increased demand in Latin America and at points along e Southern Pacific Railway stimulates activity in coal cires. Cargo shipments fall off. Guatamala Central ready to y coal.

A more active demand developed in this market last week. is was due to a greater demand for parcel shipments to tin American points, call for coal trimmed into bunkers in e harbor and additional orders from western Louisiana and xas points following the settlement of the Southern Pafic strike.

There was an absence of cargo movement from Mobile or nsacola last week but coal is being assembled for loading veral cargoes next week. The Central Railway of Guateala is expected to place its order at once. Demand from exican points has increased owing to the cutting off of the al mines in the northern part of that republic. The busiess in sight is to move to Vera Cruz and Mexico City. Seval orders are pending calling for routing via Tampico but wing to the unsettled conditions existent shipment is being eferred.

With the bulk of the cotton crop being handled there is rtain to be considerable consumption from ships. Addional facilities for the handling of coal in the harbor are beg made which will doubtless add to the number of ships aling at this port.

INDIANAPOLIS, IND.

Domestic movement satisfactory in all branches. Local arket shows little change. Full demand on contracts. creenings weak, but trade generally firm.

Notwithstanding almost summer-like conditions, there is ttle complaint in local trade circles, either from buyers or ellers. Domestic coal appears to be a little more satisfactry, and the steam business is also up to normal in spite of dverse sentiments regarding general business. The factories ppear to be taking full tonnages on their contracts, and ne large producer reports being six weeks behind orders. lines as a rule are running full time unless delayed by lack f railroad cars; the Big Four R.R. has been the worst offender in this respect but indications are that it will materially improve its service shortly. The public Utilities Comnission has entered a complaint to the effect that terminal acilities at Indianapolis are inadequate and will have to be nlarged.

The market on screenings is more unsettled than in any ther branch; an urgent order may command 70c., but prices ange from there down to 40c., depending some on quality, ut, principally, upon demand. Domestic coals have not sufered as yet, because of the mild weather, except, possibly, or a slowing up in some of the small retail business. Mineun No. 4 is quoted at $1.10@1.25, with sales usually closer o the lower figure; No. 4 domestic lump commands $1.90, .o.b. mines.

Retail prices have remained unchanged since Sept. 20. The opinion is that they will continue steady to firm alhough it is noted that Indiana lump is being offered at $3.50 n one instance, the circular being $3.75. The continued warm weather through November is causing a note of anxiety n the trade.

CHICAGO

Continuation of warm weather has created a soft market. Steam prices have been cut 5 to 10c. a ton. Springfield mines have reduced output on account of slack business. Smokeless coal continues strong. Prices for anthracite remain stationary with the volume of business light. Coke market is unsteady.

Indian summer weather has had a softening influence on the market. There has been a drop in prices for steam coal and a cut in quotations for domestic has been threatened for several days. Retail dealers announce that there has been a light demand and this condition has had the effect of weakening the steam trade. Many operators who lacked orders from the domestic market have sought to dispose of their output through steam trade channels with the result that considerable strength has been taken away from the latter branch of the trade. Prices for steam lump mine-run and screenings have been trimmed between 5 and 10c. a ton.

Variable prices are being asked for Franklin County coal. Some sales at $2.25, the mines, have been recorded, but the bulk of the business has been handled on the basis of $2. Sales have been reported in a few quarters at $1.90. Springfield operators are getting $1.50 for domestic lump coal in Chicago and $1.65 to $1.75 in the country. A majority of the Springfield mines are running only two or three days a week on domestic sizes on account of slack business.

Demand for splint coal has lessened to some extent. All-rail coal is still sold in competition with the dock coal as retail dealers realize that the dock supply will not be sufficient this year.

Smokeless coal retains a strong position. Mine-run is selling at $1.40 to $1.50 on shipment direct from the mine. Lump and egg commands $2.25 to $2.50, the mines. Very few shipments of Hocking Valley are being received and for this reason orders are being accepted with the proviso that delivery will not be guaranteed. The circular price of $2.20, the mines, remains firm. There has been a let-up in the buying of anthracite by retail dealers and sales are made with a good deal of difficulty. Prices, however, remain about the same. Carterville operators are obtaining $2 for domestic lump and No. 1 washed coal. Raw screenings are being disposed of in this market on a parity with central Illinois fine coal. Indiana domestic lump is being sold around $1.75 and spot sales on screenings are being made at 30c. a ton. The coke market is unsteady, although no cuts in prices have been made.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.32	$3.05@3.30	$2.52	
Steam lump	2.02		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.87	2.40@2.55	1.87	3.45@3.55
Screenings	1.12	1.55	1.27	

Quotations on Harrisburg coal are: Domestic lump and egg, $3.05; steam lump, $2.65@2.80; mine-run, $2.40@2.55; screenings, $1.55; No. 1 nut, $3.05; No. 2 nut, $2.80. Carterville prices are: Lump, egg and No. 1 washed, $3.05; No. 2 washed, $2.80.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; byprodust, egg, stove and nut, $4.90@5; gas house, $4.90@5.

ST. LOUIS, MO.

Weather conditions unfavorable for good prices, and coal is sold at less than cost of production. Prospects not good for future. Poor market on all fuels.

The weather has been against the coalman during the past week, and if there is another week of spring weather there will be absolutely no coal market. Both domestic and steam business went to pieces and it will take two to three weeks of good winter weather to get it back to where it was before the warm wave.

Standard screenings are down to 10 and 15c. This constitutes 40% of the coal mined. The other 60%, consisting of 2-in. lump, is being sold at from $1 to $1.10. Figuring that it would bring an average of $1.05, this makes 67c. per ton for mine-run. The very lowest cost of production in the Standard field that can be figured in any way is 78 cents.

The anthracite, smokeless and coke markets are pretty well demoralized as there is no buying of any kind. It has even effected the country, and very few orders are coming in.

The prevailing prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.05@1.15
3-in. lump	....	....	$1.50	....
6-in. lump	$1.75 @ 1.90	....	1.60	1.25@1.35
Lump and egg	1.85 @ 2.15	Over sold	....	....
No. 1 nut	1.40 @ 1.50	....	....	....
Screenings	0.40 @ 0.50	....	....	0.10@0.20
Mine-run	1.10 @ 1.20	....	....	....
No. 1 washed nut	1.75 @ 1.85	....	1.40	....
No. 2 washed nut	1.40 @ 1.50	....	1.60	....
No. 3 washed nut	1.15 @ 1.25	....	....	....
No. 4 washed nut	1.00 @ 1.10	....	....	....
No. 5 washed nut	0.45 @ 0.55	....	....	....

KANSAS CITY, MO.

Operations will have to be restricted shortly unless there is a change in the weather. Market steady but showing indications of weakening.

Unseasonable weather has held down the demand for coal in the Missouri and Kansas fields, and several mines have been forced to close down, pending the return of cold weather. Recent conditions have been unfavorable, and while yearly contracts held by several of the operating companies have tended to relieve the situation, others have not been so fortunate. The majority of the mines are being worked, but will be forced to cease full-time operations shortly. The market has been steady, despite the poor trade, but is expected to weaken in the immediate future unless a change in the weather takes place. The car shortage is hardly noticeable, because of the decrease in movement of coal.

PORTLAND, ORE.

Market quiet. Shipment of foreign coal the only feature of interest.

The general condition of the coal market here has shown no change during the past week. A shipment of 900 tons of coal that arrived here from Australia on the British ship "Segura" was purchased by the Pacific Coast Coal Co. Two car loads of coal from the new Monarch mine near Centralia, Wash., were received here last week as samples. Some of the product of the mine will probably be marketed here this winter.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN R.R.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of October, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas	1,225,803	18,681	1,244,484	1,267,615	92,431
Tug River	221,464	3,879	225,343	184,353	40,990
Thacker	247,746	9,055	256,801	167,732	89,069
Kenova	77,163	9,083	86,246	70,670	15,576
Clinch Valley	....	....	....	147,980	13,824
Other N. & W.	....	....	....	4,709	....
Total N. & W. Fields				1,843,059	251,890
Williamson and Pond Crk. RR.	....	....	....	51,688	6,300
All Othe Railroadsr	....	....	....	160,416	....
Grand Total	1,772,176	40,698	1,812,874	2,055,163	258,190

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for October and the first ten months of this year and last year:

	October		Ten Months	
	1913	1912	1913	1912
Coal	3,250,220	2,902,965	29,151,767	26,275,435
Coke	338,337	433,547	4,007,413	3,883,121
Total	3,638,557	3,336,512	33,159,180	30,158,556

NORFOLK & WESTERN

The following is a statement of the tonnage shipped over this road during October, 1913, and the first ten months, as compared with corresponding periods of 1912 in short tons:

	October		Ten Months	
Coal	1912	1913	1912	1913
Tidewater, foreign	80,812	105,523	1,175,341	1,341,910
Tidewater, coastwise	316,891	311,881	3,085,591	3,204,849
Domestic	1,542,069	1,677,545	14,787,932	15,483,089
Coke				
Tidewater, foreign	....	3,292	52,762	30,491
Domestic	131,007	111,020	1,145,181	1,264,781
Total	2,070,779	2,209,261	20,246,807	21,325,120

FOREIGN MARKETS

GREAT BRITAIN

Nov. 14—Steam coal market conditions remain very firm for all descriptions of large. With considerable tonnage in dock and outputs limited, few sellers are in a position to accept prompt orders. Buyers are hoping that after completion of the British Admiralty's requirements, easier conditions may be in evidence. Tonnage is being delayed by stormy weather, but there are sufficient ready steamers to take all the coal available for prompt loading. Quotations are approximately as follows:

Best Welsh steam	$4.86@4.98	Best Monmouthshires	$4.14@4.20
Best seconds	4.68@4.80	Seconds	3.90@4.02
Seconds	4.50@4.62	Best Cardiff smalls	2.58@2.64
Best dry coals	4.44@4.68	Seconds	2.34@2.46

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, evclusive of wharfage, and for cash in 30 days.

Newcastle-on-Tyne (England)—The counties of Northumberland and Durham are large producers, and the output of their collieries is one of the main reliances of ships trading with the North Sea ports. Necessarily the coal strike seriously affected this neighborhood, but shipment of coal in 1912 fell less than one-tenth below the total of 1911, while it was larger than many previous years. The total shipments, foreign and coastwise, aggregated 18,681,372 tons, as compared with 20,543,683 tons in 1911, a decrease of 1,862,311 tons. A more serious effect of the strike, however, was a rise in the price of coal, which will probably be permanent owing to increased wages and shorter working hours graned to miners.

Hull ,England)—In spite of the stoppage of exports due to the miners' strike and consequent derangementc, shipments of coal abroad from Hull showed considerable increase over those of 1911. It should be remembered, however, that strike troubles in that year were responsible for considerable falling off in business.

There were exported from Hull 3,684,176 tons of coal in 1912, in comparison with 3,355,415 tons in 1911; and that shipped to coastwise ports amounted to 973,877 tons in 1912, as against 982,096 tons in 1911; coke exports were 51,091 tons in 1912, in comparison with 37,129 tons in 1911. These figures represent about one-half the coal and coke traffic on the Humber River, including the ports of Grimsby, Goole, and Immingham, which shipped coal and coke during 1912 to the amount of 9,155,937 tons, as compared with 8,758,134 tons in 1911.

Nova Scotia—From the four Nova Scotia coal fields—Sydney, Inverness, Pictou and Cumberland—nearly 7,000,000 tons of coal were mined in 1912. Approximately half of this amount was sold in the Maritime Provinces, the balance going to Quebec ports and a considerable tonnage being shipped to the United States.

Prince Edward Island (Canada)—The island's coal imports, are carried in wooden schooners, and come from Cape Breton and Nova Scotia collieries; they are increasing each year at the rate of about 8 per cent. In 1912 there were imported 70,030 tons of bituminous coal in this way; 10,562 tons of anthracite coal were also brought from New Jersey and Chesapeake ports in American schooners. Both coal and lumber are rising steadily in price.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Nov. 22:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	..	..	80	87	80
American Coal Products Pref.	..	..	105	109¼	102
Colorado Fuel & Iron	27½	26⅜	27½	41½	24
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102
Lehigh Valley Coal Sales	235	230	240	....	....
Island Creek Coal Com	47⅞	47⅞	47⅞	53½	47
Island Creek Coal Pref.	83	81½	81½	85	80
Pittsburgh Coal	....	....	18¼	24⅜	14
Pittsburgh Coal Pref.	88⅞	87½	87¾	95	73
Pond Creek	19	16¾	16¾	23¾	16
Reading	160½	158⅝	159	171	151
Reading 1st Pref.	..	..	84	92½	82
Reading 2nd Pref.	..	..	84	95	84
Virginia Iron, Coal & Coke	41	41	41	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	91	92½	92	92	92	99⅛
Colo. F. & I. gen. 6s	104	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	77½	78	77¾	78	77½	85
Cons. Ind. Coal Me. 1st 5s	78	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	86	92	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	86	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	76	78¾	78	Oct. '13	73	80½
Tenn. Coal gen. 5s	97	Sale	97	97	97	103
Birm. Div. 1st consol. 6s	100⅞	102½	101	101	100⅝	103
Tenn. Div. 1st g 6s	100⅞	102½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	84	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	Nov. '13	92	98

DIVIDENDS

Delaware & Hudson Co.—Regular quarterly dividend of 2¼%, payable Dec. 20, to holders of record Nov. 27.

Hocking Valley R.R.—Regular quarterly dividend of 2%, payable Dec. 31, to holders of record Dec. 5.

Reading Co.—Regular quarterly dividend of 1% on the second preferred stock, payable Jan. 8, to holders of record Dec. 23.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

Volume 4, No. 24
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NEW YORK, DECEMBER 13, 1913

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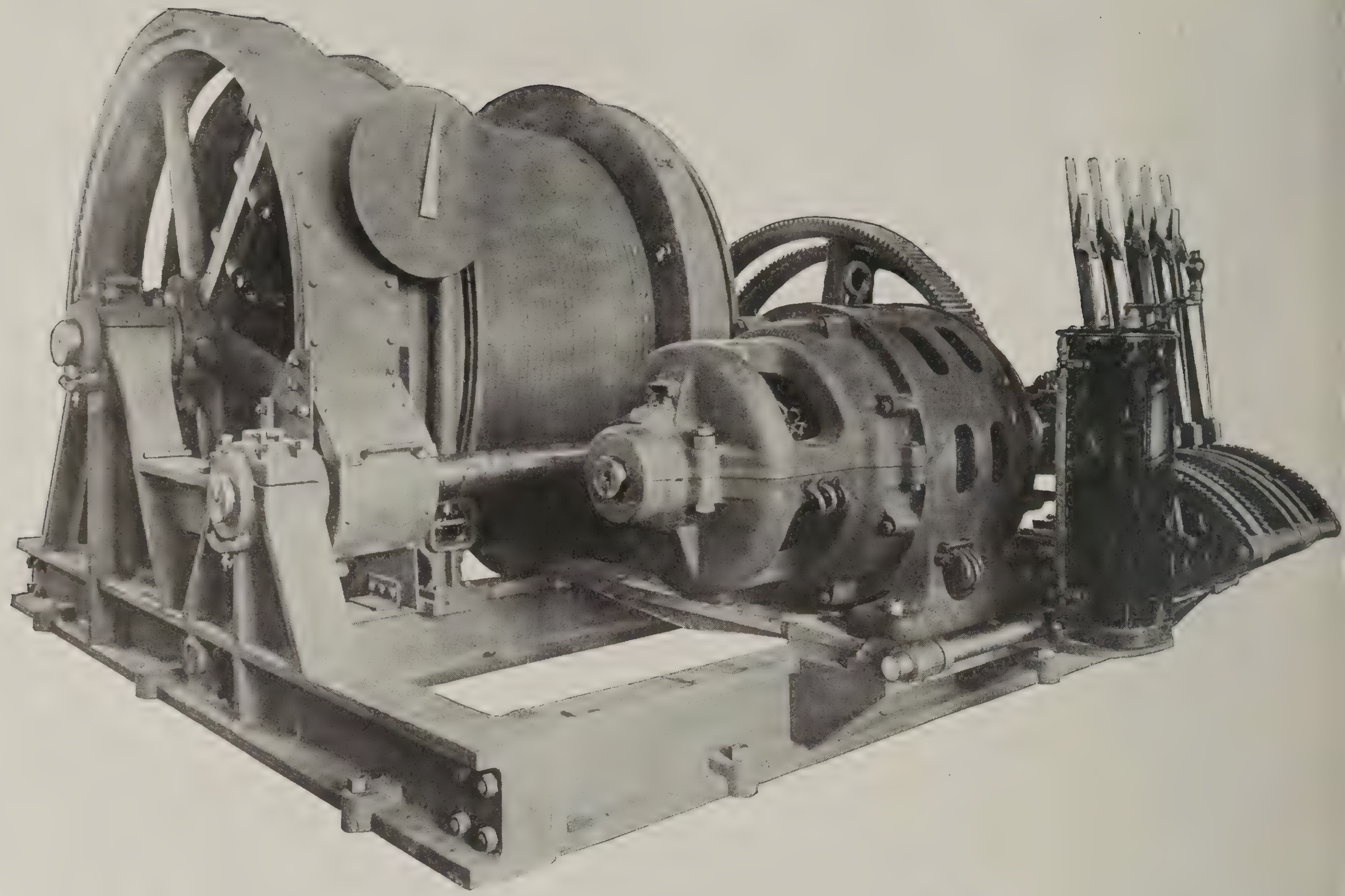
Advertising Index, Last Page

Face of Entry in Mine of Rosedale Coal and Clay Products Co., Calgary, Alta.



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While manufacturing the electrical apparatus for the largest mine hoist installation ever undertaken in the United States, the Westinghouse Electric and Manufacturing Company has devoted very careful attention to the design of motors for moderate sized hoists.

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*Westinghouse Electric & Mfg. Co. of Texas.

COAL AGE

FLOYD W. PARSONS, *Editor.*

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None sent free regularly, no returns from news companies, no back numbers

World Competition

The Weekly Ad-Talk Page

In the December issue of "Everybody's Magazine" there is a dynamic article by William Hard, called "Better Business."

It startles us first, by telling us that pig iron is being brought into the United States from China, India, Cuba and Chile at a price that puts it into active competition with American pig iron. This, with a material which is heavy, costly to move, is indicative of the new order of things in which the United States under the new tariff law will enter into a period of World Competition.

World Competition will mean that no longer under the protection of a high tariff, this country will have to compete with other countries on a basis of efficiency—nothing else.

To quote Mr. Hard: "Better Business in this country will now more than ever rest on Better Engineering. . . . A new technical triumph in managing Lake Superior ore would carry it a few miles farther east. A new technical triumph in handling Cuban ore would carry it a few miles farther west."

Thus he illustrates how important it is to cut down production cost to bed rock and at the same time raise quality as high as possible. And that this can only be done by technical knowledge, research and the equipment that results from these.

Presently Mr. Hard says: "The hour strikes for a pious act of self-examination: *For a national technical task, what is our national technical equipment?*"

He goes on to claim—and he proves his point!—that while we have been content to sit close with our prosperity, self-satisfied and complacent, other nations have forged ahead. The three most important engineering discoveries of the last twenty-five years—the gas engine, the dynamo, the steam turbine—all had their origin in Europe.

But if we have not originated, how quickly have we adapted and adopted? Again we are proved laggards.

Focusing his argument on the iron-and-steel industry (surely a representative American industry!), Mr. Hard tells us that the first installation of blast-furnace gas engines in the United States was made seven years after the first installation in both Germany and Belgium. The first installation of a turbo-compressor in a blast furnace followed the first installation in France by six years.

In the old days of the high-wall tariff this non-progressiveness may not have mattered so intensely but in the new era of World Competition it does matter—vitally!

We will need, as Mr. Hard says, all the Better Engineering we can get, all the help that technical knowledge and skill and experience can give us. To stay in the race we must have the most modern equipment, the most time-saving productive devices and machines that can be furnished us.

Where can the progressive engineer put his hand on this modern equipment? Where can he find out about it? Where can he find it guaranteed to be reliable and efficient?

In the advertising pages of his technical publication. These pages automatically confine themselves to only what is latest and best. So searching is the investigation of a product, nowadays, so keen the competition, that only efficient machinery can be profitably advertised.

In the new era of World Competition, the advertising pages of such a paper as *Coal Age* stand ready to help you.

COAL AGE

No. 4 NEW YORK, DECEMBER 13, 1913 Vol. 24

"It's a pudding will put a man in good humor with everything, except the two bottom buttons of his waistcoat," wrote Charles Dickens, in one of his Christmas stories, a half century ago.

A pudding, good humor and a full stomach! surely that's Christmas!

Dickens undoubtedly stands supreme, when it comes to making us *feel* Christmas. Other writers may tell us about "Peace on Earth, Good Will toward Men," but he gives us the actual sensation of Yuletide. We have just reread his "Christmas Carol," and when we finished that last line—"And so, as Tiny Tim observed, God bless Us, Every One;" we closed the book, realizing, as we had never realized before, the power and the goodness of his genius.

And now this thought comes to us. Suppose that every child in every mining camp in America could have that story read to him on Christmas Eve, while the spirit of the occasion is everywhere. Wouldn't the effect on the next generation of miners be beneficial?

Of course, to accomplish this, some of us would have to make sacrifices; many would have to forego Christmas family reunions planned in distant cities, others would have to create funds to buy books, or be willing to participate in public readings, and, mind you, the money required for the books would be but a drop in the bucket, for once the Christmas spirit gets loose in the land, Turkey and Plum Puddings in great plenty would have to be forthcoming from somewhere.

We doubt if any fellow who postponed the family reunion would have cause for regret. On Christmas, our mining camps need all of those inhabitants who have sentiment enough to enjoy family reunions, and if only enough of such men would realize that their mining camp could be a big family circle, the reputation of such communities might touch par.

The town, the village or the city that furnishes its children with Plum Pudding and Christmas Cheer will not be forgotten, when those children are grown to man's estate and are planning homes for their own descendants. In fact, Plum Pudding and Good Cheer might be distributed to good advantage by even the most selfish; such generosity in the end would only be "good business."

Now we have had our say, but we couldn't close with the words "good business." We prefer to turn back to Dickens: "And so, as Tiny Tim observed, God bless Us, Every One."

Efficiency in Coal Mining

By Harrington Emerson*

SYNOPSIS—Address before the Coal-Mining Institute of America. Simple and explicit rules and suggestions are given for the buying, the equipment and the operation of coal mines.

⁂

Mathematics is a science. Different businesses use it in different ways. Chemistry is a science. Different businesses use it in different ways. Hygiene is a science. Different people use it in different ways. Efficiency is a science. It is the science of realizing standards. Different businesses have different standards and different men have different standards for the same business.

We cannot talk of efficiency in coal mining without first setting up standards. As the special cases are usually more interesting than abstract reasonings, I shall give the standards that we established for a particular coal mine in a particular locality. I do not claim that these standards would have applied to any other mine.

Capital Invested

As to capital there are four general rules, one or the other or all of which are frequently violated:

(1) Know what all the facts are. Do not delude yourself with fancies or guesses.

(2) Do not pay more for any property or improvement than you can get back out of it, including 6 per cent. interest, in 8 to 10 years. Do not pay more than $1000 for a property that will not yield a net profit of $150 to $200 a year.

(3) Do not spend $1000 for an income of $200 until you are sure you have no opportunity to spend $200 or less to save $1000.

(4) Do not allow your capital to shrink. Carry as an operating expense any diminution.

Coal properties as to capital investment come in the same catagory as real estate; unless the property is made productive the interest and taxes accumulate faster than any possible increase in value. A lot in New York at the corner of Broadway and Wall St. sold about ten years ago for $1,000,000. Even at this price it would not have been a profitable investment in 1800 at $1000, unless it had brought in current revenue. The great land grants to the railroads would have swamped them if for the first 20 years taxes had been levied at $0.10 an acre a year. The taxes would have amounted to $5,000,000 yearly for the Northern Pacific alone.

Coal and lumber properties have to be worked. The revenues must come from the coal mined and the trees felled. It is an extremely ticklish business in real estate, in coal lands, in timber tracts to put the dead certainty of taxes and interest against the guessed-at rise in value.

Therefore, in considering timber tracts and coal fields, always insist on a separation of land investments from operating investments. My second rule applies to both tract and operating investments.

The third rule is often violated, frequently because the first rule about knowing the facts is violated. Don't invest $5000 to earn $1000 if you can earn $1000 by investing $200.

Labor Rules

It is not what you pay labor, it is the profit it yields you that counts.

It is a general law applying not only to labor but also to equipment and to materials that the best grades are relatively cheaper than poor grades. You know that this applies to coal.

Mr. Mellen, former president of the New York, New Haven & Hartford, is quoted recently as saying that no railroad official is worth more than $25,000 a year. He said that he would have worked just as hard for $25,000 as he worked for $75,000. This may be true. Caruso may sing just as well at a charity concert as in grand opera for $5000 a night. It does not follow, however, that you could get Caruso for $50 a night. The right president for the New Haven would have been cheap at a million dollars a year, if he could not have been secured for less.

The one efficiency rule as to labor is to determine what you can afford to pay and then put in your time and your skill and your energy finding the best men that your permitted pay can buy.

In coal mining you have the scale. You are prevented from going below a certain amount. I have never seen a coal mine yet in which money was spent to best advantage for labor.

This is so tremendously important a subject that I wish I could dwell upon it. Take it from me that your descendants 100 years from now will have learned to handle labor in the way you ought to be able to handle it today. A strike seems to me not only a preventable thing but a ridiculous, a stupid thing like the sinking of the Titanic or the wrecks on the New York, New Haven & Hartford Railroad.

In these two rules: (1) Handle your capital economically; (2) handle labor economically, is laid down the basis for efficient coal mining.

How to handle capital and labor efficiently is the chief business of the great executive. There are many principles, not rules or devices, that will guide him, and without these principles he cannot succeed. Some great geniuses know the rules instinctively. The rest of us poor mortals have to learn them. Some boys learn to swim by themselves, most of us are taught to swim. But unless we know how to swim we shall surely drown if we fall overboard even if we are not 20 ft. from shore.

Some of the principles for efficient direction are:

Definite ideals, definite authority and responsibility, constantly available and used competent counsel, strict discipline, fair dealing, high and immediate efficiency reward.

The main principles for efficient supervision are that every part of material, of equipment, of personal work shall be designed, specified, selected, tested, conserved and inspected with continuous intelligent care.

The main principles of successful management are that there shall be balance between the three great human incentives—action, appetite and inspiration.

The main principles of successful operation are:

(1) Standardized conditions; (2) standardized operations; (3) advance planning; (4) standards and sched-

---

*Efficiency Engineer, 30 Church St., New York.

ules; (5) dispatching of all work; (6) standard practice instructions; (7) records, reliable, immediate, available, classified and adequate.

As to Particulars

A few years ago I was one of a committee which made the following report on a coal mine in a receiver's hands:

"If the coal properties are shut down, the annual loss will be $420,000.

"If they are operated at the standardized cost per ton of $0.857 and for an output of 3,000,000 tons and the coal is sold at the price realized last year, $0.8097, the loss will be $141,900.

"The standard cost includes a charge for interest of $0.067 and for depreciation of $0.058, a total of $0.125 per ton.

"The standard costs are 14.8 per cent. lower than 1909-10 corresponding costs, 17.4 per cent. lower than July and August, 1910, corresponding costs."

This short report was amplified into the following:

Our Findings

(1) The coal lands have been injudiciously acquired.

(2) Money has been injudiciously spent in equipping the plants.

(3) Overhead charges for interest, maintenance and depreciation are therefore high.

(4) The present market selling price for coal is so low as to make profitable coal mining difficult, if not impossible, even if the coal lands had been secured without price, and had been equipped with rigid reference to economical operation.

(5) The present situation would be most effectively bettered if the market price of coal increased.

(6) To shut down the mines and wait for better prices would entail an annual expense for power, maintenance, supervision, depreciation and interest of $420,000.

This does not include an annual charge of $104,494 on book value of coal lands not immediately identified with the plants to be operated.

(7) The cost of mining coal if operations are standardized, will be $0.857 per ton for a daily output of 12,000 tons, a monthly output of 250,000 tons and a yearly output of 3,000,000 tons.

(8) The loss from continued operation will depend on the price obtained for coal sold:

At $0.66 loss will amount to	$561,000
At $0.70 loss will amount to	420,000
At $0.70 loss from operations and loss from suspension of operations will be equal.	
At $0.79 loss will amount to	200,000
At $0.8097, price netted by coal sales in 1909-10, loss from operation will be	141,900
At $0.857 there is neither loss nor profit from operation.	
At $0.921, profit above operation	192,000
This is sufficient to pay interest on obligation. Coal should therefore continue to be mined.	
At $0.948, profit from operation	272,000
This pays for operation, for moneys owed and for present administration charges.	

(9) While waiting, hoping and working for better coal prices, costs of operations are to be standardized;

(a) By revaluing all the lands and equipment, thus reducing future operating overhead charges;

(b) By putting the management of inside and outside operations in the hands of a competent and experienced man of reliable character;

(c) By giving him all the assistance possible from modern business organization and methods adapted from other bituminous coal-mine operations and industrial enterprises;

(d) By concentrating operation at that plant, or those plants, where coal can be mined most cheaply;

(e) By investigating the advantages, if any, to be derived from coking the product of these mines;

(f) By investigating the advantages, if any, of establishing a washery at the mines.

Standards and Standard Table of Costs

In making its investigations your committee attempted to determine a standard cost per ton of mined coal for a standard output, which we assumed at 3,000,000 tons each year.

The standards adopted for immediate use are:

(1) The present standard mining scale for mining labor, $0.485.

(2) Current rates of wages for a minimum amount of other efficient working labor, $0.175.

(3) Moneys for supervision, supplies and other bills, taxes, insurance, etc.; an efficient minimum, $0.07.

(4) Depreciation charges based on revaluations, on experience, and on the present ascertained coal reserve tributary to operating plants, $0.06.

(5) Interest at 6 per cent. per annum on reappraised values of coal reserves, mining buildings, equipment, etc., actually used for mining operations, $0.067.

The company has other expenses not standard and not directly appertaining to mining operations. These expenses are:

(6) Interest and other charges on investments at present inoperative, $0.029.

(7) Excessive interest load, due partly to investment in elaborate and unnecessary plants, partly to deficits accumulated from former years, and partly to other causes, $0.035.

(8) High costs of administration of the Company's business.

COSTS FOR 1910

Operation	$77,294	
Maintenance	14,156	
General expense, excluding insurance	37,912	
	$129,362	
Less allowance for mining operation	48,000	
	$81,362	
Cost per ton		$0.0271

The output of coal can fluctuate from no tonnage, if the mines are closed, to a maximum daily tonnage of 17,000 tons.

If this maximum of 17,000 tons daily could be attained it would reduce mining costs about as follows:

OUTPUT PER YEAR, 4,250,000 TONS

	Costs per Ton
Mining labor	$0.455
Other labor	0.15
Operation	0.06
Depreciation	0.06
Interest	0.045
Total	$0.77

TABLE ON BASIS OF 3,000,000 TONS ANNUALLY
Daily Output, 12,000 tons

	Costs per Ton	
1. Mining labor	$0.485	
2. Other labor	0.175	
3. Total working pay-roll (1 and 2)		$0.66
4. Operations	$0.07	
5. Depreciation	0.06	
6. Interest	0.067	
7. Total overhead charge (4, 5, 6)		$0.197
8. **Total standard cost per ton of coal (3 and 7)**		$0.857

The whole practical problem is to attain the standard costs, and it is this aspect of the situation which underlies our report.

Because the future is more important than the past, we have established standard costs for operation for the next year.

Having set up standards of cost for carrying output and having established current efficiencies we are able each month to show the exact losses due to inefficiencies and their cause.

We do not say vaguely, "You ought to mine for $0.10 a ton less." We subdivide the $0.10 above standard into perhaps 50 different items and point out not only the amount of, but also the cause of the excess or unstandardized cost in each."

If you know where and when and why losses occur, it is usually possible to prevent them.

The science of efficiency is applied to any business in a similar manner.

It is possible to have a great deal of system without any efficiency. It is possible to have great strenuousness without any efficiency. It is possible to have a minimum of system, a minimum of strenuousness, yet great efficiency.

⁂ ⁂

Industrial Safety

By Herbert M. Wilson*

SYNOPSIS—Some of the developments in the industrial-safety movement are here enumerated. Figures are also given, showing the decrease in coal-mining accidents during recent years.

⁂

The mining industry may point with pride to the fact that long before safety was considered in other industrial occupations, state legislation had been enacted making provision for mine inspection, and much has been done in the succeeding years to safeguard the workers, not only through the various state mine departments, but also through the private inspection maintained by the operators.

Up to a few years ago, the too oft-recurring mine explosions, with the long lists of dead and injured, and the reports of the daily accidents from minor causes, were accepted as inevitable to the industry. It was at this period that the impetus furnished by the first Conservation Congress and a series of coincident mine explosions awakened Congress to the necessity of investigating these disasters.

The propaganda which led to the creation of the Federal Bureau of Mines and the publicity created by its method of operation has in the interval aroused the mining community to a realization of the lack of safety and has given a quickened impulse for better conditions in every other industrial occupation.

It is a fact worthy of just pride, therefore, that not only has this industry led in state and in individual concern for the safety of its employees, but also it is the first—unless transportation be called an industry—to receive federal aid and encouragement. It should be a matter of still greater pride that the activity for safety in mining has pointed the need and the way for the guidance of the other industries.

Two New Societies Are Organized

Due perhaps in some measure to these causes, and in larger sense to the agitation for the enactment of workmen's compensation laws, and further in large degree to the activity everywhere evidenced for greater consideration of our fellow-beings, as voiced in Christ's commandment, "Love thy neighbor as thyself," last year witnessed the organization of at least two national societies concerned in furthering the safety movement.

First among these is the American Mine Safety Association, conceived in this city and now entering upon its first year. Its membership includes mine operators, mine inspectors, mine workers and physicians. It aims to secure as a member every man concerned in mining coal or ore. The good results from this organization are already evidenced in the more frequent field meets of miners, both for contests in and instruction regarding safety, the establishment of local branches of the association, a national mine-rescue corps, and a national first-aid corps.

At almost the same time there was conceived in Chicago the National Council for Industrial Safety, numbering in its membership the leaders in every industrial branch—railroads, manufactures, iron and steel, etc. This council will strive to coördinate the efforts of kindred organizations as a medium for exchange of information relative to those safety measures which may be applicable to the several industries.

The steel industry has perhaps pushed farther the introduction of safety appliances and safeguards around machinery, the organization of safety committees, and the awarding of prizes, than any other of the industries, while the manufacturing corporations—the National Cash Register Co., our own "57 Varieties" and their fellows—are spending hundreds of thousands of dollars in advancing the safety and welfare of their employees.

Meetings and Exhibitions in New York

The American Museum of Safety in New York held in the month of October its first annual exhibition of safety appliances in the Grand Central Palace. This exhibition was worthy of a long journey if only as an object lesson in the tremendous amount of energy and money being expended in every industry for the adoption of safeguards to human life. And next week there will be held in the same building a National Safety and Sanitation Conference.

Have you scanned the latest statistics of mine accidents? If so, have you noted that in the United States in the year 1911 there were 2719 persons killed in coal mines and 695 in metal mines; that there were 9106 seriously and 22,228 slightly injured in coal mines, and 4169 seriously and 22,408 slightly injured in metal mines,

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*Engineer-in-charge, Bureau of Mines, Pittsburgh, Penn.

Note—Abstract of an article read before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4, 1913.

while in all 61,325 mine workers were incapacitated for one day or over?

Humiliating as is the apparent indictment against the mining industry, conveyed in the above figures, yet they do not tell the whole story. There is comfort in the fact that in the last quarter-century, while there has been a constantly increasing ratio of men killed in the mines per thousand employed, or per million short tons of coal produced, the high-water mark was reached in 1907. In that year the death rate in the coal-mining industry alone was 4.88 per thousand men employed, or 6.93 per million short tons of coal mined.

During the last five years, up to and including 1912, there has been a constant and gratifying diminution in the death and accident rate, the number killed in 1912 being 3.27 per one thousand men employed, or 4.42 per million short tons of coal mined. No other industry can point to so splendid a record of safety work accomplished.

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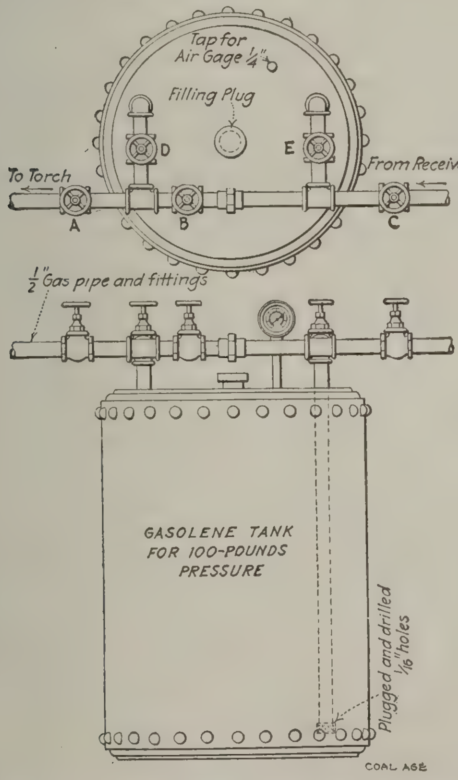
Removing Steel Tires from Mine-Motor Wheels

When tires must be removed from the ordinary mine locomotive, the usual custom is to heap coals of fire over the entire wheel until the desired degree of heat is obtained, then remove the wheel, cool the central portion, or all parts but the tire, then pull the latter off. This process is both slow and expensive, and frequently results in breakage of the cast portion of the wheel, since the spokes cool much more rapidly than either hub or rim.



The Gasoline Tank and Its Connections

While superintendent at the Tennessee State Coal Mine, the writer installed the apparatus here described to facilitate the removal of tires.

A Westinghouse locomotive air compressor was purchased and bolted to two 6x12-in. upright posts, located in the boiler house. This machine required but little space, being only 30 in. high, and 14 in. wide. An old boiler 30 in. in diameter and 7 ft. high was used as an air receiver, and connected by 1½-in. pipe to the compressor. A suitable air-pressure gage and safety valve were provided and installed upon this improvised receiver.

The air was conducted to the mine a distance of about 1200 ft. by 1-in. wrought-iron pipe. This was connected to a gasoline tank as shown in the accompanying drawing.

A torch was then made by bending a ½-in. pipe in a circle, the internal diameter of which was about 2 in. larger than the outside diameters of the tires to be handled. The ends of this circular pipe were then connected by means of a tee, provided with right- and left-hand threads on the run. Into the outlet of the tee a piece of pipe, about 5 ft. long, was screwed, this connected to a hose which in turn was joined to the gasoline tank.

The inner side of the circular torch was drilled with $\frac{1}{32}$-in. holes spaced 1½-in. centers. In order to keep the blast uniform, however, those holes which were located diametrically opposite the tee were drilled slightly larger than $\frac{1}{32}$ inch.

The method of operation was as follows:

The gasoline tank was placed at least 40 ft. from the locomotive wheel, and connected upon the inlet side to the air line from the main air receiver. The highly inflammable gasoline is thus removed 40 ft. from the flames. The discharge pipe is then connected to the torch. After all pipe fittings and connections have been made, the receiver is filled with as much gasoline as is necessary to do the work, ordinarily about three gallons. After this is done, the compressor is started and valves marked *C* and *E* are opened, until a pressure of between 35 and 40 lb. is registered by the pressure gage attached to the gasoline tank. Valve *E* is then almost entirely closed, being left but slightly open. Valve *A* is then opened fully, and valve *B* slightly opened. Valves *A* and *D* are then so adjusted that a mixture of air and gasoline is caused to flow through the pipe to the torch. This adjustment should be such as to secure a continuous blue flame.

The air used in the gasoline tank should be as dry as possible in order to keep water out of the fuel. Filling the reservoir about two-thirds full of excelsior will help to remove moisture from the air and adds materially to the work of the same.

In shutting down the apparatus in order to prevent a back suction, which is liable to blow up the reservoir, valve *A* should first be entirely closed. Valve *C* is placed in the line so that connection can be cut from the main receiver in case of trouble at that point. After the torch is burning properly, it only requires a few minutes' heating before the tire is ready to remove. Generally speaking, 40 or 50 tons is sufficient to take off a tire. This method, therefore, which is comparatively inexpensive to install, is much more efficient in every way than that of the old open fire.

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A German method of reducing coal dust at working faces is to force water by means of high pressure into the coal through drill holes, thus wetting the coal, which reduces the amount of dust produced. It also helps to bring down the coal. This method gives best results in longwall mining, but can also be used in wide rooms

Selection of Coke Samples for Analyses

By Fred C. Keighley*

SYNOPSIS—Most of the phosphorus trouble that occurs in the manufacture of coke can be avoided if proper methods of sampling are followed. Several instances are cited from practical experience.

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The sampling and analysis of coke have always been a source of much annoyance and uncertainty to the coke manufacturers and I imagine to the iron smelter as well; in fact, it has often been the cause of much bad feeling between the manufacturer of coke and the consumer of the same, not to mention the proneness to profanity of the parties involved in the controversies arising from the amazing seeming impossibility of getting two sets of analyses to be on terms of equality with each other.

To the average coke maker it seems to be the height of absurdity and unreasonableness on the part of the iron smelter to turn down said coke maker's coke on account of one- or two-thousandths of 1 per cent. of phosphorus, when said coke was first class in every other respect and acknowledged to be so by the iron smelter. The coke maker would say, "But the chemist gets different results and the one-hundredth part of a gnat's heel that you are kicking about does not exist," and so the arguments pro and con can proceed *ad infinitum*, much to the disgust of the participants.

I have been connected with coking coal and coke manufacturing operations in one capacity and another for over 30 years, and nothing ever caused a sinking of my heart and the changing of my complexion as much as that term phosphorus when it appeared in my morning's mail. It is a fact that I once lost a good position by reason of a difference of opinion as to the cause of the phosphorus barometer or constituent taking a trip of a couple of one-thousandths of 1 per cent. in altitude.

How I Lost My Job

My superior officer said one day: "The phosphorus in your coke is positively abominable," and I heartily agreed with him, but when he further remarked that I was the cause of such misbehavior on the part of the coke that I was producing, my temperature went up in an alarming degree and the atmosphere in that neighborhood immediately assumed a bluish aspect that smacked more of sulphur fumes than phosphorus. We stormed at one another by mail and the upshot of that correspondence was that I suggested that he take his coke works to a certain very warm climate, but he decided that it was a much simpler proposition to induce me to seek a cooler place which I did with great promptness.

The facts in the case were that the plant I had charge of at the particular time referred to had in its youth discreetly managed to keep a little shy of 0.02. Then it suddenly got to flirting with 0.022, with a further occasional looping-the-loop with the naughty shades of 0.03.

The figure 0.02 is the upper limit of decorum in bessemer coke etiquette, and flirting with fractions of thousandths of 1 per cent. above that is simply scandalous in a high degree. At the time I refer to, the superintendent of a coke works did not know what the constituents of the coal he daily produced were. All he knew was that the resulting coke had a good behavior record, an indifferent one or a vile one, as the case might be. Such a thing as sampling coke and coal regularly was considered a piece of extravagance not to be tolerated for one moment. The iron smelter was the fellow to cut such capers as that and even he only did it when his furnace got the stomach trouble and the gastric juices were unfavorable for the delivery of the correct thing at the hearth of the furnace.

Phosphorus Was Due to a Fault

To make a long story short, it was discovered some months after my leaving the works in question, that a very large fault crossed the coal field operated on and the high phosphorus contents of the coal were in some way due to the near presence of that fault. Many of us have more or less phosphorus troubles even now, in spite of the better facilities afforded to the coke manufacturers to ascertain the chemical constituents of not only the coke, but the coal. With large coke producers it is now customary to have a chemist to look after troubles of this kind and thus assist the management in keeping tab on that very mysterious element, phosphorus.

No chemist, no matter how skillful he may be, or how great his experience might have been, can lay his finger on phosphorus, and tell you where it came from and what to do with it; however, he does know where it invariably goes when it gets associated with the contents of a blast furnace. There is as yet no known way of reducing or driving off phoshorus in either the coal or the coke and about the only thing that can be done is to sample both coal and coke regularly and carefully and have the same analyzed as regularly and carefully by a competent chemist. This, as before stated, is the practice of uptodate coke-makers, and the same will apply equally to the iron-smelting management.

There will be a difference between the findings of the different chemists of given samples, but with care the phosphorus determination should not be more than one- to three-thousandths per cent. apart. After much thinking, some trying experiences and just a little "cussing," I have about come to the conclusion that where the chemists are so far apart in their determinations of the phosphorus constituent of the coke or coal as the case may be, that in all probability the method of sampling and the preparation of the same have a great deal to do with the difficulty referred to.

A short time ago my attention was called to the fact that a certain heretofore low-phosphorus coke was changing its complexion. I could not believe this at first, but, as you no doubt know, these chemists have such a persuasive way about them that I was compelled to sit up and take notice. Remembering my experience in the past as cited to you in the other paragraphs of this paper, I advised the parties interested to go after the coal, and the result was that in a certain section of the mine where the pillars were being taken out, the coal upon analyses ran up to 0.077 in phosphorus, which would be equivaent to 0.115 in coke. A short distance away from the point just named going westward the phosphorus showing was 0.040 to 0.060 in the coke equivalent. It would be as well to remember that the phosphorus showing in a given sample of coke is generally about one-half higher than that shown by the coal analysis.

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*General superintendent, Oliver & Snyder Steel Co., Oliver, Penn.

Note—Paper read before Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4, 1913.

Phosphorus Decreased as We Went Westward

The culprit having been caught, as it were, at the fountain head, a series of samples were taken on a westward course, and this resulted in getting results as given by the following figures. These figures stand in the order of the sampling as it proceeded westward: 0.032, 0.029, 0.021, 0.021, 0.012, 0.011, 0.011, 0.010, 0.009, 0.009, 0.008, 0.006, 0.006, 0.006, 0.005.

I have not been able to figure out just what law this diminution of the phosphorus contents in coal works under, but it certainly was a godsend to the parties to discover that the high-phosphorus coal existed only in a small portion of the mine territory, yet the results of the coke analyses were not entirely satisfactory, at least not as good as a small quantity of high-phosphorus coal output would indicate. In view of this fact the next thing to be done was to follow up the coke problem.

When this difficulty first appeared, samples were taken from the coke cars as follows: A typical piece was taken at one end of the coke car, one was taken from the middle and a third from the remaining end of the car while the same was in process of being unloaded. This, of course, meant three samples from each car and made quite a bulky pile when any considerable number of cars were sampled. The samples gotten in this way were gathered up and reduced by hand to a general sample. This did not bring the expected results. Full-length samples were then taken from every oven at three different points and again reduced to general samples. Still there was trouble.

Finally, at the suggestion of a chemist of well known ability and experience, samples were taken at several points in each oven, such points being designated on a blueprint showing a horizontal section of the whole oven, such section being divided into three concentric circles of equal area and samples taken in such number and at such points as to give a fairly accurate sampling of the whole of the output of the ovens under observation and consideration. This was the best method of all but still things did not seem to "gee" just as they should.

At this stage, it was apparent that the method of gathering up and the division of the samples for procuring a general sample of the coke was largely responsible for the difficulty, and I intimated this to said chemist. He came to my aid again and suggested that a "Chipmunk Crusher" might be a good thing to get and use in connection with the sampling of coke. Such a crusher was installed, and the results were of a most encouraging character; in fact, the crusher nearly eliminated the trouble.

In conclusion, I will say that there are still some features bobbing up occasionally that furnish food for reflection, but I believe there is not the slightest doubt that the bulk of the phosphorus trouble in question came through the poor methods of sampling and the lack of knowledge as to the best method to be adopted in that connection.

This paper is not intended to be final, but rather is written with a view to open up an intelligent discussion as to what can be laid down in the way of a method of procedure that will attain or reach the best possible practice along the lines of coke sampling and the preparation of same for the chemist's work, which is certainly of the greatest importance to both coke producers and iron smelters.

Perhaps it would be as well to state that this paper was written principally from a bessemer-coke standpoint, i.e., on coke that was intended to be used in connection with the bessemer process of refining iron. In the case of iron smelting that later on is to be refined by basic process, phosphorus is not nearly so serious a question, as that element is taken care of in the openhearth furnace; however, there is a limit to the percentage of phosphorus that can be tolerated even there.

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A Portable Sheave for a Gravity Plane

One of the most interesting applications of the gravity plane is to the lowering of ore and the hoisting of empty skips in the stopes of the North Star mine, Grass Valley, Calif. It may well be recommended for use in coal mines where the rooms are steep. At the same time, where the grade is not too heavy for standard cars and where the inclination is not so steep but that a car can be fully loaded, the methods should be modified so that cars instead of being dumped at a battery may be run out onto the heading. The gold-ore vein at the North Star mine lies at 23 deg. to the horizontal. The head sheave, says L. O. Kellogg, in the *Engineering and Mining Journal*, has three pulleys, as illustrated in Figs. 1 and 2.

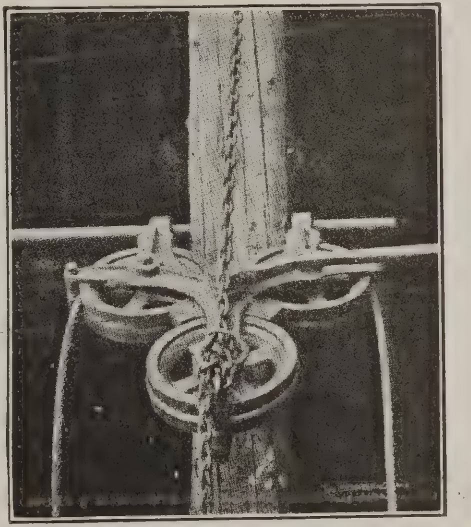
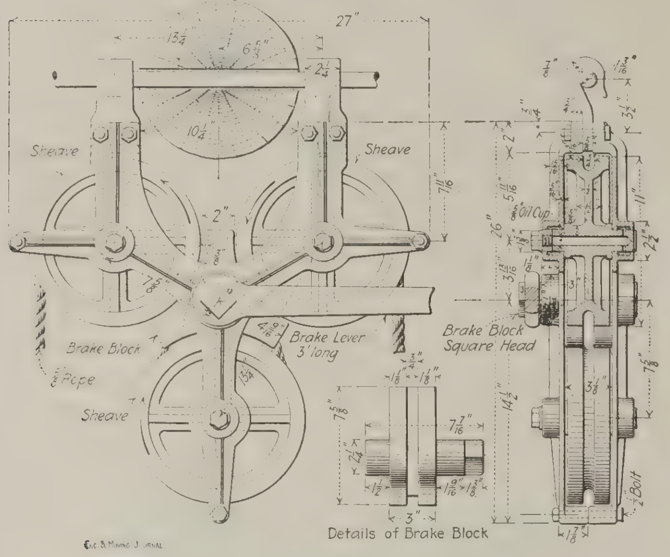


Fig. 1. Go-Devil Head Sheave in Position on Post

The rope passes up on the outside of the outer pulleys, down the inside through grooves in the brake block and around the lower edge of the third pulley. The brake block is triangular, pivots about its center in between the three pulleys and is operated by a handle attached to the square head shown. It is brought to bear on all three pulleys and thus gives a strong braking effect. Passing around all three, with a large angle of contact on each, the rope has no opportunity to slip.

The brake lever can be locked in position by extending the handle with a piece of pipe and by connecting the end of this to a lever with a ratchet lock set on a stout post. The two halves of the triangular spider-frame, the three pulleys and the brake block make six castings entering into the device, besides the bolt, nuts and handle. The manner of suspending the block by a chain and a bolt through the post is shown in Fig. 1.

A ⅝-in. steel-wire rope is used and is attached by means of a safety hook. As there is only one car weighing about 3000 lb. on the down grade, and, as much energy is lost in the unavoidable friction in the head block, the gravity plane or "go devil" as it is called, will not operate below a 5-deg. slope and with difficulty below a 10-deg. When a 35-deg. inclination is reached, the operation of the plane is difficult and sometimes dangerous.



Eng. & Mining Journal

FIG. 2. TRIPLE-SHEAVE HEAD BLOCK FOR GO-DEVIL GRAVITY PLANE

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Coal and the Panama Canal

Under the above caption, *The Iron and Coal Trade Review* (London, England), says editorially in its issue of Nov. 7, as follows:

> News comes to hand from the United States that American coal producers and manufacturers are laying ambitious plans for the extension of their export trade in view of the imminent opening of the Panama Canal. It is stated that several companies, formed with that end in view, have now been organized and have secured depots on the Gulf, and the Central and South American coasts for the purpose not only of supplying bunkers to ships but also of sending coal inland.
>
> We are told, too, that lines of steamships, some units of which are being built in this country, are being formed specially to meet the expansion in trade which the Canal is expected to bring about, and also that arrangements are being made to secure return cargoes. It seems probable that some such preparations may be in progress, but whether they are on the stupendous scale outlined in the advices from across the Atlantic is another story.
>
> There can be no doubt, of course, that the opening of the Canal, providing us as it does with a new and most important trade route, offers great business possibilities so far as the bunkering trade is concerned, and in view of their geographical advantage the coal producers of the United States will probably absorb most of it. It remains to be seen how much shipping will be diverted from Suez to the new route. That will depend in some measure upon the prices charged for American coals at Panama.
>
> A statement is made to the effect that the United States Government proposes to supply best quality steams at about $4.55 per ton at either end of the Canal, which is about $2.40 less than the f.o.b. price of Durham unscreened bunkers at Port Said. No official announcement on the subject appears to have been made, however, and it has also to be remembered that every vessel passing through the Panama Canal will not necessarily bunker there any more than every vessel passing through the Suez Canal bunkers in that locality.
>
> **Possible Changes in Trade**
>
> Beyond the bunkering business it is difficult to see how the opening of the Panama Canal will benefit the American or injure the British coal trade to any great extent. It will not alter our position with regard to the Atlantic States, to which the great bulk of our South American coal exports is shipped. The Pacific Coast of South America will certainly be more vulnerable to American attack, but our exports to those markets are not very large and, moreover, British firms have secured an excellent footing there; on the confession of the accredited Consular representatives of the United States in the countries in question, it will be difficult to shake our hold on these markets.
>
> It is easy, therefore, to exaggerate the consequences of the opening of the Panama Canal so far as our coal trade is concerned, and we feel sure that British exporters having connections with markets likely to be affected at all are fully alive to possible dangers and are taking steps accordingly. In his paper on the Panama Canal, read before the British Association, Professor Kirkaldy seemed to suggest that it might enable the United States to displace British coal throughout the world, and he urged both the capital and laborer interested to forget internal causes of difference and to unite against the common enemy.
>
> This certainly appears to be an entirely alarmist view of the situation. For some years past now our American friends have been paying more attention to their coal-shipping trade, which, while still small as compared with our own, has increased rapidly of late. It is certain that they are not likely to miss any fresh opportunities which the opening of the Canal may afford them, but why this impending event, important as it is, should deliver a mortal blow to the British coal-shipping trade, we cannot conceive. It is better to be warned, however, even in exaggerated terms, than to remain over-confident when a wealthy and enterprising rival is in the field and it will be well to keep an eye upon the activities of our American competitors.

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Bureau of Mines Appropriations

The estimates of appropriations for the United States Bureau of Mines, for the fiscal year ending June 30, 1915, as approved by Secretary Lane, of the Interior Department, have just been forwarded to Congress.

The estimates are as follows:

For general expenses of the Bureau of Mines, $70,000.

For investigating mine accidents, $347,000.

For the equipment of mine-rescue cars and stations, $30,000.

Equipment of testing plant at Pittsburgh, Penn., $10,000.

For testing fuels, $135,000.

For mineral-mining investigations, $120,000.

For inquiries and investigations of petroleum and natural gas, $30,000.

For inspection of mines in Alaska, $7000.

For books and publications, $2000.

For lands, leases, etc., for mine-rescue cars, $1000.

The total for the Bureau of Mines is $752,000, an increase over the fiscal year ending June 30, 1914, of $90,000.

The item of $30,000 for equipment of rescue cars and stations is for the first time placed separately in the estimates and represents an increase.

The $10,000 asked for the equipment of the testing plant is a new item. The money is needed for the purchase of steam and electric equipment. The estimates set forth that the present power- and electric-service plant at the experiment station is on the eve of breakdown.

Some Notes on the Selling Price of Coal

By R. A. Colter*

YNOPSIS—A discussion of this important question long original lines. The author points out the low earnngs realized in the coal business and states that steps nust be taken to obtain a better profit. A closer coöperaion between the operating and selling departments is esential. Also a more careful study of costs.

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It is my intention to discuss the selling price of coal vith regards to what relation it bears to the cost of proluction and how and by whom it is fixed. Wonderful rogress has been made in the way of ascertaining definite nd accurate costs of production; in the mining field this as resulted, in some cases, in the reduction of costs, but n most instances an increase, on account of the more cientific methods of mining and the safeguarding of life nd property.

Often where this scientific analysis of cost indicates an ncrease, it is probably more imaginary than real for the eason that the coal had been actually costing what the nalysis showed and the producer had previously been aboring under a misapprehension. Therefore, when he wakens to the fact that the margin between the actual ost and the selling price had been greatly overestimated, e immediately wants more money for his product.

Fixing the Selling Price

Answering the query—What should be the relation of he selling price to the cost, I would say: The selling rice should be:

The Cost of Production
Plus
A Reasonable Charge for the Money Invested and Risk Involved
Plus
The Cost of Selling.

Assuming, of course, that the producer has an average plant, with no extraordinary features, no excessively expensive or elaborate equipment or administrative quarters, is cost is upon an equality with his neighbors and competitors, at least in his own field. His money is no better nd worth no more, his risk is equal but no greater, and he proper returns upon his investment is easily established.

The cost of selling depends upon the method. It is not my intention to discuss this question, although allusion may be made later to it, but it is worthy of the same careful research as the cost of production and might well be more definitely known. In answering the question of the relation of the selling price, we have, it seems, described how it should be made and are now ready to determine by whom it should be made.

The responsibility for the low returns in the past cannot be entirely shifted to the shoulders of the selling agent, whether or not he be a producer as well, for the ignorance of the cost on the part of the producer has often misled the selling agent. But we see improvement in this direction by the closer relations between the producer and seller. There was a time when it was only necessary to learn at what price a certain grade of coal was being put into a certain market; that figure was then met or cut, as the case might be, the freight deducted and the balance was the price of the coal. In more remote instances, the process was reversed; the delivered price was made in the same manner but the operator was paid the least he would take for his coal and the railroad took the balance for the freight.

Coöperation between Producer and Seller

This condition having either corrected itself or killed itself, there sprang up another in its stead. The seller appeared who dealt only with tonnage and whose only thought was to move enormous quantities, his interest being solely in the commissions involved or earned, and not how much could be obtained for the coal.

This can only be corrected by coöperation between the producer and the seller by which they are brought to see that their interests are not separate and antagonistic but mutual and interdependent. The two branches, producing and selling, are distinct and the one requires quite as much business acumen and integrity as the other but they can and must be harmonized.

Thus far we have discussed the selling price of coal upon the basis of fixed charges and have not taken into consideration any contingencies that might arise, such as the demand, abnormal market conditions, terms of delivery and payment, all of which affect the selling price to a greater or less extent. A shipper not long ago, during a conversation, remarked, "There is no such thing as a market price, it is simply what you can get for it." This is in a large measure true, but if one is imbued with a knowledge of what one's commodity costs, how it is prepared and under what conditions it is produced—he is more likely to get more for it than he would otherwise.

The fact that a gas coal from another field is being sold in a certain market at what would be a low price for another coal of the same kind does not necessarily warrant the owner of the second lot in meeting that price; instead he should endeavor to find another market which will bring a reasonable figure.

The present knowledge of accurate costs on the part of the producers was not attained in a single day and not without many conferences and much interchange of thought and ideas. This has in some measure been reflected in a more equitable selling price, but it will require considerably more work on the part of both the producer and the distributor to educate the buying and consuming public to the readjustment of prices which is bound to come about soon.

The innovations and reforms in mining and producing coal are not accomplished without some opposition from those whose cherished ideas and pet theories are upset. Neither can the reforms in the handling and selling be accomplished without a frank discussion of the ignorance, errors and abuses attendant upon that branch of the business.

Having assumed that the producer has an accurate cost of production for a start, the question of a reasonable return on the capital involved is next in order. The figures compiled by the Federal Government place the average returns of all mines in the United States for the year 1909 at 3 per cent. on the capital invested, the coke-making mines of Pennsylvania and the Connellsville district being the only exception, these showing returns of over 6 per cent.

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*Secretary and treasurer, the C. G. Blake Co., Cincinnati, Ohio.

Note—Paper read before the winter meeting of the West Virginia Mining Institute at Charleston, W. Va., Dec. 8-10.

The coke-making mines of West Virginia showing returns of 3.5 per cent. and the others a deficit.

The three leading coal-producing states are Pennsylvania, West Virginia and Illinois. These show returns as follows: Pennsylvania, 4.6 per cent.; West Virginia, deficit of 0.9 per cent.; Illinois, 1.7 per cent.

Does this not show conclusively the necessity for figuring on a larger percentage on the investment than has been the custom?

Notes on Selling

As to the cost of selling, this varies according to the volume and method of marketing. While it is a profitable field for discussion, I think there is much misapprehension on the part of the producer as to the actual cost of doing business these days. Especially is this true where the territory is of unlimited proportions, this being partly brought about by numerous inquiries during an active market from more or less unreliable parties, many whom have only desk room in some large jobbing center with little or no financial responsibility. Flattering promises lead the unthinking operator to imagine that his entire product can be sold without any effort. These undersirables are only heard from during active periods, while the legitimate sales agent is hard at work the year round to keep your plant in operation and at the same time maintain the market, which is no small job, I assure you, and worthy of the best efforts of any man.

Then the matter of terms is important. The measure of a tradesman's profit is determined by the time required for the turnover of his stock. If everyone's terms were identical, say, 30 days net, it would be a simple matter, but when we consider that the interest for 60 days at 6 per cent., is from 1c. per ton on $1 coal to 2c. per ton on $2 coal, it can be readily seen how much of the selling price is lost in extra time given buyers.

It is indeed unfortunate that the Federal Government having done so much toward educating the producer to the true value of his property, the scientific compilation of his costs and the safeguarding of life and property, has not been as zealous and active in teaching and helping him to secure a reasonable return for his product. The day of segregated individualism has passed and we have entered upon an era of collective effort which, rightly directed, will redound to the benefit of all. While I am not a prophet, I believe that in the not far distant future there will be a radical change in the attitude of our Federal Government toward the securing of a reasonable return for the product of our mines.

Manufacture and Character of Basic Coke

By J. R. Campbell*

SYNOPSIS—Basic coke cannot be made in beehive ovens as the temperature is insufficient. It can be manufactured in byproduct ovens but only one-third of the original sulphur is converted into calcium sulphide. However, by the addition of lime to coal in the oven to make basic coke, some of the volatile sulphur is retained in the fuel which would otherwise be expelled. As the sulphide is not incapable of reduction in the blast furnace, there is no assurance that basic coke is desirable. Its chief value seems to be that coals which will not fuse into reliable coke can be made to agglomerate with slag as a binder as a result of the addition of a large percentage of lime.

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Sulphur in coke is almost wholly present as sulphide of iron (FeS), or perhaps more properly speaking as the magnetic sulphide (Fe_7S_8) and as such it readily dissolves in the iron during the smelting process, unless it is carried into the slag by the use of suitable fluxes. In blast-furnace practice, limestone, which is charged with the ore and coke, slags this sulphur impurity as well as performs other functions.

It is generally believed that the sulphur, in whatsoever form it is introduced into the furnace, is transformed into calcium sulphide (CaS) at high temperatures and, by virtue of its lighter specific gravity, floats off with the slag instead of dissolving in the metal. From this belief is deduced the well known axiom of the furnaceman: "A hot furnace makes iron, which is low in sulphur and high in silicon and a cold furnace makes high-sulphur and low-silicon iron," which is true, unless the furnace is run hot and limy when both sulphur and silicon will be low.

Why Coke Should Not Have over One per Cent. of Sulphur

In passing it may be remarked that the chief source of sulphur in blast-furnace operation is the coke; hence it is easy to understand why the furnaceman always has his "weather-eye" open for the sulphur content of the fuel, especially if it runs over 1 per cent. The average coke operator knows what it means to try to pacify an irate furnaceman if the coke plant has unfortunately shipped a few cars of coke above the prescribed limit in sulphur. Of course, up in the Connellsville region we would not like to be accused, nay, even suspected, of such a breach of metallurgical etiquette, where by repute we have the finest coking coal in the world.

This brings us to the question, "Why does the furnaceman object to more than 1 per cent. of sulphur in the coke?" For often the coal operator is apt to think that the ills of the furnaceman are largely imaginary, and that he is seeking to excuse himself by venting his spleen on the coke, but there is a valid reason why sulphur should not much exceed 1 per cent. if the furnace is to make good iron. Using round numbers, a ton of coke makes a ton of pig iron, and usually about a half ton of slag is produced in the process from which it is easily deduced that with a furnace working properly, the one-half ton of slag must carry all the sulphur in the ton of coke, that is, it must remove twice as much sulphur per ton as each ton of the coke contains.

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*Chief chemist, H. C. Frick Coke Co., Everson, Penn.

Slag Can Dissolve only 2 to 2½ per Cent. of Sulphur

Thus, if a 1 per cent. sulphur coke is used, the slag will have to carry about 2 per cent. to remove the sulphur completely from the iron. Now the practical limit of solubility of the sulphur in the slag is usually considered to be from 2 to 2½ per cent. In other words, unless the furnace is run very limy, which practice is more or less detrimental to the lining, we do not expect the slag to hold more than 2 to 2¼ per cent. sulphur. There are rare instances, however, where the slag has carried 2½ per cent. of sulphur or even more for a considerable length of time.

This limit to the solubility of sulphur in slag is the main reason why the furnaceman does not like his coke to contain much more than 1 per cent. of sulphur. Coke containing much more than 1¼ per cent. of that element has but little metallurgical value for the economical manufacture of low-sulphur iron.

The Attempt to Make Basic Coke Is Not New

In view of the foregoing, many attempts have been made to improve the chemical quality of coke from the sulphur standpoint during its manufacture. This paper concerns itself only with the addition of crushed limestone to the charge of coal or the formation of basic coke. The idea is old. Fulton tried it a number of years ago. I believe he mentions it in his book on "Coke." Lately the scheme has been revived, both here and abroad, the claim being made that the cause for past failure lay in the fact that the mixtures were not scientifically proportioned.

How the Limestone Required Is Calculated

According to the claims of these latest investigators, the limestone must be added in proportion to the ash in the coal to form a slag consisting of a monosilicate of lime. In other words, the limestone addition is calculated much after the manner of determining the burdening a furnace. The following table and example will show how this calculation is made:

TABLE FOR THE CALCULATION OF MONOSILICATES

1 part of SiO_2 combines with:		1 part of base combines with:	
1.0 SiO_2	1.86 CaO	1.0 CaO	0.535 SiO_2
1.0 SiO_2	1.33 MgO	1.0 MgO	0.750 SiO_2
1.0 SiO_2	1.14 Al_2O_3	1.0 Al_2O_3	0.873 SiO_2
1.0 SiO_2	2.40 FeO	1.0 FeO	0.416 SiO_2
1.0 SiO_2	1.77 Fe_2O_3	1.0 Fe_2O_3	0.562 SiO_2
1.0 SiO_2	2.36 MnO	1.0 MnO	0.422 SiO_2
1.0 SiO_2	1.91 Mn_3O_4	1.0 Mn_3O_4	0.524 SiO_2
1.0 SiO_2	7.43 PbO	1.0 PbO	0.134 SiO_2
1.0 SiO_2	3.32 $CaCO_3$		

The table shows in the second column the weight of the bases required to bind 1 part by weight of silica (SiO_2) as monosilicates. The fourth column shows the weight of silica (SiO_2) required to bind 1 part by weight of the various bases as monosilicates.

To calculate CaO as $CaCO_3$ multiply by 1.7857.

COAL ANALYSIS

	Per Cent.
Volatile matter	39.05
Fixed carbon	52.34
Ash	8.61
	100.00
Sulphur	2.09

COMPOSITION OF ASH

	Per Cent.
Silica	47.85
Iron oxide	15.84
Alumina	23.98
Lime	4.41
Magnesia	1.66
Sulphur	1.11
	94.85

4.41 of lime × 0.535 = 2.36 per cent. silica (SiO_2) taken care of by lime
1.66 of magnesia × 0.750 = 1.24 per cent. silica taken care of by magnesia

Total 3.60 per cent. silica taken care of by lime and magnesia

47.85—3.60 = 44.25 per cent. silica remaining to be taken care of
44.25 × 3.32 = 146.88 percentage of $CaCO_3$ needed for every unit of ash

$$\frac{146.88 \times 8.61}{100} = 12.65 \text{ per cent. } CaCO_3 \text{ or limestone needed to flux the ash.}$$

From the above, we calculate that 12½ per cent. of limestone, of good quality, is needed to flux the ash. It is the hope also that the sulphur in the coal will pass into the slag during the coking process. Both the coal and limestone must be crushed very fine. The coal should all practically pass a ⅛-in. screen, and the limestone, a 20-mesh screen. The mixture must be intimate and thorough.

Basic Coke in Beehive Ovens a Total Failure

The ash in the coal under test in beehive ovens ran about 8 per cent. The limestone additions were made gradually, as it was early discovered that the physical quality of the coke was impaired, it being soft and crumbling easily.

ANALYSIS OF BASIC COKE

Per Cent. Ash	Per Cent. Sulphur	Per Cent. Phosphorus	Per Cent. Lime in Ash	Per Cent. Sulphur in Ash	Per Cent. Limestone Added
13.93	0.882	0.008	1.65	0.264	3
15.85	0.918	0.010	4.18	0.537	5
19.17	0.878	0.008	5.72	0.594	7½
19.90	1.000	0.013	6.34	0.911	10
27.19	0.942	0.012	12.24	0.998	12½
25.90	1.015	0.010	12.13	1.002	15

ANALYSIS OF RUN-OF-MINE COKE

	Per Cent.
Volatile matter	0.75
Fixed carbon	87.07
Ash	12.18
Sulphur	0.891
Phosphorus	0.014

About 12½ per cent. of limestone was theoretically required to form the so called basic coke, but this high percentage rendered it practically worthless. Failure to secure high enough temperatures in the beehive process may be ascribed as the reason. It is an internal-combustion process and the large quantities of "black damp" (CO_2) given off by the decomposition of the limestone, seemed to smother the fire. In fact, the conclusion was reached that "basic coke" by the beehive process, was a total failure from the physical standpoint.

Basic Coke in Byproduct Ovens

More promise was held forth by the byproduct ovens, as it is a retort method, external heat being applied, but here, too, the claims for "basic coke" were not completely realized.

The temperature of the coking mass is not high enough, even in byproduct practice, to cause the sulphur to pass into calcium sulphide (CaS) during the coking process, as evidenced by the following data:

TEMPERATURES IN COKING MASS OVEN NO. 47 TEST NO. 1

Time	Hole No. 1 Deg. F.	Hole No. 2 Deg. F.	Hole No. 3 Deg. F.
5:30 p.m.	350	325	275
6:00 p.m.	200	225	200
6:30 p.m.	200	225	200
7:00 p.m.	200	270	250
8:00 p.m.	220	250	240
9:00 p.m.	230	260	250
10:00 p.m.	230	260	240
11:00 p.m.	240	280	240
12:00 m.	240	280	240
1:00 a.m.	280	290	250
2:00 a.m.	380	320	250
3:00 a.m.	690	360	290
4:00 a.m.	1220	420	380
5:00 a.m.	1300	720	620
6:00 a.m.	1360	1060	822
7:00 a.m.	1400	1120	880
8:00 a.m.	1580	1550	1510
9:00 a.m.	1700	1700	1680
10:00 a.m.	1770	1770	1770
11:00 a.m.	1920	1920	1950

TEMPERATURE AS PUSHED

Location	Pyrometer	Deg. Fahr.
Hole No. 1	Hoskins	1814
Hole No. 2	Hoskins	1814
Hole No. 3	Hoskins	1830
On the coke mass	Wanner	1938
On the oven walls	Wanner	1992
Flue on No. 46 (pusher side)	Wanner	2370
Flue on No. 48 (pusher side)	Wanner	2300

The study of the temperature chart is interesting. Hole No. 1, for the pyrometer, was located in the charge near the side wall, No. 3, in the center of the charge, and No. 2, at an intermediate point, all on a line at 45 deg. inclination to the axis of the door of the oven. The maximum temperature in the coking mass in good practice was about 1900 deg. F., and rather strange to say even at the beginning of the process it was about as hot in the middle as at the sides, yet raw coal would have appeared in the center had the coke been pushed ahead of time. The flues on either side showed a temperature of about 2400 deg. F.

Only One-Third of Original Sulphur Is Combined with Lime in Byproduct Basic Coke

The analyses of the coal used showed ash 8.61 per cent. and sulphur 2.09 per cent., and the composition of the ash showed that 12½ per cent. of limestone was necessary to form a flux. These detailed analyses have been given elsewhere.

Only one-third of the original sulphur in the regular coke is changed to calcium sulphide (CaS) in basic coke, in which form it is supposed to pass through the blast furnace unchanged and float off into the slag instead of passing into the pig as iron sulphide (FeS) does. This percentage is too small to have metallurgical significance.

Furthermore, the sulphur is higher in basic coke than in run-of-mine coke, due to the lime of the limestone taking on some of the otherwise volatile sulphur in the coal. It was supposed that the limestone would not be decomposed by the heat of the coking process until all of the volatile sulphur had been driven off, but practically this was not true.

Physical Properties of Basic Coke

Another of the claims for basic coke is that the physical quality is improved by the addition of limestone to the coking charge. Within certain limits this is true in byproduct coke—never in beehive coke. The improvement is due to the slag binder if the proper temperature is attained, otherwise the free lime, upon exposure to the air, slakes and causes the coke to crumble and fall apart.

COMPOSITION OF COKE

	Run-of-Mine Coke Per Cent.	Basic Coke Per Cent.
Volatile matter	0.90	2.34
Fixed carbon	85.51	72.70
Ash	13.59	24.96
	100.00	100.00
Sulphur	1.62	1.76

COMPOSITION OF THE ASH

	Run-of-Mine Coke Per Cent.	Basic Coke Per Cent.
Silica	46.87	24.06
Iron oxide	15.61	11.54
Alumina	24.12	9.93
Lime	4.21	48.00
Magnesia	1.41	1.15
Sulphur	0.86	0.61
Sulphur as	93.08	95.29
Calcium sulphide	trace	0.53

PHYSICAL TESTS OF BASIC COKE

	Run-of Mine Coke	Basic Coke—12½ Per Cent. Limestone
Shatter test	70.5 per cent.	31.9 per cent.
Porosity	38.8 per cent.	43.9 per cent.
Apparent sp. gr.	0.900	0.934
Real sp. gr.	1.470	1.666

The shatter test is the crucial determination. It is made according to the U. S. Government's specifications, that is, 4 drops of a given quantity of coke at a height of 6 ft. are made and then the broken coke is passed over a 2-in. screen. The percentage passing through is then determined. In the above examples, 70½ per cent. of run-of-mine coke and 31.9 per cent. of basic coke passed through the 2-in. screen. The latter figure is about standard for byproduct coke.

The Possible Advantages of Basic Coke

The porosity and the specific gravity of the basic coke are better than those values for the run-of-mine coke. In fact, we believe it is possible to take an inferior grade of coking coal, and, by the scientific use of crushed limestone in the byproduct process, make A-1 blast-furnace fuel, where otherwise a total failure would result. As before stated, this is due to the formation of a slag binder in the coke. Owing to the strength given by this binder, vast quantities of low-grade or semi-coking coals would be opened up for byproduct use. Whether or not "the game is worth the candle," at present is without the scope of this article.

There might be some advantage to the furnaceman in having limestone added to the coke instead of with it. There are also some natural advantages to the byproduct operator. The total ammonia yield would be increased by the addition of limestone to the coal, and the percentage of fixed ammonia decreased, which would lessen the work of the stills in the indirect or semi-direct processes.

Finally, the main aim in the search for basic coke has been to produce a slag in the fuel which will carry the sulphur with it. But even if this were possible during the coking process, it could not be safely assumed that the sulphur would not get into the iron in passing through the blast furnace just as it does now without the proper safeguards. In fact, we believe the old assumption that calcium sulphide passes through the blast furnace unchanged, is erroneous, and that it would avail nothing from the sulphur standpoint, to have basic coke. Calcium sulphide is stable only at high temperatures and in a reducing atmosphere. As the matter now stands, we think that the sulphur in basic coke would be acted upon by the iron ore in the top of the blast furnace and changed back into its original harmful form ready to be assimilated by the pig iron, unless slagged off as usual, due to the action of the metallic oxides on calcium sulphide (CaS) at comparatively low temperatures.

In view of the foregoing, we conclude: First, that basic coke, in the chemical sense, is not practically feasible, nor wholly desirable; secondly, in the physical sense, it has possibilities in utilizing low-grade semicoking coals for byproduct use.

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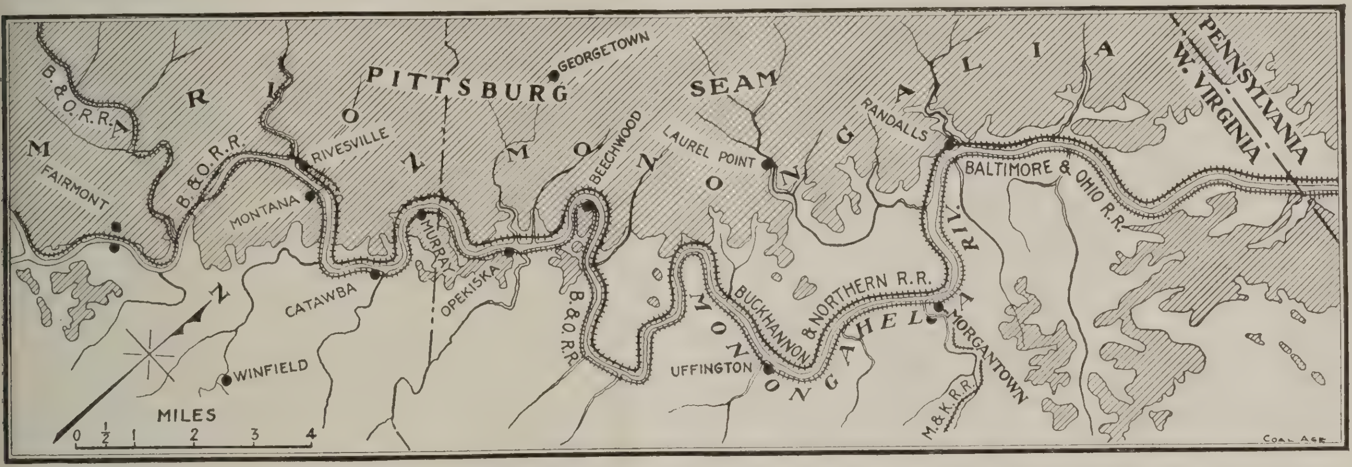
New Freight Rates in Kansas

The Kansas Utilities commission held hearings at Topeka, Kan., during the past week, regarding new freight rates for mine-run coal. This class, under present conditions, takes the lump-coal rate. Consumers advocated that mine-run coal take the slack rate. Operators are against the proposed change almost without exception. Should it be put into effect, slack would be a drug on the market, according to those in touch with the situation. The rate would apply only on shipments in Kansas, even if projected. The commission took the matter under advisement after hearing testimony from all sources and will not announce its decision for some time, according to present indications. Some of the Kansas operators who testified, asserted that the Southeastern Kansas coal field is waning fast. The maximum output, eight million tons annually, will be reached in five years, it was stated. About 6,700,000 tons were mined in 1912.

A New Coal Railroad

The Buckhannon & Northern R.R., now being constructed between Rivesville, W. Va. (five miles north of Fairmont) and the West Virginia-Pennsylvania line, will tap a large area of excellent Pittsburgh coal which has hitherto lain idle, because the Baltimore & Ohio R.R. by some mischance was built on the wrong side of the Monongahela River. As will be seen, without the building of expensive bridges, the road could not tap the Pittsburgh coal bed, except in insignificant areas near Montana, and Opekiska, where there are already mines owned by the Consolidation Coal Co. and the Pittsburg Steam Coal Co. The Upper Freeport and the Lower Kittanning coals can be found on the right or east bank of the river, but they have not been worked along the Baltimore & Ohio R.R. Consequently there is but little activity throughout Monongalia County. The building of the railroad will change this condition and bring a strong competitor into the field.

The Buckhannon & Northern R.R. is being built by the Little Kanawha Syndicate consisting of the Pittsburg & Lake Erie R.R. Co., the Pennsylvania Co., and the Baltimore & Ohio R.R. Co. It will connect at the southern end with the Baltimore & Ohio R.R. and at the northern junction with the Monongahela River R.R., which is owned jointly by the Pennsylvania R.R. Co. and the Pittsburgh & Lake Erie R.R. Co. Thus the coal will find an entry into Pittsburgh.



THE BUCKHANNON & NORTHERN R.R. WHICH WILL OPEN UP THE REGION NORTH OF FAIRMONT, W. VA.

The maximum grades are 0.15 per cent., and several miles are entirely level. The maximum curvature is 8 deg., and as there are only two curves of this sharpness, the maximum severity of curvature may later be reduced to 6 deg. The track is laid with 85-lb. rail, and the work is designed for the heaviest traffic. There are five steel bridges, one a viaduct, 274 ft. long, and another a crossing 290 ft. long, over Indian Creek, opposite Opekiska.

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A Large Modern Breaker

Work is progressing rapidly on the new Loomis colliery of the Delaware, Lackawanna & Western Coal Co., near Nanticoke. Over 40 of the 81 concrete footings for the new breaker are in position, and all the other buildings are practically completed. The hoisting engines at the two main shafts and at No. 1 slope are working, and the coal is being taken to the Bliss breaker, two miles away, for preparation.

The buildings of this colliery, all designed by F. J. Nies, the company's architect, will be the most modern and artistic of any in the anthracite region. They are all built of concrete and brick, except the breaker itself, and are all entirely fireproof. The breaker is to be of concrete up to the pocket line, and of steel and wire glass above. The output of the plant will be about 5000 to 6000 tons daily.

Along the north side of the hill, upon which the colliery is located, are the powder magazine, the wash house for the men, the model barn for the mules, the wire and cement house, the ice house, and the fan house with its two 20-ft. fans. In this building, also, is an air compressor with a capacity of 1500 cu.ft. per minute, which will be used for small hoists in the mines. Two more buildings on the north side of the hill are the supply house and the engine house for No. 1 slope. In the center are the two shaft engine houses. The main shafts at present are 930 ft. deep.

On the south side of the hill is the steam plant with its 135-ft. stack. There are shower baths for the firemen in this building, and blast fans for the furnaces in the basement. The power is now supplied by the temporary plant at the foot of the hill, but the large boiler house will be ready in December. At the foot of the hill also are two pretty double houses, concrete with covered pergolas in front, for the use of the mine foremen.

The breaker, which will also be along the south side of the hill, will be the third in the region to be entirely operated by electricity. The power will be supplied by the company's Nanticoke plant, which also supplies the power for the Truesdale breaker, about two miles away. The equipment of the Loomis breaker as to shakers, spiral separators, sorting tables, rolls and jigs will be modeled largely after that in the Truesdale breaker in that every unit of machinery will be operated by its individual motor.

There will be four shafts in all at this operation. The steel headframes, 80 ft. high, are in place over the two main shafts, each 50.4x14 ft., and these shafts are being operated. The shafts are equipped with gooseneck automatic dumping carriages, which dump the coal upon a bucket-type endless conveyor running from the mouth of the shafts to the breaker.

The third shaft is the old Dundee shaft, abandoned in 1851 on account of the gaseous nature of the mine and the lack of proper ventilating facilities at that time. Coal from this shaft was shipped by boat to Philadelphia. The shaft, which was 10x16 ft., has been filled up to get rid of the water in it, and a caisson will be sunk around it and the shaft enlarged to 14x20 ft. The old shaft was 810 ft. deep, and was sunk to the Ross vein. The fourth shaft will be sunk near the Nanticoke power plant, and the coal from all four will be run into the breaker through the conveyor line.

There are 1247 acres in the property, and the buildings with their fireproof construction, resemble a group of college buildings rather than those of a colliery.

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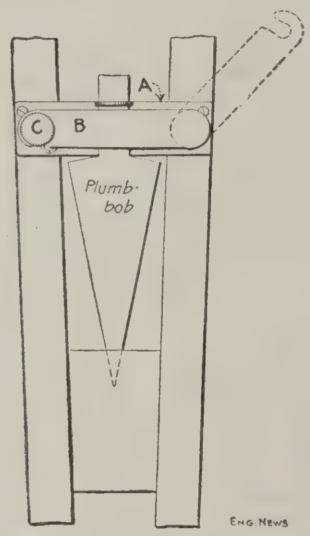
A Plumb-Bob Holder

An ingenious device for carrying a transit plumb-bob is described in a recent issue of *Engineering News* as follows:

> A plumb-bob holder attached to one leg of the transit tripod has been designed by a Canadian surveyor, as a remedy for the plumb-bob getting lost or punching holes in the transitman's pockets. The cut shows the device applied to a split-leg tripod. The point of the plumb-bob rests in a ¼-in. hole bored ½ in. deep in the spacing block of the leg, while its neck fits between two strips of brass. The inner strip, A, is secured by two screws. The outer strip B is hinged at one end, while the other end is notched to hook over a pin C. This pin is fitted as a clamp screw, so that by a slight turn of the milled head the plate is held firmly in place. Both plates are slightly bent at the middle so as to allow for the neck of the plumb-bob and the string which is wound around it.
>
> This contrivance is described in the 1913 "Proceedings" of the Dominion Land Surveyors Association, by F. H. Kitto, Director of Surveys, Dawson, Yukon Territory, Canada. He states that he uses this as the permanent receptacle for the plumb-bob, whether in the field or the office.



PLUMB-BOB HOLDER ON THE LEG OF A TRIPOD

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Vigilance and Co-operation as Factors of Safety

By W. E. Holland*

Believing that the following recommendations, recently made with a view to reducing the number of accidents, both fatal and nonfatal, occurring in the district, to a minimum, would be of value to all engaged in mining, I submit them for consideration and discussion.

The usual custom, at most of the mines operating in this vicinity at the present time, is for one or more company men to pass through the entries at the beginning of each shift, and examine the roof and take down any loose pieces of slate or rock that are found to be unsafe. While this is a good system, as far as it goes, I believe it can be improved. To my mind, the weakest point in the method is that no one is made responsible for any accident that may occur. It has been my chief endeavor to eliminate this weakness and make somebody clearly responsible for the safety of haulage roads and traveling ways throughout the mine.

For the toiler underground, surrounded as he is by dangers seen and unseen, there is never too much protection at the best; and whatever is worth doing in his behalf, is surely worth doing well. In order to reduce to a minimum the accidents that are of such common occurrence and which arise from incomplete or careless inspection or lack of care and caution on the part of the worker, every effort must be made to awaken both employer and employed to recognize their respective individual responsibilities. It is important that they should realize that they must meet on common ground and amalgamate their efforts to avoid the common mine accidents that are of almost daily occurrence.

Reporting Unsafe Conditions

The first recommendation of which I have spoken was to the effect that each company or operator appoint a competent, sober and reliable man, who should go on duty at night shift and make a rigid examination of all the entries and traveling ways throughout the mine. This examination should include the observing of all unsafe conditions of any nature whatsoever, giving particular attention to the security of the roof and coal; and the condition, amount and style of timbering.

The examiner should record in a book, carried for that purpose, each unsafe condition, describing its nature and location. A carbon copy of the report of each examination should be given to the day foreman, whose first duty would be to examine the report and remove or safeguard each of the dangers mentioned. When this has been done the report should be signed by the foreman and sent to the superintendent, for his information.

This system would not only make the mine foreman responsible for the condition of the mine each day; but it would keep the superintendent intelligently informed as to the dangers existing in the mine and would, besides, serve a good purpose as reference, in case of accident. The effect of thus fixing the responsibility for accident, upon each official charged with the work of inspecting the mine or removing the dangers found, would be to increase the degree of caution and efficiency of every mine official. Under such a system, many small details that were formerly disregarded would be given attention.

The second recommendation had reference to a useless practice that has, in the past, contributed so largely to the occurrence of avoidable accidents. I refer to the habit so prevalent among the men and boys employed in the mines, of visiting each other in their respective working places. Not only does this habit result in a loss of time to the workers and, to an extent, reduce the capacity of the mine for putting out coal; but there is a tendency, at such times, for idle loiterers to engage in practices that impair both health and morals. The visiting should be done at the evening fireside, when the day's work is ended.

It should be remembered, in this connection, that when an accident occurs to a man or boy who is out of his place, no one can be held accountable for the same; but the responsibility rests upon the individual alone. There are numerous instances of record where serious injury and even death have resulted from this practice. I would sugst that legislation along this line would help greatly to duce the number of avoidable accidents.

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*State mine inspector, District No. 1, Albia, Iowa.

The third and last recommendation was to the effect at any employee who knows of an existing danger, ther in his own or in another working place, or on the ad or traveling ways of the mine, shall at once notify e mine foreman, giving its nature and location. Every ine worker should feel his individual responsibility in is regard. The safety of the mine demands this hearty öperation on the part of every worker, in the effort remove every source of danger common to mining.

The old adage: "*Eternal vigilance is the price of fety,*" applies emphatically in coal mining. If there is e place more than another where vigilance is an eternal ecessity, it is in the dismal domain of darkness where e toiler daily and hourly courts disaster and death, order to provide the necessities and comforts of home nd life for those whom he loves and cherishes.

The point I desire to impress most strongly is that esponsibility for safety rests equally on every mine work-r, whether he be official, shifthand, miner or laborer. No ne is exempt, as far as his ability to observe and act ex-ends. Let anyone who enters the mine realize his individual responsibility for the promotion of safety.

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Michigan Mining Interests in Spitzbergen

The Arctic Coal Co., controlled by John M. Longyear, of Marquette, Mich., and associates, has in 1913 shipped 35,000 tons of coal from its mines in Spitzbergen, within the Arctic Circle. The coal has gone to continental ports. The company owns two steamers, one the "Kwasind," of 3800 tons burden, that regularly carries coal in the shipping season, the months of July, August and September, and the "William D. Monroe," a whaler that is used in transporting supplies, but it depends for most of the tonnage it needs on season charters.

It is 10 years since Longyear's attention was first directed to the coal resources of Spitzbergen, and the present stage of the Arctic company's enterprise represents eight years' continuous development, conducted on a constantly increasing scale.

Great sums of money have been spent in the field by Longyear and his associates, and the only returns so far have been the few cargoes sent to civilization. But the region possesses termendous resources in coal, and if all goes well the men interested in the Arctic company will be richly rewarded, both for their daring and the persistence of their efforts to have the international status of Spitzbergen satisfactorily determined.

The shipment of 38,000 tons of coal to southern ports this year was more than has been forwarded in any previous season and more, also, than will likely be forwarded next year, for the shipment was incidental to the development of the property. The stage of actual mining on a commercial basis has not yet been reached. However, the preliminary work has been well advanced and Longyear expects that the company's operations will soon be definitely determined. Much equipment will have to be installed before the property is in readiness for production on a large scale. The general manager is Scott Turner.

A deposit of more than 60,000,000 tons has been indicated by the operations to date. The mines are worked by 250 to 300 men, and, although the shipping season lasts but three months, mining is carried on throughout the year. The geological conditions place no bar on successful mining in the Spitzbergen fields. The beds are uniform to a surprising degree, running about 3½ ft. thick, and the mining problem is simple. The coal is undercut, and drops from the sandstone capping which overlies it. The sandstone makes a stable roof and has to be supported with comparatively little timbering. However, other conditions raise some question as to what part of the coal can be taken out.

The international phase of the matter is one that continues to give concern to the men interested in the company, for Spitzbergen remains No Man's land, and although the Arctic company holds title to its 170 square miles of land by purchase from a Norwegian company, by exploration and by possession, it is regarded as an interloper by the northern nations of Europe, and its rights may not be established without a fight.

In fact, the company's land has already been entered upon by a force of Russians, who have undertaken exploration and who have carried it forward sufficiently so that they have shipped a cargo of coal. What to do about these invaders is only one of the many problems that give concern to the officials of the Arctic company. There is a strong suspicion that they have pursued their course with the knowledge of the Russian government.

Norway has made several attempts to bring together representatives of eight leading nations in a conference in which steps will be taken to determine the status of Spitzbergen, but so far the conference has failed to eventuate. It seems impossible to agree on a time when all the powers are willing to settle down to the task of determining how Spitzbergen shall be governed, or what rights will be respected there.

Our Federal Government Has Given but Small Assurance of Protection

The officials of the Arctic Coal Co. have met with no more success obtaining satisfactory assurances about the backing it will get from the American state department than Norway has encountered in bringing the powers together to deal with the subject. In one of President Taft's messages reference was made to the anomalous condition existing in Spitzbergen, and the necessity of protecting American interests, but so far there has been no more definite declaration that Americans who have made investments in Spitzbergen will be protected by the Government in the final scramble for land and power.

That this is the case is not due to a lack of representations by officers of the company to the state department, but to the reluctance of the officials of that department to act finally on the matter. Longyear has frequently had the matter before the undersecretaries, and recently discussed it with Solicitor General Folk and other officials. This last interview gave Longyear considerable satisfaction and he is hopeful that steps will soon be taken to define the position of the American government in relation to Spitzbergen. With the Russians aggressively in possession of tracts of the company's land, and showing every evidence of a purpose to go ahead and mine coal, this naturally is a matter of great interest to the men who have staked so heavily on the exploitation of the Spitzbergen coal fields.—*Engineering and Mining Journal.*

Meeting of Coal Mining Institute of America

SYNOPSIS—The winter session of the institute was the most successful in its history, and the papers were all of unusual interest. The principal discussions were on the effect of adding foreign bodies to coal before coking, on profits of efficiency and their distribution, and on Rule 18 of the Pennsylvania State mine law.

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The meeting of the Coal Mining Institute of America was called to order by W. E. Fohl, president, at 10 a.m., on Dec. 4, in the assembly room of the Fort Pitt Hotel, Pittsburgh, Penn. The short initial session was entirely taken up by regular business of the less interesting kind. The president declared that he had no address to deliver, so the meeting was soon adjourned.

After lunch the assembly room filled to overflowing and several extra chairs had to be provided for the unusually large attendance. Harrington Emerson's address (see p. 886) entitled "Efficiency in Coal Mining," was most interesting, but perhaps the best feature of his part of the program was his reply to criticisms, in which he digressed slightly from bituminous coal mining in obtaining illustrations of his ideas.

The principal objections were to his argument that strikes are unnecessary, and to the practice of the efficiency experts in bringing all the pressure to bear on the employer and not on the employee. So long as the latter regarded efficiency as a means of making money for the operator, so long will he oppose it. As a matter of fact, the chief gainer in efficiency will be the workingman, but he must not claim the whole gain or there will be no inducement for the operator to sink his money in increased efficiency. On the whole, however, the differences of opinion were rather in expression and emphasis than in real essentials.

Other Speakers

Among those addressing the meeting were C. L. Clark, S. A. Taylor and Thomas L. Lewis, the latter being the ex-president of the United Mine Workers of America.

Clyde G. Brehm, electrician of the Oliver-Snyder Steel Co., Uniontown, Penn., then read his paper on "Safeguarding the Use of Electricity in Mines." This paper appeared in last week's issue of Coal Age. H. H. Clark responded in general approval of the paper. Jesse K. Johnston's paper, entitled "A Study of the Wages and Selling Price of Coal in the Pittsburgh District," will also appear in an early issue. It was exactly described in the title as the author made no attempt to analyze causes or to draw deductions.

After a few complimentary references to E. W. Parker's analysis of the conditions of the coal trade in the bituminous regions (made at the American Mining Congress), there was no further discussion of note. In apparent contradiction of A. J. Moorshead's dictum in Philadelphia, the coal operators did not "just like to talk about their troubles."

The institute banquet was also served in the assembly room. H. M. Wilson, engineer-in-charge of the Bureau of Mines, Pittsburgh, Penn., addressed the meeting on industrial safety. In his speech he claimed for the mining industry the honor of being the source of the widespread movement for the conservation of life. C. L. Fay then made a plea for subscribing memberships at five times the regular yearly rate and found several volunteers. Dr. W. J. Holland, director of the Carnegie Museum, who was erecting a diplodocus in Spain, was unable to be present. Thos. L. Lewis addressed the audience and made quite a favorable impression.

The Question Box

The question box was then opened by John I. Pratt, state mine inspector at Pittsburgh, the first question being: "Should rescue work after mine disasters be performed by men in the employ of the coal operators, or by specially trained corps maintained by the federal or state government? The answer is obvious enough. It would be unfortunate, indeed, if the whole burden of rescue were to be placed on any official body. However, the persons discussing the questions, including J. W. Paul, took up a larger view of the question and discussed the reasons for the continued existence of state and federal rescue corps and the matter of control. In brief it may be said he did not claim or desire any dominating authority for the federal corps. For further details reference may be made to an editorial in this issue on the National Mine Rescue Service. As the question box took up much time, the other questions were reserved for the following morning.

Which Race of People Is Most Subject to Accidents

The first question at the morning session was: "Are accidents more frequent among the foreigners from Italy, Hungary, Poland, etc., than among English-speaking people? As we hope to publish H. I. Smith's reply, it is enough to state that the figures of the West Virginia Department of Mines show the most meager variation between the death risks of natives and foreigners. Unfortunately, West Virginia is probably the only state publishing statistics of the nationality of living and uninjured miners, though nearly all states publish the nationality of those injured fatally or otherwise. Mr. Smith's figures were for one year only and some nationalities, notably the English, are not represented in proportion sufficient to give any exact determination.

The third question evidenced the conviction of the questioner, F. C. Keighley. It is stated as a declaration of principles. It had reference to the injustice of enforcing Rule No. 18 of the Mine Code without considering local conditions. Rule No. 18 refers to the driving of exploratory drill holes 3 ft. ahead of shot holes when approaching clay veins. The old law has the same provisions as the present, but by the omission of a preposition or so, and the change of punctuation, the provision has been totally changed so as to refer to all narrow workings instead of to clay veins in headings.

Exception Is Taken to Attorney General's Ruling

S. A. Taylor took exception to the attorney general's ruling in favor of a drastic interpretation of the law, and pointed out how the wording had been changed without the knowledge of anyone that a modification was intended. He believed the law as originally written was perfectly logical. Clay veins are frequently crevices filled with clay, which crevices extend from the Pittsburgh coal up o the Sewickley and Redstone measures. Large bodies of as are let loose when these crevices are uncovered, and t is best to let these stored-up bodies of gas loose by a mall hole where their escape can be observed and conrolled, rather than to let them be suddenly uncovered by heavy shot. The approach of a clay vein is easily foreasted for the coal gets hard and gnarly. It is wrong to ay the law would be a dead letter if it applied only to lay veins on the ground, and that it was only of force vhen the workings reached an indeterminable point, beause clay veins do give advance warning of their presnce.

F. C. Keighley then presented his case as against the state. His company had not definitely determined to drive up its rooms throughout the mines and let the pillars stand till later, but that was practically its present practice in places. The first recovery was only 15 per cent.; the other 85 per cent. might stay for five or ten years. The pillars left were 90 ft. wide. When he attempted to run crosscuts through these pillars after long exposure to the air on both sides, rule No. 18 was enforced against him. He regarded it an unfair provision. He had clay veins but they were not such as Mr. Taylor described. They were clay rolls in the floor, and they never cut the coal down to a thickness of less than two feet, and never had any leaders passing up to the top of the seam. They could not carry gas, therefore, from other beds.

Mr. Smith explained that the laws were not punctuated till printed in pamphlet form. The punctuation was then added by an editor. The legislature had nothing to do with periods, colons, semicolons and commas.

Election of Officers

Three other questions which were to have been discussed were ruled out by the chair for lack of time. The elections then took place, and the following were elected for the coming year:

President, J. K. Johnston, general mine superintendent of the Pittsburgh Plate Glass Co., Creighton, Penn.; 1st vice-president, W. Seddon, Brownsville, Penn.; 2nd vice-president, A. P. Cameron, superintendent of the Westmoreland Coal Co., Irwin, Penn.; 3rd vice-president, I. G. Roby, state mine inspector, of Uniontown, Penn.; secretary-treasurer, C. L. Fay, Wilkes-Barre, Penn.

G. A. Burrell then read a paper on the "Relative Effect on Men and Small Animals of Small Amounts of Carbon Monoxide." This will be reproduced in an early issue, so it is only necessary to say that Mr. Burrell's statement that opinions differed as to what were injurious doses of monoxide was fully borne out in the discussion. We hope some time that Mr. Burrell will answer W. J. Price's question as to the manner in which the Bureau compensates for the changes produced by a large animal or man on the percentage of vitiated air in the atmosphere of the test chamber. In some manner this question was overlooked.

Papers on Coke

The article on "Basic Coke" (see page 894), by J. R. Campbell, chief chemist of the H. C. Frick Coke Co., followed and was discussed after lunch, as was also the paper of F. C. Keighley on "What is the Proper Method of Sampling the Beehive Coke Oven for Analysis" (see page 890). It may be noted that by basic coke is meant coke in which the alkali bodies exceed the acid bodies in the coke substance. There is another definition used in the trade. This declares basic coke to be coke which is too high in phosphorus to be used in a bessemer converter. The name "high-phos coke" is sometimes used for fuel of this description.

Mesabi Ore Was Mixed with Powdered Coal, but Result Was a Failure

Mr. Keighley stated that he had mixed 10 per cent. of Mesabi ore with powdered coal and obtained a strong coke, closely resembling the ordinary run-of-mine variety, though it rusted somewhat badly when watered. The manufacturers wanted to offset the dustiness of the ore by introducing it into the furnace as part of the coke charge, but 10 per cent. was regarded as being too small a proportion so it was raised gradually to 20 per cent. The result was a failure, as the final product was a fluxed material of no possible value as coke. Later attempts were made to use breeze in the oven charge, but the results were not encouraging.

J. L. Sherrick declared that 2600 deg. of temperature were necessary for the lime to form a slag in the coke, and he could not see how that action could take place in the byproduct oven where the heat was insufficient. E. B. Wilson discussed the addition of sodium chloride to the coal. This, J. R. Campbell stated he had tested and was full of hope that it would solve the problem. However, as the product ammonium chloride instead of ammonia was formed, the indirect process of producing sulphate of ammonium had to be adopted. This made the addition of common salt to the coal undesirable.

E. W. Parker asked F. C. Keighley if the coal was crushed before coking in the Connellsville region, and the latter stated that one concern had crushed and washed its coal and found the percentage of sulphur increased over uncrushed and washed coal. They found they obtained better results by cracking the coal. By not producing so fine a powder, the flake "sulphur" could be separated. When crushed, this "sulphur" became fine and could not be removed from the coal. He believed this flake "sulphur" came from solutions which descended through the roof. It was his experience that coal was higher in sulphur when found under a sandstone roof, which is permeable, and lower in sulphur when under a close shale roof.

W. F. Elwood neither came nor sent his paper on "Stray Electric Currents," and the meeting proceeded to W. R. Crane's interesting address on the "Coal-Mining Fields and Transportation Problems in Alaska." The address on "Portable Electric Mine Lamps," by H. H. Clark, interested and pleased the audience, but did not draw out much discussion.

Finally with the nomination of a committee on electrical affairs to discuss the adoption of standards for electric mine lamps, the meeting closed. The committee thus formed consists of C. A. Means, electrical engineer to the Department of Mines; R. N. Hosler, chief engineer of the Rochester & Pittsburgh Coal & Iron Co., and H. T. Booker of Monongahela, Penn.

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Asphalt residue from petroleum and water-gas, tar and pitch in large percentages are the best briquette binders for lignites that are caked by fire. Starch, magnesia and sulphite liquor are the best for noncaking lignites. With grates constructed so as to hold the fire together, lignite briquettes without any binder give good results.

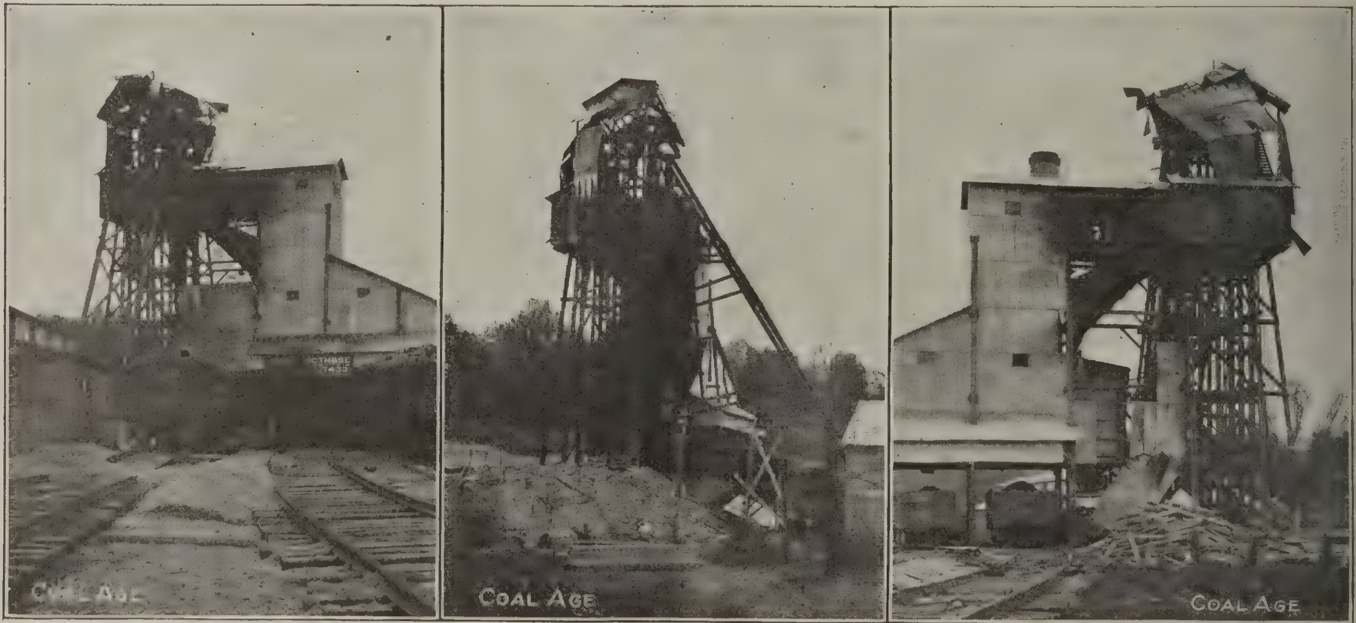
SNAP SHOTS IN COAL MINING

Shows Houses and Store of North East Coal Co., at Thealka, Ky.

Pumping Water Out of Crown Hill No. 1 Mine, at Clinton, Ind., with "Air Lift"

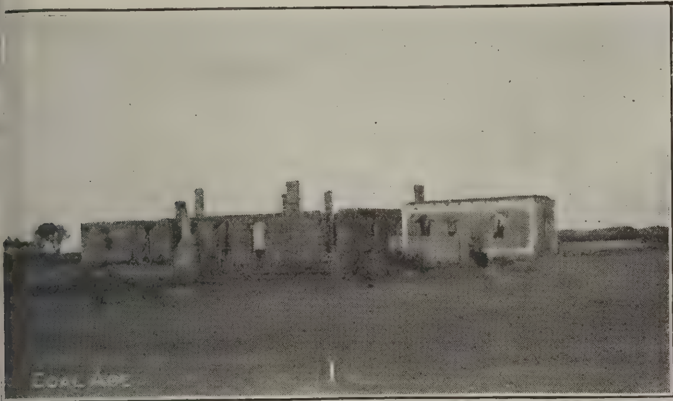
Steel Double-Track Incline, Connecting Tipple and Mines, Roden Coal Co., Marvel, Ala.

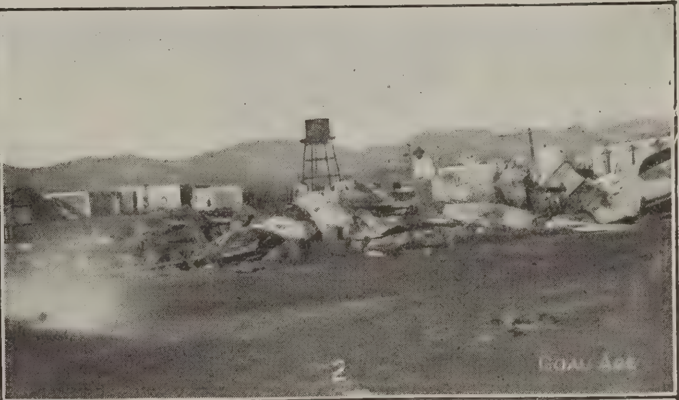
General View of Tipple, Power House and Washer of Roden Coal Co.

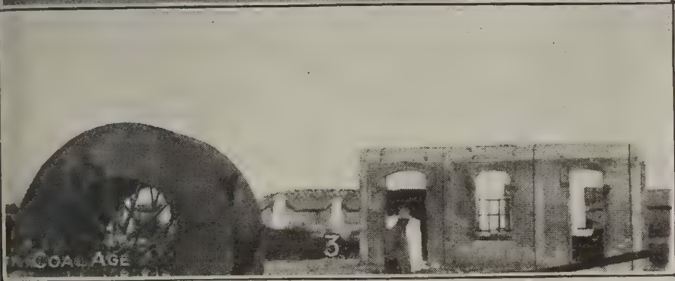


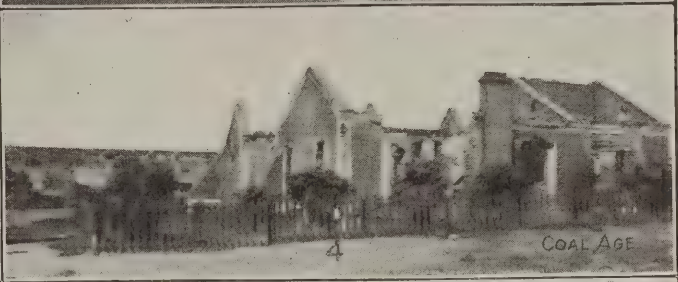
Shows Damage Done to Clovelley Tipple, Vigo County, Ind., by Explosion on Nov. 10

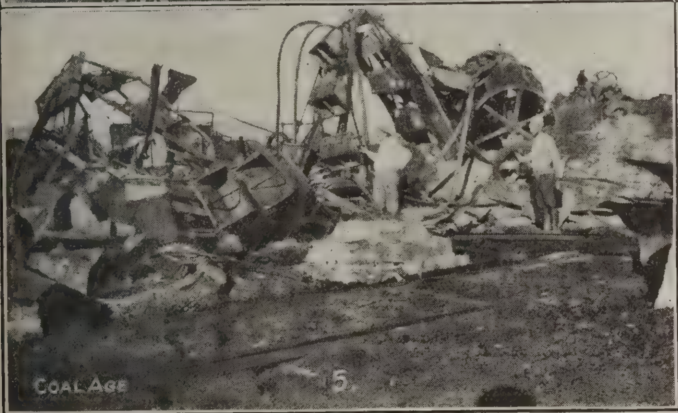
Coal Plants in Mexico Are Destroyed

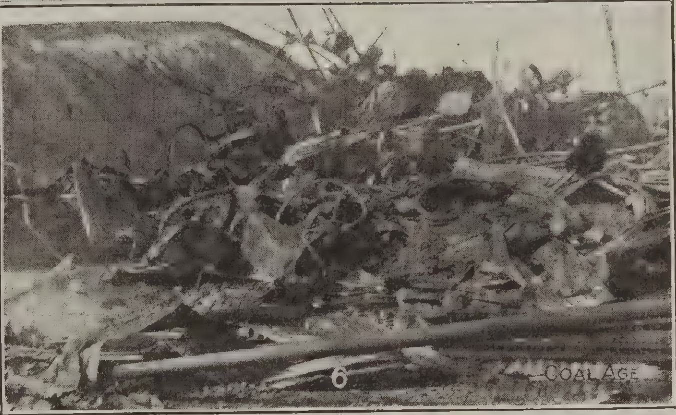


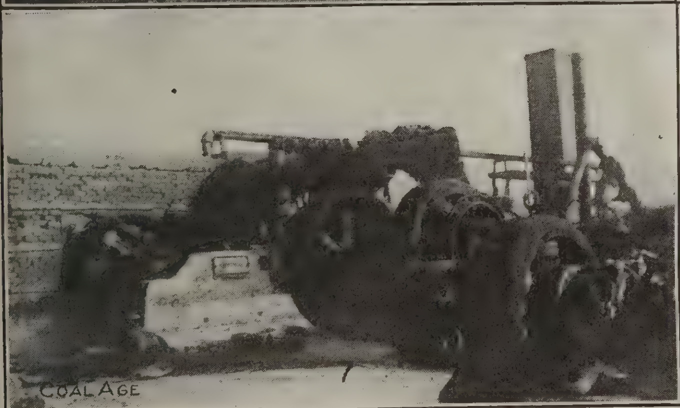


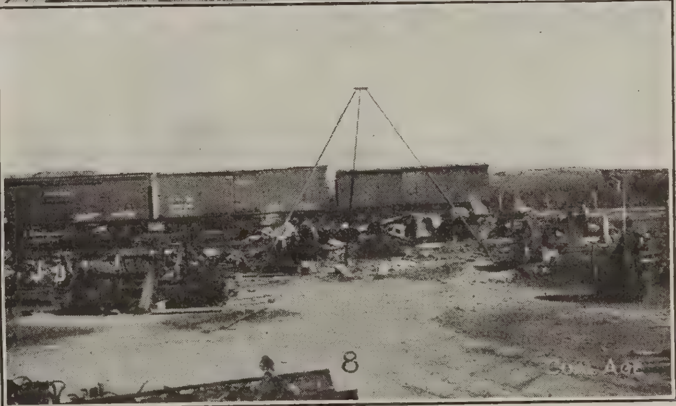












1. RUINS OF GENERAL COAL OFFICE AND MANAGER'S RESIDENCE AT LAMPACITOS.
3. WRECK OF FAN AND LAMP HOUSE AT MINE NO. 3, NEAR ROSITA.
5. THIS IS WHAT REMAINS OF THE LAMPACITOS COAL WASHER.
7. INTERIOR OF LAMPACITOS POWER HOUSE. ALL EQUIPMENT IN PLANT IS NOW A TOTAL LOSS. THE INSTALLATION INCLUDED TWO DIRECT-CONNECTED GENERATORS AND TWO BELTED SETS.
2. REMAINS OF LAMPACITOS WAREHOUSES, ETC., WITH RUINED BUILDINGS IN BACKGROUND.
4. CONDITION OF SOME OF THE EXECUTIVE BUILDINGS AT AGUJITA.
6. SHOWS WHAT REMAINS OF THE AGUJITA WASHER. THIS PROPERTY WAS DESTROYED BY REBELS. ALL WORK NOW SUSPENDED EXCEPT FANS AND PUMPS AT THE AGUJITA MINES.
8. WHAT REMAINS OF MACHINE SHOP AT CIA CARBONIFERA DE SABINAS ROSITA.

The Necessity of Organization

By Thomas L. Lewis

SYNOPSIS—Mine labor is about as efficient today as it was several years ago. By organization the miner has given stability to the industry. Disputes between operators and labor unions could be advantageously and peaceably settled and the operators otherwise greatly benefited if they were as strongly and thoroughly bound together as are the miners.

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I was much interested in the paper read by Mr. Emerson. To discuss every phase of this question would take more time than could be allotted to it this afternoon. There were so many facts stated in that address that every man in this audience, young and old, ought to be not only willing but anxious to express his opinion either for or against what was said.

I have no criticism to make of his position with reference to efficiency. If I were to presume to criticize any part of the address of Mr. Emerson it would be that part referring to the cost of producing a ton of coal. Not that the statements as made are incorrect, but a wrong impression will go out to the American people as to what it actually costs to produce a ton of coal in this country, and it will make it much more difficult to get a fair price for a unit of output.

The trouble with the coal industry is that fuel in this country is being produced at such a figure that at the present selling price the consumer is demanding that we give the product to him for nothing, notwithstanding the fact that we are exhausting a valuable resource. Nobody seems to be interested except to get a ton of coal at such a price that there is practically nothing in it for the producer. I know of a number of corporations in this country who are charged right and left with bleeding the public on the one hand and robbing the workingmen on the other, and yet, with the most efficient appliances they can get, they are on the verge of bankruptcy. This is the usual condition with coal companies.

Labor Is Not Much Changed

However, I am not going to agree with my friend on the left that the labor of today in the mines is much different from what it was 25 or 30 years ago. I worked in the mines 35 years ago, when the dominant, or the predominant mine workers were the British, the French and the German people. And when I say British, I mean the Irish, Scotch, English and Welsh. They in their line were neither better nor worse miners than those of today. It is now a question of having competent men, in most instances who know how to operate a machine to cut coal. At that time it required skill, muscle and brain power, because we had to mine it all, shear it and block it down without the use of an ounce of powder. But we have got away from that today. We now recognize that there is no necessity for that method. If proper time is taken and proper effort is made and intelligent methods used, we can produce a better grade of coal under our present system, with machine mining, than we could under the old system with pick mining, wedge and sledge.

I believe the gentleman on the right—and I am diverging now possibly from Mr. Emerson's paper—at least indirectly, where he takes the position that what we need today is to get to the operative. Rather get to the mine workers in this country. Let me ask you this: How much time is taken by the mine managements, by the operators, by the institutes of this character—and you are doing a splendid work—to impress the ideas that are brought forth here back upon the minds of the men who swing the pick and the shovel? How much space will the public press in the great city of Pittsburgh devote in the columns of their papers to the elaboration of the splendid ideas you men bring forth in this Institute? The chances are that tomorrow morning you will pick up a daily paper and see about two or three or maybe four inches of space buried back among the advertisements. Why? If we want to find out why we cannot make our people more efficient, more progressive, more determined to lift the coal industry to a higher standard, let us go back—and I am going to talk from an operating standpoint, though I am not an operator—and ask ourselves as operators how much time we have devoted to the work of efficiency as applied to getting to the mine workers?

That is where we are lost. We understand those questions here. We can discuss them here from our standpoint. We know what the remedy is. But there are nearly 800,000 mine workers in this country, of every nationality under the sun, who have not the faintest conception of what is meant by raising the standard of efficiency of labor. And we must reach those people.

Now as far as the nationality or class or kind of people is concerned, working in the mines, what do we find? Why has the Italian developed into an objectionable laborer in the mine? Not because he is any less strong than his fellow worker of some other nationality; not because he is not disposed to learn to swing a shovel just as quickly; not because of his inability to learn any other kind of work in and around a mine. But because by nature he is impulsive and much more easily appealed to through his prejudices and his passions than the other nationalities are. The result is that he is more apt to resort to things that we term un-American. They cannot conceive of a system where they ought to be subordinated to the will of law, where they ought to conform to our general ideas of Americanism, and the result is that in every industrial struggle in this country we find the Italian more apt to resort to the old Feudalistic system of force than to permit himself to be appealed to in reason or intelligence.

That is generally true of the Italian. It applies to certain other nationalities, though probably not to the same extent. And we find, as stated by Mr. Emerson, that strikes are a deplorable, and in my opinion a ridiculous, proposition. Why do we have strikes? On one side we have an organization of mine workers which has sought to improve the conditions of their membership. We find that by insisting upon being paid certain rates of wages for their labor they have given more or less stability to the coal industry. That is a matter that is subject to proof. Back in 1896 and 1897 the average operating company in this country was on the verge of bankruptcy; the average miner in this country was on the verge of

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Note—Impromptu address before Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4, 1913.

starvation, and when he worked steady every day he could not meet his honest obligations. Why? Because of a disorganized condition existing between the mine workers and the mine operators. A mine operator is not seriously opposed to his employees organizing, because he feels that it is going to help him. But the trouble has been that the operators have been inefficient in not learning the lesson of united effort. If they had learned that, they would have been organized all over this country and they would then have been in a position to say to the mine workers, "We will go along as far as it is right, just that far and no farther."

The Remedy for Petty Strikes Which Are Now Becoming Frequent

And we find another condition developing. The other condition is what I call stand-pat, local strikes in violation of contracts now in existence. Now what is the remedy for that? First it is up to you to get together and say, "If we are going to have contracts we are going to live up to them, and we are going to make the other fellow live up to them." It sounds harsh, but we live in an age of organization. Our very country is founded upon it, and we might as well attempt to empty the water out of the ocean into space as to try to disorganize any form of organization in this country.

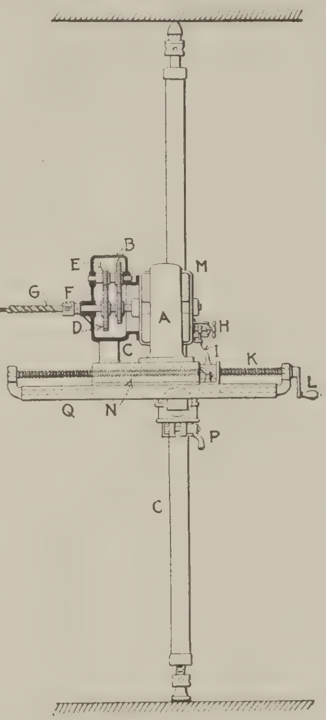
What we want to do is to make every mining organization a lawful and a legal organization, with a fixed purpose, and that fixed purpose the uplift of the mining industry. First, because we are selfish enough to believe that our own interest begins with the mining industry when we are connected with it, and then we are willing to help uplift the whole country. But with 750,000 miners, and, counting operators, mine bosses, fire bosses, weigh bosses, as well as the operating managers of the different corporations I would not be far wrong in saying at least 75,000 more, every one of them supposed to be an unusually intelligent man to hold his position, what influence do they wield? I know I am talking plainly, but that is my weakness. I realize that if the operators of this country will organize as they should do, you could begin talking efficiency with effectiveness. You could say to us fellows in joint convention, "We believe you are entitled to certain things for your labor, and we are entitled to certain considerations in the operating and developing of our properties and we are going to have them." Intelligence would compel both sides to come together on reasonable grounds, and I think strikes would be a thing of the past in the mining industry of this country.

I hope no one will take offense if I have been too plain spoken expressing these few rambling ideas. I always invite criticism of whatever I have to say myself, and I always reserve the right to criticize anyone else—not the individual, but his method of doing business and his action. At first I did not know that I was to have the privilege and the honor and pleasure of coming here and listening to a discussion on such a vital subject, especially to the coal industry. I am glad I was able to come, because I have learned a great deal and I expect to go away from here having learned a great deal more, even though my time is limited. And I want to thank the Institute, therefore, for the privilege and the honor of being permitted to address this assembly and express a few thoughts.

Recent German Drilling Practice

From an article on Prussian mining practice during the year 1912, in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," the following information is obtained:

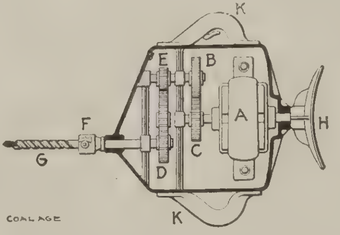
At the Bismarck mine of the Königsgrube in the Königshütte district, trials have been made with electrically driven column drills, as shown in Fig. 1. A three-phase-current motor *A* of one horsepower and 120 volts, drives, through the gearing *B, C, D, E,* the drilling head *F* in which is seated the twist drill *G*. By turning the handle *H,* which is seated on an eccentric shaft, through 180 deg. the feed nut *I* engages or is released from the feedscrew *K*. This screw is turned by the feed crank *L,* which causes the nut *I* to move the housing *M* forward or backward on the slide *N*. The drilling machine is mounted on a double-screw column *O* by clamp *P*. The drill entire was furnished by the Schlesische Gruben und Hüttenbedarf G. m. b. H., of Kattowitz, its price being about $600.



The Siemens-Schuckert Works build a machine resembling it which does not contain the slide *N*, but is equipped with a closed nut on the feedscrew and an automatic feed.

Electric Hand Drills

The experiments with the above machines have been successful, but the adoption of post electric drills has been limited by the new electric hand-drillers which have been placed on the market by the same firms. In these the design of which is fundamentally like that of the column machines, a three-phase motor of a half horsepower using current at 120 volts and 50 cycles is used. It operates through the gearing *B, C, D, E* and the boring head *F* in which is placed the twist drill *G,* Fig. 2. The drill is fed by the pressure of the workman against the breast plate *H* and the switch is placed in the handle of the machine *K*. The weight of the entire drill is about 24 lb.



Two Electric Drills in Use in German Mines

The output of a single machine in coal is equal to that of good hand-hammer drills. It turns out a coarse drill dust. This is an important matter because of the dangers of fine coal. A further advantage, particularly in pillar work, is the almost noiseless operation of the machine. Few repairs have been found necessary so far. As to the economy of the drills, a judgment can only be formed after longer service. It is, however, to be assumed that, in spite of their higher purchase price (which is with appurtenances about $225 each) they will be found cheaper in service than hand-hammer drills because it is less expensive to transmit electricity than compressed air and less power is required than with a pneumatic drill. The exhaust does not furnish ventilation and the drills are unsuited for operation in rock but otherwise they are as available for drilling as hand-hammer drills. They are being used successfully in other mines besides those named.

Winter Meeting of the West Virginia Coal Mining Institute

The meeting of the West Virginia Coal Mining Institute followed the schedule on Monday exactly, except in the matter of the address of Fred C. Keighley, who did not put in an appearance.

On Tuesday morning E. N. Zern made an excellent report on the membership of the institute and on the means whereby that membership can be increased. All the officers of the previous year were reëlected unanimously, which perhaps was unfortunate as one, J. F. Healy, has moved recently from Elkins, W. Va., to Utah.

The officers elected were: President, Neil Robinson, Charleston, W. Va.: Vice-presidents: George T. Watson, vice-president Consolidation Coal Co., Fairmont, W. Va.; John Laing, coal operator, Charleston, W. Va.; R. S. Ord, general manager, Elkhorn Coal & Coke Co., Maybeury, W. Va.: J. F. Healy, general manager, 1240 E. South Temple St., Salt Lake City, Utah.; J. C. McKinley, coal operator, Wheeling, W. Va.; secretary-treasurer, E. N. Zern, professor of mining engineering, Morgantown, W. Va.

Frank Haas was delayed by a freight wreck at Parkersburg, W. Va., and telegraphed that he could not arrive till 5 o'clock, and, therefore, would not come at all. His paper was not read.

J. W. Hunt read a paper on "Overcutting Machines," to replace an address on "Continuous Cutting Machines," by John S. Walker, Jr. This was followed by a discussion on mining education by I. D. Shaw, secretary of the Industrial Department of the International Committee of the Y. M. C. A., New York City.

In this discussion, D. C. Kennedy, E. B. Wilson, R. A. Colter, C. R. Jones, W. H. Grady, J. E. Beebe and R. D. Hall participated. The discussion covered every ground from most elementary education to preparatory teaching for mine foremen and firebosses. Mr. Jones spoke relative to the work of the University and his hope that it may be extended to the various mining towns. He also referred to the bill for congressional aid of mining schools, and in the afternoon a resolution strongly supporting this bill was unanimously adopted.

E. W. Parker suggested that Neil Robinson, who is also president of the West Virginia Coal Operators' Association, endeavor to interest them in the success of the institute. In the afternoon this was also made the subject of a resolution.

In the afternoon R. A. Colter read his paper on the "Selling Prices of Coal," and J. F. Callbreath, secretary-treasurer of the American Mining Congress, and Carl Scholz, president of the same and a former mine official in West Virginia, addressed the meeting on the purposes of the congress. An article on "Pocahontas Mining Methods" was then read by W. H. Grady, of Bluefield, W. Va. John Laing spoke on the Department of Mines.

The discussions, except during the morning session, were somewhat short. If greater encouragement had been given, more would have been said. In fact, several persons had prepared written discussions of Mr. Grady's paper, but were somewhat slow in rising to their feet. Neil Robinson's ability to say the right thing at the correct time with grace, clarity and force was generally remarked, but some wished that he had given a little more place to discussion. There is perhaps not a mining institute in the country with as accomplished a speaker as Neil Robinson occupying the position of president.

The Largest Mine Hoist in America

The North Butte Mining Co. recently awarded the contract for a new electric hoist to the Westinghouse Electric & Mfg. Co. This machine will be installed on the new Granite Mountain shaft of the above named company and it is believed that it will be the largest electric mine hoist in America.

The hoisting drums will be 12 ft. in diameter and direct connected to an electric motor driven from a motor-generator set at a speed of 71 r.p.m. The motor-generator set will be equipped with a 50-ton flywheel to secure elimination of the peak, incident to the period of starting and acceleration.

Skips will be hoisted, each containing 7 tons, by a rope 1⅝ in. in diameter, at a normal rope speed of 2700 ft. per min. with a maximum of 3000 ft. per min. The capacity of the hoist is such as to permit 300 tons per hour being raised from the 2000 ft. level or 200 tons per hour from the 4000-ft. level.

The motor will be of the type used in steel mills and will consequently be of extremely heavy construction. All the equipment has been designed with absolute reliability as the paramount consideration. A number of special safety devices are included in the equipment, among which are electrically released brakes, automatic slow-down devices to prevent the skip or cage ever going through the head sheaves and a special controller to limit the speed when hoisting men. The installation furthermore is so designed that the draft of power from the power line will be practically constant throughout any hoisting cycle.

The Production of the Mines

According to the figures prepared by the Geological Survey the total mineral production of the United States in 1912 aggregated $2,243,630,326, or about six times the value of the output in 1882. During that time the population has about doubled but the per capita output of the mines has increased from $7.27 to $23.47. Values of pig iron increased from $106,000,000 to $420,000,000; copper from $16,000,000 to $205,000,000; gold from $32,000,000 to $93,000,000; lead from $12,000,000 to $37,000,000; zinc from $146,000,000 to $650,000,000. The value of coal produced in 1912 was about double the total mineral output of 1882. In 1880 the average value of mineral products was about $1,000,000 a day, but in 1912 it was over $6,000,000 a day. The figures given are the latest official estimate issued by the survey.

EDITORIALS

The National Rescue Service

The problem arose in the question box at the recent session of the Coal Mining Institute of America whether the operator, the state inspectorate and rescue forces, or the federal rescue service should take the lead in mine disasters.

The members of the Bureau of Mines frankly admitted that the local forces had a considerable advantage over the corps of the government on their earlier arrival at the mine opening and in their greater knowledge of the conditions in the mines. This, of course, cannot be questioned, although a knowledge of the nature of the explosions occurring in other mines and of the tactics used in other places is no small advantage; for good generalship in war commonly exceeds in value any mere local knowledge of the roads, streams, hills and forage, in the tactical field.

Perhaps the most remarkable feature in the discussion was the readiness of both the state corps and the Federal Bureau of Mines to coöperate as to the need of indefinite continuation of official rescue work. Retirement from any line of effort is not a common practice of those who are employed by state and nation. Self-perpetuation is more usually the chief aim of such bodies, regardless of public advantage. We are glad that the Bureau of Mines and the Illinois officials are exceptions to that rule.

It was pointed out that the burden placed on the operators of Illinois, following the "Cherry" mine disaster had put them at a considerable disadvantage in respect to coal-mining corporations in competing states, and so the legislators, feeling that the discrimination arising from state lines would work undue hardship on the industry in Illinois, argued that, at least temporarily, it was well to relieve the operators in their state of the obvious necessity of providing rescue apparatus for mine recovery. That need will not be adequately met till there is rescue apparatus at every mine or group of mines.

The members felt that ultimately such protection would be demanded, and thought that the need of it was already powerfully exemplified by the fact that some of the operators were providing such apparatus and training stations at their mines before there was any legal compulsion.

Like them, we cannot but feel that the need for state or government stations, or both, will entirely pass away with the progress of corporational activity in this line. Even if every company should, at some future time, have its own corps or should participate in providing the services and equipment of some central rescue body, still there would be need for men of experience in actual rescue and fire-fighting work, just as there is need for a standing army in a nation, despite the readiness and eagerness of volunteers.

There is no lack of bravery among miners. That fact has been evidenced again and again, and perhaps it hardly needed the earnest expression of its truth delivered by E. W. Parker. Such appreciations are necessary, however, because the work of bravery should never pass without its laurel.

But in actual service, it has been observed occasionally, that the readiness of miners to jeopardize their lives, after disasters, was not always so evident when they were asked to depend on the mercies of a rescue apparatus, which perhaps they had never worn before or which they had never used in actual mine-rescue work. They prefer to face a greater certainty of death with the natural unencumbered use of their limbs and lungs. To recall an old story, they do not essay to go out to battle in armor they have never tried. Furthermore, it is better they should not if more experienced men are obtainable.

Many a mine explosion kills off most of the trained men and as the rescue work must be done either in apparatus or in fresh air, the miners usually declare for the latter. There is in some regions a preference for this fresh-air work, because in such localities, mine fires and secondary explosions do not usually supervene. However, in the greater part of the United States, the risk of adding to the death roll by these methods cannot be overlooked. The mysterious second explosion at Brookside shows that even in the anthracite region a violent explosion may follow the first blast, though it would be a mistake to declare, in view of the peculiar circumstances and undetermined causes, that this second disaster would not have occurred had the fan been stopped while an exploration was made by men with breathing apparatus.

Because of the frequency of second explosions, the advocates of fresh-air rescue work must expect their claims to be disputed and disproved in most of our coal districts.

That being so, before we desire to sweep away federal and state institutions for mine-rescue work, we shall have to assume that at all disasters, men will be found ready not only to enter the mines but to put on breathing apparatus. There will always be men at every mine who will take a chance to save a comrade, and this statement will apply without contradiction, to every body of mine workers from Pennsylvania to Oregon and from Illinois to Texas. However, it is a fact that at some disasters, the local rescue men begin to wonder, when the time comes, whether their apparatus is in perfect condition, and they are prone to doubt whether the natural respiration can be advantageously supplemented by a mechanical contrivance.

Wales has numberless brave men and it has several excellent rescue stations with automobile rescue trucks. Yet at Senghenydd, the rescue work was done in fresh air by men trained in the use of breathing appliances and by others. The apparatus was not worn, at least in the bulk of the recovery work, yet that mine was the logical place to use them for the coal caught fire in several places.

No second explosion resulted, such as occurred at the Cadeby Main colliery, but the risks were there and dangers are inseparable from such methods in mines which are gaseous, or where mine fires have been started and are ready to blaze up as soon as the air is renewed.

It is when there is a lack of local helmet men that regulars are needed who can rely on their breathing appliances, on their ability to wear them and who can be depended on to pass rightly on the condition of such apparatus as they find at the mine. As was remarked, "there is always a risk that some corporation driven by the law to buy appliances, will thrust them into some dark corner and leave them without proper attention, giving the men who should use them no training in their use."

This fact makes it probable that the rescue cars of state and nation are here to stay, though possibly they may in time serve only a secondary though quite a necessary line of defense.

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Market Charts

Many students of economics assert that the trend of business and industrial activity moves in certain prescribed cycles. They maintain that the pendulum swings from a high to a low point at more or less well defined intervals. If this be true in a general way, then the same principle is of interest when applied to the coal markets, which are subject to annual seasonal fluctuations.

With this thought in mind, Coal Age has devised a series of original charts for showing graphically, and at a glance, the exact status of the different conditions which combine to fix the market price of coal. The charts have been tested out for a number of months and have been so well received that it has been decided to increase their general scope and furnish those who are interested, with enlarged reproductions, suitable for wall charts.

There are three controlling influences which go to make the coal markets and for which exact and reliable figures are available. These are the temperature, the comparative price level, and the supply of railroad equipment. The last named condition enters into the problem only once during the year, as a rule; that is, in the fall, when forehanded consumers start laying in their winter's supply of coal and operations all over the country are being tuned up to full capacity.

Coincident with this condition of increased activity, the crop movement starts up in full blast and the railroads are soon facing the maximum load of the year. If, then, at this time of unusual transportation demands, a period of inclement weather sets in, interfering with the movement of trains, the situation often becomes acute and the market hinges entirely on car supply. To cover this phase closely, we publish a detailed statement of transportation conditions in all sections of the country, and also a chart which shows at a glance the exact condition of the gross car supply for the present year and the 12 months preceding. It should be noted in this connection that this is the only statement of this kind now published and confined entirely to the coal-car supply.

The close of the year of 1913 finds the coal trade facing what is commonly termed a "weather market." Complaints are general in all parts of the country regarding the abnormally mild temperature and, as a consequence, what had promised to be a buoyant fall trade, really developed into a situation where summer prices could scarcely be maintained. It might be argued in this connection that the difference in consumption between a severe and a mild winter is too meager to influence the market, and it is true that a competent authority in New York places the differential in consumption between a severe and easy winter at only 10 per cent.

However, it must be remembered that the difference is not only one of consumption, but of production and movement as well. Operations at the mines are often interfered with by adverse climatic conditions and, as is well known, the efficiency of the railroad service is always seriously crippled at such times, so that weather conditions become a prime factor in the situation. This is, therefore, an important consideration, and we are accordingly publishing charts, at intervals, showing the comparative mean weekly temperatures at three representative distributing centers, and three more will be added shortly.

The relative condition of the market as regards prices is also an important consideration when studying the current status of the trade. The competent sales agent, watching the trend of business closely, carries a well defined synopsis of the situation over the past year or two in his mind's eye, and is continually balancing present conditions against those in effect at the same time last year.

He knows that at a certain time in the fall, an advance in the prompt market may be reasonably expected and that a decline some time in the spring must inevitably follow. The exact time and range of these price variations are, as a rule, only vaguely fixed in his mind and are more or less subject to the vagaries of the human equation. To overcome this difficulty, we have compiled charts showing the comparative prices for the past two years, according to weekly quotations in Coal Age.

This data is of value principally in a comparative sense, and not for the actual figures quoted. Unlike other commodities, the price of coal is subject to so many varying conditions that no standard quotations are available, but the figures given are standard in a comparative sense, since they are quoted under indentically the same conditions and by the same men. We believe them to be representative of a conservative market in every sense of the word, since they are fixed in an entirely impartial and unbiased manner.

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The Scranton Situation

The present status of the mine-cave question in Scranton is proving no exception to the experience of the past, that time always temporizes men's feelings and hearts. Time amalgamates human interests.

The wisdom of the seeming indifference of the great coal corporations, whose capital and energy have coöperated to develop the natural resources of the city and its suburbs, is now beginning to appear to the progressive citizens of Scranton. The skies are brightening with the coming of the new year, which it is hoped will mark the dawn of a new era of prosperity for the anthracite city.

Mayor-elect Jermyn is a man whose precedents emiently qualify him to head the committee that will discuss with President Truesdale the interests of Scranton and her citizens.

Recent Legal Decisions

Assumption of Risk by Miner—A coal mine owner is not liable for injury to a miner caused by a falling rock, where the miner himself tested the rock before knocking a prop from under it, which action permitted it to fall. (Alabama Supreme Court, Adams vs. Corona Coal & Iron Co., 62 Southern Reporter 536.)

Avoidance of Settlement Made by Administrator—A settlement made by a miner's administrator of a claim of damages against the decendent's employer, arising from his death while at work, may be avoided by a beneficiary of the estate if it appears that the settlement was unfair (Kentucky Court of Appeals, New Bell Jellico Coal Company vs. Stewart's Administratrix, 159 Southwestern Reporter 962.)

When More Than One Certified Foreman Must Be Employed in Pennsylvania—The Pennsylvania Anthracite Mining Law requires a certified mine foreman to be placed in charge of each separate mine operated by a single company; it is not sufficient, when one company owns two disconnected mines, that an assistant foreman be placed in charge of one of them. (Pennsylvania Supreme Court, Janosky vs. Lehigh Valley Coal Co., 88 Atlantic Reporter 419.)

Employer's Liability—Measure of Damages—A miner injured while being lowered to his place of work, through a defect in the engine controlling movement of the cage, is entitled to recover such amount, as damages, as will presently compensate him for his past and future physical pain and loss of time, or diminished earning capacity, resulting from the accident. (Texas Court of Civil Appeals, Texas & Pacific Coal Co. vs. Choate, 159 Southwestern Reporter 1058.)

Accumulation of Coal on Track as "Dangerous Condition"—Accumulation of coal on a mine track, caused by its being raked off the cars on account of lowness of the roof of the entry, in such quantities as to cause derailment of the cars, is such "dangerous condition" as the law of Illinois requires the mine owner to guard against. Such law is not unconstitutional as constituting class legislation, since it applies to all mines similarly situated. (Illinois Supreme Court, Mengelkamp vs. Consolidated Coal Co., 102 Northeastern Reporter 756.)

Duty to Warn Mine Employee Against Danger—Although, in a suit against a coal company for injury to an employee, sustained while attending a winch wheel by having his arm caught between the wheel and a nearby steel bar, the question whether the employer was negligent in failing to give notice to the employee of the starting of the engine which operated the wheel is not to be determined by any custom of the employer to give or not to give such notice, it was not necessarily negligent to fail to give the notice, where the winch line was taut and the machinery was being operated; the injured employee not being a novice in the work. (Kentucky Court of Appeals, West Kentucky Coal Co. vs. Kelley, 159 Southwestern Reporter 1152.)

Responsibility for Company Physician's Negligence or Malpractice—Before a coal mining company will be held legally responsible for negligence or malpractice of a physician employed by it to treat its employees, it must appear that the company was negligent in selecting or retaining him. But if an employee has as full knowledge of the physician's incompetency as the employer and yet fails to complain against his retention by the company, the employee cannot recover against the employer on account of any damage resulting from negligent treatment at the doctor's hands. (West Virginia Supreme Court of Appeals, Guy vs. Lanark Fuel Co., 79 Southeastern Reporter 941.)

Liability for Injury to Miner—A verdict for $1250 was not excessive recovery against a coal mining company for physical suffering of a miner, preceding his death, resulting from his being crushed between a car on which he was riding and a prop set near the track, where the jury found that the company negligently failed to maintain the place in a reasonably safe condition. The jury were properly instructed that the company was not required to furnish an absolutely safe place of work, but that it was bound to use ordinary care to make the place reasonably safe; and that if the accident was caused by negligence in this respect, while the injured miner was in the exercise of ordinary care for his own safety, his administrator was entitled to recover (Kentucky Court of Appeals, West Kentucky Coal Company vs. Butler's Administrator, 159 Southwestern Reporter 958.)

Right to Enjoin Operation of Coal Washery—Suit will lie to enjoin operation of a business in such way as to injure the public health or comfort as where smoke or gas is emitted in offensive quantities. In determining what constitutes a nuisance of this kind, the particular surrounding circumstances must be taken into consideration, including the density of population, the character of the neighborhood as to occupancy for residential purposes, etc. But in this case, a suit to enjoin practices at defendant's coal washery, it was decided that the evidence was insufficient to show that a slack pile, smoldering from spontaneous combustion and emitting smoke and gas, constituted a nuisance, or that there was any public nuisance arising from the fact that water from the plant was cast into open drains. (Illinois Supreme Court, City of Pana vs. Central Washed Coal Co., 102 Northeastern Reporter 992.)

Illinois Safety Requirements—A miner who is injured while working under dangerous conditions, pursuant to orders from his superior, is entitled to recover the amount of his damage from his employer, if he used due care for his own safety, and the danger was not so obvious that a reasonable person would not have undertaken work in similar circumstances. Direction by an assistant mine manager, after inspecting a mine roof, to a miner to proceed with his work constitutes implied assurance that the roof is safe. The clause of the Illinois mining law which makes it unlawful for a miner to commence work without examining the roof over him, and until any dangerous condition has been obviated, except to make the place safe, applies only to miners who have fixed working places, and not to men who work all over the mine wherever fall of material from roofs may occur. (Illinois Supreme Court, Grannon vs. Douk Bros. Coal & Coke Co., 102 Northeastern Reporter 769.)

Railway Company's Liability for Failure to Furnish Cars—Although a statute in force in Kentucky requires railway companies to furnish cars to shippers on demand, the employees of a coal company cannot maintain suit to recover for loss of work, caused by a railway company's wrongful refusal to furnish cars to the coal company. (Kentucky Court of Appeals, Illinois Central Railroad Co. vs. Baker, 159 Southwestern Reporter 1169. The court said: "It may be true that this statute imposes upon the carrier the duty required for the benefit, in part, of the public, but the statute only becomes operative when some person having a contractual relation with the carrier has been injured by the breach of duty, and the right of recovery is confined to such person. In other words, the statutory duty, to be the basis of an action, under circumstances like those we are considering, must rest on a contract, expressed or implied, made between the complaining party and the carrier."

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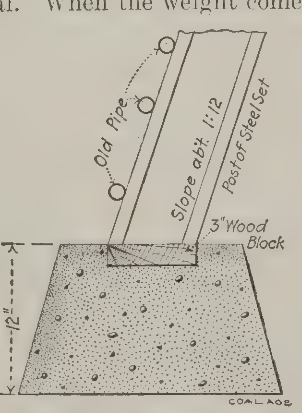
Some Susquehanna Methods

In using steel timber sets the Susquehanna Coal Co. at Nanticoke builds concrete bases for its posts but, in order not to render the support too unyielding, a wood block 3 in. thick is placed in the top of the concrete pedestal. When the weight comes on this wood filler it is often crushed till but 1 in. through. This takes up those changes in relative elevation of top and floor, which always take place on the commencement of mining. The lagging over and alongside the timber sets is usually of scrap pipe and when enough of this material is not obtainable, it is purchased elsewhere. Of course, this pipe lagging is supplemented in various ways by cross-lagging of rock or wood. The pressure is not sufficient to crush the pipe.



FOOTING FOR STEEL POST IN MINE SET

The Susquehanna Coal Co., on breasts at pitches varying from 10 deg. to 20 deg., is using concrete batteries built 2 ft. thick and 12 ft. wide, and they are giving perfect satisfaction. As a rule the breasts are only 4 yd. wide at the gangway and are not enlarged to 30 ft. till they are about 24 ft. long. But conditions are not quite uniform and some variation in practice is allowed.

DISCUSSION BY READERS

Working Coal under Sandstone Cover

Letter No. 4—I offer the following, in the hope that the suggestions may help W. N. Anderson and West Virginia Engineer, in the difficulties they described, Coal Age, Nov. 15, p. 745.

The chief difficulty seems to be that the pillars are not sufficiently thick to support the roof pressure and permit of a high percentage of extraction of the coal. I submit the accompanying sketch (Fig. 1), showing a section of the mine only. It may be assumed that all of the work inby on this pair of entries and to the rise of the same has been completed and the pillars drawn. The figure shows the work in progress of drawing back the pillars in rooms 5 to 9, inclusive; while room No. 4 is shown as being driven through the barrier pillar that separates the faces of these rooms from the air course above.

The plan is to drive each room, successively, through this pillar, and then start the work of drawing back the pillars from the lower rib of the air course. Before doing this, however, the upper block, in each pillar, which is 30x60 ft., is divided by driving a crosscut 10 ft. wide, through the center of the block. The upper and lower halves are then divided, in turn, by a similar heading, 12 ft. wide. The remaining four blocks into which the pillar is thus divided measure, each 9x25 ft. These smaller blocks are then taken out, in turn, starting at the upper inby corner. It may be necessary to stand props to prevent the falls from crowding the work on the pillars. This operation is repeated on each one of the blocks in succession, observing the precaution to keep the line of pillar work regular and to draw all timber so as to permit the roof to fall in the rear of the work.

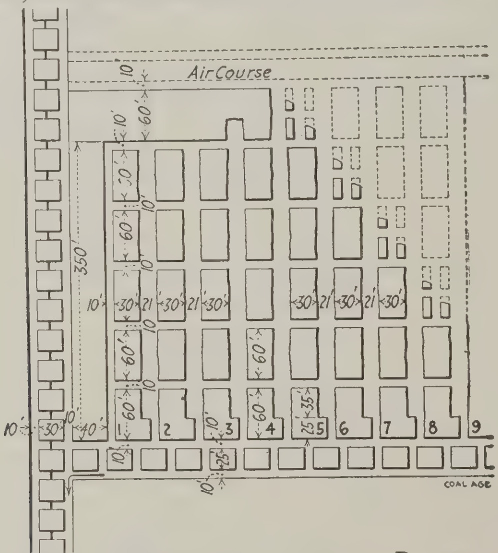


Fig. 1. Retreating Plan of Drawing Pillars and Barrier

In regard to the proposition stated by West Virginia Engineer, I would mine all coal by machines, provided the conditions permit. The rooms should be driven not more than 20 ft. wide to get the maximum amount of coal. These rooms should be driven on 80-ft. centers, so as to leave 60-ft. pillars between them, which should provide a sufficient support to prevent any heaving of the bottom.

In some instances, under similar conditions, the rooms are driven on 100-ft. centers, and the method has been working successfully for several years. From 95 to 96 per cent. of the coal is taken out. In any method of longwall, it is important to draw all timber, so as to allow the roof to settle uniformly on the gob. This applies, also, in drawing pillars in the room-and-pillar method. No stumps of coal must be left, to provide local surface support for buildings, as this is a false security and often results in greater damage than where all the coal is taken out.

William D. Roberts.

Rock Forge, W. Va.

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Letter No. 5—Referring to the inquiries of W. N. Anderson and West Virginia Engineer, Coal Age, Nov. 15, p. 745, in regard to working coal under sandstone roof with a soft bottom, I offer the following as being a good method to pursue in such a case:

Mr. Anderson states that the rooms are driven 21 ft. wide, with 30-ft. pillars between them, giving 51-ft. centers; and adds that the rooms are protected above by a 60-ft. barrier pillar, which separates them from the next pair of entries. It is my belief that the room pillars are too small and there is too much open work in this case. The bottom will heave in spite of anything that can be done to prevent it.

Under these conditions, I would suggest retimbering the first five rooms before starting the work of drawing back the pillars. A board or foot-piece should be used under, instead of a cap on top of each prop. This footboard should be 3 in. thick and 12 in. wide by 3 ft. long. Then, start drawing back the pillars in these five rooms; and when the work has advanced a good distance and the bottom begins to heave badly on the road draw or shoot all the timber possible, so as to start a good fall of roof behind, which will relieve the weight on the pillars. It is important, however, to continue timbering the rooms back toward the entry.

In the mine where I am now employed, we had the same trouble. The top was a heavy sandstone, while the coal was underlaid with 2 in. of slate and from 6 to 10 in. of coal. A portion of this mine was old workings that had been standing for a considerable length of time. I found that the only method was to produce a good fall of roof, to accomplish which I often had to shoot all the timber standing in the places. This gave good results.

I would suggest that Mr. Anderson's rooms be driven (Fig. 2) on 60-ft. centers with 40-ft. pillars, making the rooms from 18 to 20 ft. wide. It would be better to leave a barrier pillar of 150 ft. and drive the cross-entries on 75-ft. centers. These cross-entries should be driven 200 ft. before any rooms are turned. The rooms could then be driven 400 ft. deep without producing any undue pressure on the pillars.

I have used this system with good success. When the first two rooms have reachel the limit, I would pull the track in the first room and start drawing back the pillar through room No. 2, continuing this as far back as the first crosscut in the rooms. This first crosscut was made 100 ft. from the entry. Since the West Virginia mining law requires crosscuts to be made at distances not to exceed 80 ft. apart, it was necessary here to build square packs of slate and dirt in the first five rooms. Before the first fall of sandstone occurred, I had arranged an opening in room No. 1, so as to ventilate the falls and prevent any accumulation of gas above them.

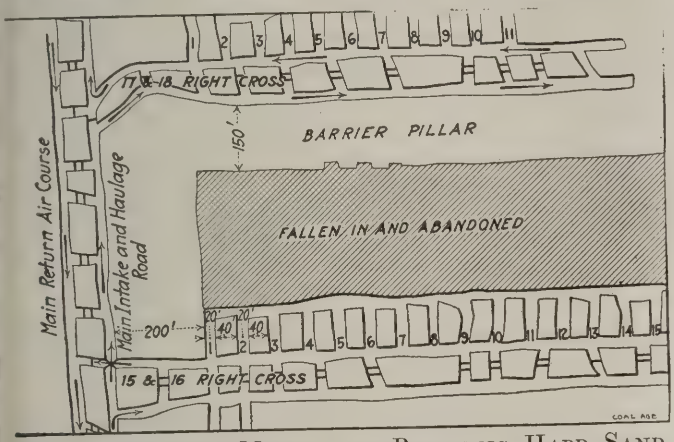

FIG. 2. PROPOSED METHOD OF BREAKING HARD SANDSTONE ROOF

In regard to drawing back the barrier pillars, it was necessary to drive an opening or room 30 ft. in advance of the rooms turned off the entries, through which the work of drawing back the barrier was started. The entry or chain pillar, and the room stumps up to the break line were all drawn back together. A great saving of material is effected by drawing the track in the rooms, as the falls occur, and using the same in the rooms being driven.

JAMES H. HUGHES, Mine Foreman,
The American Coal Co.

Mannering, W. Va.

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Letter No. 6—Replying to Mr. Anderson's inquiry, in regard to working coal under a sandstone cover, I want to say that it is important to break the roof in order to relieve the pressure of the overburden on the pillars. To do this (Fig. 4) I would double shift the entire line of pillars and draw these back as rapidly as possible for a distance of, say 150 ft. This should start a break in the sandstone, but if one does not occur in this distance, drillholes should be put up in the roof, in a line parallel to the face. These holes should be 10 ft. deep and spaced a distance of 20 ft. apart. The holes should be charged and fired by a battery when the men are out of the mine.

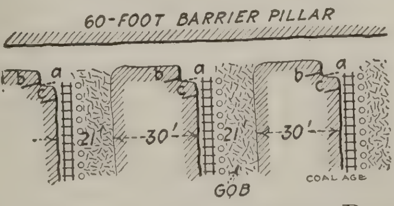

FIG. 3. METHOD OF EXTRACTING PILLARS

When a break is once started, there will be no further trouble, but it will be necessary to keep the pillar work in line with the break and to protect the men with a double row of timbers or cogs. In the accompanying sketch, I have shown a section of the pillar work, with a track laid across the rooms and a double row of posts. The track must be shifted back following the work on the pillars. Each line of timbers should be drawn regularly and a new row of posts set. The posts, or "cogs" if necessary, should be set on a pile of slack or slate, so as to enable them to be removed readily; but if these should become wedged too tightly, they must be blown out with dynamite.

H. GEDOSH.

Poteau, Okla.

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Letter No. 7—In reply to the question of Mr. Anderson, on drawing back pillars under sandstone cover, I wish to say that the best method to adopt will be to draw these pillars back in line with each other, for if this is not done, those pillars that fall behind the rest will be subjected to a greater pressure than the others, and the coal will be crushed.

In my opinion, the work of drawing back the pillars should have been commenced as soon as each room reached the limit, but always leaving a stump of sufficient size to protect the entry. The work on each pillar should be started by driving a crosscut at the face so as to leave a loose end. In Fig. 4, I have shown my plan of working the pillars in steps. I have used this method in drawing pillars in the lignite mines, at Alba, Texas, where I formerly worked.

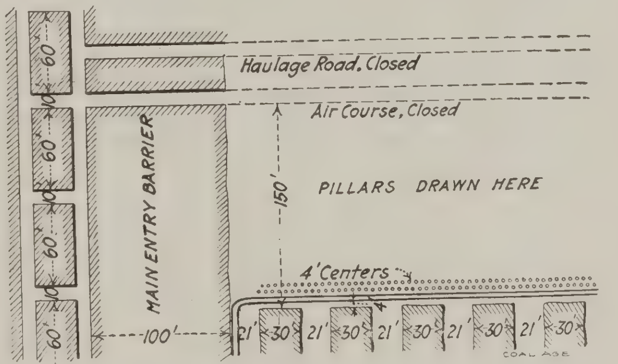

FIG. 4. PROPOSED METHOD OF DRAWING PILLARS

In this plan, the shot *a* was first put in on the rib, about 6 ft. from the end of the pillar. This shot blew off the corner of the pillar, as shown. A second shot *b* is then put in, which blows off another piece on this skip, and this is continued across the width of the pillar. The coal is taken out on the track which runs close to the straight rib of the room. If possible, another track might be laid up the other side of the pillar by clearing the gob. This, however, will often be impracticable, and the coal must be taken out on the single track, as just mentioned. A row of posts is now set across the face to protect the end of the pillar, and a second skip is started by placing a shot at *c*. The work is continued across the pillar, as before, the coal being cleaned up and taken out on the track, as mentioned. A second row of posts is now set across the face, after which the first row of posts may be removed.

If the roof does not break when the work has progressed a good distance, holes should be drilled in the roof and shots fired to start the break. In order to avoid the heaving of the bottom, larger pillars should have been left in the planning of this mine. It is best under such conditions to make the width of the pillar twice the width of the room.

Where the gob has not been filled tight to the roof. it may often be necessary to clear spaces at intervals in the gob and set heavy cribs or timbers to relieve the pressure on the pillars. If the roof coal has been left up in the first working it must be recovered when the props are knocked out or drawn.

JOSEPH JELINEK.

Newcastle, Texas.

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Education and Training of Mining Men

Letter No. 5—Referring to the letter of Samson Smith, COAL AGE, Nov. 15, p. 743, I believe with him that boys ought to be taken into the mines and given a practical training in the different branches of mining work. Before this can be done, however, the boys should have a thorough school education and possess a knowledge of mine gases, ventilation, electricity, compressed air, and the general principles of mining and mining machinery. Mr. Smith refers to the many Scotch and English miners who are now the best mine foremen in this country today and who went into the mines when they were boys; but he must remember that the conditions in England, in this respect, are quite different from our conditions here.

Everyone acquainted with mining in this country knows that shiploads of men who have never seen the inside of a mine are being landed in New York every week, and these men come in large numbers to the mining districts and are put to work in the mines. I believe I express the sentiments of most mine bosses when I say we are pleased to see them, as we can generally place them with one of their own countrymen who will look after them and give them what they are worth for a few months, or until such time as they learn to look after themselves.

Owing to the large numbers of this class of labor, it becomes the duty of every mine foreman to educate these men in the best way he knows how. Unless he can speak a half dozen different languages, however, he must give them the instruction they need through the miner who employs them. I have always had much sympathy for men who do not understand the language or what is expected of them in the mine; but I have found the best means of educating them is through kindness.

We must be practical in all of our suggestions. It is of no use to assume conditions that do not exist in the mine, and lay out a plan, which we will find on going into the mine in the morning cannot be put into practice because there are men there of all nationalities, creeds and degrees of intelligence. One might as well discharge a man at once as to ask him to work with another of a different nationality.

The suggestion made by Mine Inspector Nesbitt that instructors be employed to go around the mine and show these men how to take care of themselves, would no doubt be a paying investment in many large mines. The suggestion is worthless, however, in respect to a mine running on a small margin of, perhaps, a cent per ton.

The principle is generally recognized that the more intelligent and efficient a workman becomes, the greater benefit he is to himself and his employer. If a brattice is to be put up or a switch to be laid, the mine foreman generally picks out a good worker of less experience and sends him along with an experienced bratticeman or tracklayer to do the job. In this way, the new-comer gains his experience and becomes more valuable to himself and his employer; but it frequently happens that as soon as a man has received his training in this way, he overestimates his ability and looks for work elsewhere. It is much the same with a coal digger. A greenhorn comes from the old country, gets a little experience in the mine, and soon makes up his mind that the coal is a little softer or the roof better in another mine, and he is gone. I believe that kindness and sympathy will do more to win and hold these men than anything else, as by this means we gain their confidence.

THOMAS HOGARTH.

Heilwood, Penn.

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The Certificate Law

Letter No. 5—I have been interested in the discussion of the mine foreman's certificate, being made nation wide, as proposed by Mr. Dixon, COAL AGE, Oct. 25, p. 604. And I would like to say that I for one am entirely opposed to such a proposition.

Everyone who has been much around, knows the conditions are so varied that one examination can hardly cover the ground in a single state, and much less could it be made to meet the needs of different states. A man might successfully manage mines in some of the districts in this state, for example, and yet utterly fail in respect to safety in another state. Some mines have gas, dust, water, bad roof and dangerous quantities of blackdamp, while others have but one or two of these troubles to contend against, or perhaps are free from all of them.

Fancy a man, for instance, who has had charge of mines in the Clearfield region, but with no other experience, coming to take charge of the gaseous mines of West Virginia, or the mines on the Monongahela, or some of the mines in the Panhandle region. And what shall we say of the solid shooting in Illinois and Oklahoma, or the dusty mines of Colorado, or the broken roof and faulted conditions of the anthracite mines.

Perhaps there may be someone who is versatile enough to make an examination that would cover all of these regions, but that has not been my experience. I think such lowering of the bars would be a mistake. Surely, if any man wants to take a position in another state, he ought to have the ability to stand the examination in that state; and, as to the cost, that is a mere bagatelle.

I have stood examinations myself in different states and countries, and see no reason why others should not do the same. To my mind, safety is obtained by experience and training alone; and no one man's knowledge is broad enough to cover all the conditions of the different states without such training.

JOSEPH VIRGIN, Supt.

Moundsville, W. Va.

Letter No. 6—Referring to the recent interesting discussion of the mine foreman's certificate, I want to say, in my opinion, it would be of material benefit to the mining world if each man holding a certificate were called before an examining board, at least once every two years, and given such an examination as would enable the board to determine whether or not he is keeping abreast of the times.

It often happens that men by a brief study of mining books and from personal information are able to pass an examination, without having the all-essential experience that makes them fit to assume the duties and responsibilities of mine foreman. I could mention several men who hold mine-foreman certificates who cannot take a safety lamp apart, clean, fill and put it together again properly. They would not be able to ventilate a pair of entries without a room turned, to say nothing of ventilating the working faces of a large number of rooms. While this may seem a sweeping statement, it is a fact that can be confirmed; and although accidents will occur, at times, in mines in the charge of men who have had a life-long experience, they are not as frequent in such mines as in others where incompetent foremen are employed.

I hope to see the time come when every mine foreman who holds a certificate will be required to stand another examination at least once in four or six years. I am willing to take my chances with an intelligent examining board. I believe such a board should have power to revoke any certificate when the man who holds the same fails to come up to the standard of the examination. I agree fully with District Mine Inspector Rose, when he says that candidates should be examined every six years. Mr. Rose sounds the keynote to safety in mines, as far as the mine foreman is concerned.

I have in mind one man who never worked six months in a coal mine, but holds a first-class certificate. This man carries a safety lamp in the mine, but could not tell gas from sunshine. The same man has said that he carried the lamp so that the miners would think everything was all right, adding that "any fool can boss a coal mine." In view of some facts, I am almost forced to the same conclusion myself.

When I first took charge of the mines here I found a poor current of air traveling, largely caused by a door so placed as to choke the air current that was trying to find its way through the mine. This door was set by a man holding a first-class certificate. The question may be properly asked, "Who is to blame?" I say, Give me a man who has experience, as well as technical knowledge.

A. H. Stansberry, Mine Foreman,
Big Mountain Coal Mining Co.
Oliver Springs, Tenn.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

GREATEST COMMON DIVISOR

The greatest common divisor of two or more numbers is the greatest number that will exactly divide each of them. The operation of finding the greatest common divisor depends on the following:

Principle—Any number that will exactly divide the difference of two numbers and one of them, will exactly divide the other also; and an exact divisor of a number is also an exact divisor of any multiple of that number.

The application of this principle gives the following:

Rule—Divide the greater number by the less. Then continue to divide the last divisor by the remainder till the division is exact. The last divisor is the greatest common divisor of the two original numbers.

If there are more than two numbers, however, find the greatest common divisor of two of the numbers, as explained and then find the same for that divisor and another of the numbers; and continue this operation till all the numbers are used. The last result is the greatest common divisor of the numbers.

Example—Find the greatest common divisor of 77 and 396.

Solution—

$$\begin{array}{l} 77\,)\,396\,(\,5 \\ \underline{385} \\ 11\,)\,77\,(\,7 \\ \underline{77} \\ 0 \end{array}$$

Proof—

$$\begin{array}{r|rr} 11 & 77 & 396 \\ \hline & 7 & 36 \end{array}$$

Therefore, 11 is the greatest number that will exactly divide both 77 and 396.

Example—Find the greatest common divisor of 42, 63 and 98.

Solution—

$$\begin{array}{l} 42\,)\,63\,(\,1 \\ \underline{42} \\ 21\,)\,42\,(\,2 \\ \underline{42} \\ 0 \end{array} \qquad \begin{array}{l} 21\,)\,98\,(\,4 \\ \underline{84} \\ 14\,)\,21\,(\,1 \\ \underline{14} \\ \;\,7\,)\,14\,(\,2 \\ \underline{14} \\ 0 \end{array}$$

Proof—

$$\begin{array}{r|rrr} 7 & 42 & 63 & 98 \\ \hline & 6 & 9 & 14 \end{array}$$

Therefore, while 21 is thus shown to be the greatest common divisor of 42 and 63; 7 is found to be that of the three numbers 42, 63 and 98. In other words, 7 is the greatest number that will divide each of these without a remainder.

LEAST COMMON MULTIPLE

The least common multiple of two or more numbers is the least number that is exactly divisible by each of the given numbers. Thus, 24 is the least common multiple of 6 and 8; because it is the smallest number that is exactly divisible by both 6 and 8.

The Coal Age Pocket Book

Rule—Write the given numbers in line and divide successively by any prime number that will exactly divide any two of the numbers. The continued product of the several divisors and the remaining quotients or numbers is the least common multiple of all the numbers.

Example—Find the least common multiple of 24, 30, 54 and 150.

Solution—

$$\begin{array}{r|rrrr} 2 & 24 & 30 & 54 & 150 \\ \hline 3 & 12 & 15 & 27 & 75 \\ \hline 5 & 4 & 5 & 9 & 25 \\ \hline & 4 & 1 & 9 & 5 \end{array}$$

$$2 \times 3 \times 5 \times 4 \times 9 \times 5 = 5400$$

Proof—

$$\begin{aligned} 5400 \div 24 &= 225 \\ 5400 \div 30 &= 180 \\ 5400 \div 54 &= 100 \\ 5400 \div 150 &= 36 \end{aligned}$$

CANCELLATION

In the solution of mathematical problems, it frequently happens that there are a number of factors involved as multipliers or divisors. In such cases, instead of performing each separate multiplication and division, the work is much shortened by writing all the multipliers in the numerator and all the divisors in the denominator of a compound fraction, and then proceeding to cancel all the factors common to both terms of the fraction. When this has been done the remaining factors of the numerator are multiplied together, as also those of the denominator, and the former product divided by the latter. An example will serve to illustrate the process.

Example—A certain mine produces 100,000 tons of coal in a year of 270 working days. In this mine, the average number of men employed was 150 and they worked 8 hr. a day. On this basis, what output may be expected from a mine employing an average force of 240 miners, who work 9 hr. a day, for a year of 210 working days?

Solution—Without reference to the use of ratio and proportion, to be explained later, it is necessary to divide the tonnage produced in the first mine, successively, by the number of men employed, the days they worked and the hours per day, to obtain the output per man per hour. Then, this multiplied, successively, by the same factors in respect to the second mine, will give the probable output for that mine.

Thus, $100{,}000 \div (150 \times 270 \times 8) = \frac{25}{81}$ tons per man, per hour. Finally, $\frac{25}{81} \times 240 \times 210 \times 9 = 140{,}000$ tons.

As previously stated, the work is much shortened by writing all the multipliers including the tonnage of the first mine, in the numerator and the divisors in the denominator of a compound fraction and canceling out common factors; thus,

$$\frac{100{,}000 \times \overset{\cancel{8}}{\cancel{240}} \times \overset{7}{\cancel{210}} \times \cancel{9}}{\underset{5}{\cancel{150}} \times \underset{\cancel{9}}{\cancel{270}} \times \cancel{8}} = \frac{700{,}000}{5} = 140{,}000 \textit{ tons}$$

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What gases result from the explosion of dynamite?.

Ans.—The products of the explosion of dynamite are carbon dioxide (CO_2), nitrous oxide (N_2O), nitrogen (N_2) and water vapor (H_2O). The reaction that takes place is represented by the equation:

$$2\,C_3H_5(NO_3)_3 = 6\,CO_2 + N_2O + 2\,N_2 + 5\,H_2O$$

Ques.—What gases are formed during a mine fire?

Ans.—The composition of the gases resulting from a mine fire will depend chiefly, if not wholly, on the quantity of air present. In a plentiful supply of air, the combustion will be more or less complete, producing carbon dioxide (CO_2). If the ventilation is slack, and the air supply insufficient for complete combustion, varying amounts of carbon monoxide (CO) and nitrogen (N_2) will be produced in addition to the carbon dioxide.

Ques.—If 20,000 cu.ft. of air and gas, at the maximum explosive point, is passing per minute through a mine, what is the quantity of gas given off and what quantity of air should be added to render the mixture nonexplosive?

Ans.—A firedamp mixture at its most explosive point contains 9.46 per cent. of gas (methane). The volume of gas carried in this air current or given off in the mine is, therefore, $20,000 \times 0.0946 = 1892$ cu.ft. per min. In order to render this volume of gas nonexplosive, it must be mixed with thirteen times its volume of air; or $13 \times 1892 = 24,596$, say 24,600 cu.ft. per min., which is the total volume of pure air in the current. The quantity of air to be added is, therefore, $24,600 - 20,000 = 4600$ cu.ft. per min.

Ques.—If a portion of a mine is worked with locked safety lamps and approved powder is used for blasting, how would you proceed to light the shots and what precautions would you take in performing this duty?

Ans.—Use none but an approved type of safety lamp. Having properly prepared and tested the lamp, ascertain that all of the men are out of the mine. Observe that the usual volume of air is in circulation. Proceed to the gaseous section of the mine and begin firing the shots on the end of the air, in this section first. With some possible few exceptions, fire only one shot at a time in a single working place, giving ample time for the smoke and gases to clear before firing succeeding shots. Advance thus in regular order against the air until all the shots are fired in this section of the mine. Follow the same general rule in the other sections of the mine. In every case, make a careful test for gas in the place and examine every shot before firing.

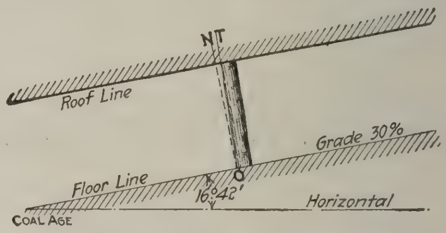
Ques.—What advantage is to be gained by turning the rooms at an angle with the entry?

Ans.—In flat seams, an advantage is often gained by turning the rooms in such a direction that they will cross certain clay slips or faults in the coal, or that the coal face will make a certain angle with the natural cleavage of the coal, so as to enable the coal to be worked "longhorn" or "shorthorn," according to requirements. The coal always works better when advantage is taken of these natural conditions.

In inclined seams, the levels, or gangways, are driven on the strike of the seam, allowing only sufficient grade to permit economical haulage and drainage. In moderate pitches, if the rooms are driven on the full pitch of the seam, the grade of the roads in the rooms will often be too great to enable the cars to be handled safely. This grade is reduced by driving the rooms across the pitch or at an angle with the entry.

Ques.—How would you set your timbers in an inclined seam and why?

Ans.—The posts should be set so as to lean slightly up the pitch, as shown in the accompanying figure. The pressure of the roof on the timber is exerted in a direction NO, normal or perpendicular to the seam. As the extraction of the coal proceeds, the roof has a tendency to slip downhill. If the post was set normal in the seam, or perpendicular to the roof and floor, the slipping of the roof downhill would loosen it, and it would fall out; but when the post is "upset," or inclined up the pitch, as shown in the figure, any movement of the roof downhill will tend to tighten the post.



Standing Timber in an Inclined Seam

Ques.—What are the advantages of driving rooms on sights, and how would you keep rooms straight without sights?

Ans.—The advantage of driving on sights is that all the rooms then keep the same general direction and the width of the room pillars is maintained uniform; or, in other words, the rooms do not "hole" into each other. When no sights are used, the miner keeps his direction by sighting back along the rail.

Ques.—What is a squeeze?

Ans.—A squeeze, in coal mining, is the effect produced by the overburden settling down heavily on the supporting pillars in the mine. The effect is indicated, in greater or less degree, by the sagging of the roof, the crushing of the pillars, or the heaving of the floor, or any or all of these combined.

Ques.—What method or means is most effective in arresting the progress of a squeeze?

Ans.—When a squeeze has attained any headway, its progress can only be arrested by causing a heavy fall of roof, by drawing all pillars and timbers over a considerable area, which has the effect to overarch the weight resting on the pillars, causing it to rest on the waste.

COAL AND COKE NEWS

Washington, D. C.

Attorney-General McReynolds has prepared a report for the year 1913 which was made public on Dec. 9 and in which he gives the most uptodate and thorough data yet available with respect to the coal cases prosecuted by the Department of Justice under the anti trust and other laws.

Mr. McReynolds first deals with the subject historically, and reviews the anthracite coal case, saying in part:

> "It was held (1) that the defendants including most of the anthracite coal carrying railroads and affiliated coal companies were unlawfully combined in restraint of trade through the instrumentality of the Temple Iron Co., whose stock they owned in agreed proportions, and through which they purchased a number of independent mines and prevented the construction of an independent railroad; (2) that the system of agreements known as 65 per cent. contracts, by which the defendants acquired control of the independent output, were in restraint of trade.
>
> The decree enjoined the defendants from voting or receiving the dividends on the stock of the Temple Iron Co., or otherwise attempting to exercise any control over it, and canceled the 65 per cent. contract. A general charge that the defendants were engaged in a combination in restraint of trade was dismissed. The charges against separate groups of the defendants, namely, (1) the Reading Co. and affiliated corporations, (2) the Lehigh Valley R.R. Co., and affiliated corporations, and (3) the Erie R.R. Co., and affiliated corporations, were not determined but were left to be dealt with in separate proceedings."

The Attorney-General then takes up the status of other cases and refers particularly to the case of the United States vs. the American Coal Products Co., in which a decree was entered by consent on Mar. 4, 1913, and the case of the United States vs. the Reading Co., et al. in which a petition was filed Sept. 2, 1913, against a combination consisting of the Reading Co., and affiliated corporations, charging it with restraining and monopolizing trade in anthracite coal, in which the defendants have only recently answered. As to cases under the commodities clause, Mr. McReynolds says:

> In the United States vs. the Delaware & Hudson Co. the Supreme Court construed the commodities clause as prohibiting a railroad from transporting articles in which at the time of transportation it has any interest, direct or indirect, in a legal or equitable sense * * * in a later case the Court held that if the corporation owning the articles transported by the railroad was so completely identical with the railroad as to be but an arm of the railroad then the railroad would have an interest in the articles in the sense of the statute just as if the railroad held a title to the articles in its own name.
>
> It is to be observed that under this construction the statute is not violated unless the railroad has the required interest in the articles at the time of transportation. It may have been the producer of the articles but if it parted with the title before transporting them it does not violate the act of Congress.
>
> Thinking to bring themselves within this construction of the act the following plan has been devised: A railroad company engaged in mining coal either directly or through a controlled corporation which is but a part of itself will organize a new corporation, the stock of which will be distributed rateably among the stockholders of the railroad; whereupon the railroad will sell to the new corporation at the mouth of the mines its production of coal. This plan has been challenged in the case now pending in the district of New Jersey against the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co., the contention of the Government being that a corporation after all is but an association of persons and that under this plan the same association of persons which mines the coal transports it, and that therefore such transportation is a violation of the act of Congress.

Coal Inspection and Analysis

Another in the long series of bills introduced for the control of the coal mining and selling industry has been offered by Representative Treadway of Massachusetts and is a plan for the inspecting and analyzing of coal, the results to be furnished to purchasers. The alleged purpose of the bill is to prevent sales of inferior coal possessing an unduly small number of heat units from being made to individuals Mr. Treadway's plan is to have the Government apply the same methods of analysis which are employed in the army and navy where the British thermal unit system is adopted in order that the purchasers may be informed whether they are getting the coal that is represented or not.

Mr. Treadway says that the coal of ordinary use is the most general and necessary commodity of everyday consumption and that the consumer ought to be able to know in the same way and for the same reasons that he is informed concerning the constituent elements of foods, of the real nature of the fuel he obtains.

It is thought that the Bureau of Mines might be entrusted with the task of thus sampling and certificating the coal which is to be subjected to analysis. The bill will be taken up by the House Committee on Interstate Commerce and its consideration will probably be bunched with that of a multitude of other coal bills introduced last session and this, that are now pending before the Committee.

Probable Action on Alaskan Railway

The general examination of the outlook for the Alaska Railroad bill has given rise to confident prediction that the Senate will act on that measure at an early date and will provide an appropriation of at least $35,000,000 to be expended by the President in the construction of the desired roads in Alaska locating them in such a way as to open up the coal fields of the territory.

Senator Pittman of Nevada who is attempting to further the progress of the bill asserts that it will pass shortly and that in his judgment the measure will mean a saving of $1,000,000 a year to the Government in its purchases while it will also open large fields of other minerals.

HARRISBURG, PENN.

Auditor General Powell is getting ready to proceed with the collection of the state tax on anthracite coal, provided for by the act of 1913, and all producers will be required to make a statement of their output at the end of the present year.

The department will send bills for the amount of the tax based on the returns made by the operators, who are required to make reports under oath, and it is expected that a test of the constitutionality of the act will be inaugurated without much loss of time by the coal operators. Next year the state will not have the proceeds from one-fourth of personal property tax as an item of income. This amounted to about $1,300,000 this year, and it was the idea of the Legislature that the state's share of the coal tax would make this up. According to reports received, some operators have been charging the tax on their bills of sale of coal.

A systematic inventory of the water and water-power resources of the state of Pennsylvania is being discussed by the Water Supply Commission, and it is the plan to cover every stream in the state and to prepare for the people a list of all streams, their flow, the horsepower and other data. This will be a movement toward conservation and for the retention by the state of the water power now going to waste in many localities.

The commission has been chary about approving applications for charters for power companies in the last two years and only a few big water-power projects have been granted letters patent. Others have been so restricted that but little has been done toward putting them into operation.

This move by the state will no doubt help many coal companies who suffer several months of the year for water, and which many of the progressive companies are guarding themselves against by erecting large tanks and by building reservoirs.

Officers of the U. M. W. of A. are protesting to the operators against cutting coal and loading the same on Sundays, stating that hereafter the work will not be performed.

It seems that men employed in the strippings have been compelled to load coal on Sunday. They claim there is no necessity for doing this. They will agree to perform any necessary labor on the Sabbath so as not to interfere with prompt operations on Monday morning, but loading coal they assert is an abuse of rights.

They point out the fact that even during slack time in the coal trade men are compelled to work on Sunday and are laid off on days that the breakers are idle.

State Chief of the Dept. of Mines, Jas. E. Roderick, is taking steps to secure precautions against accidents in the mines of the state by issuance of stringent regulations in mines and instructions to inspectors to see that they are enforced. Every mine is being covered.

Union Organizers Have Been Busy

Field organizers of the United Mine Workers of America have been busy in District No. 2 (bituminous region) during the past several months, and the result is that the union is stronger, both numerically and financially.

At a number of the mines throughout the district, especially in Clearfield and Jefferson Counties, "closed shop" which means that only members of the union will be given employment, has been established, and great efforts are being made to make the organization as strong as possible so that the men will be in a position to present the strongest possible case, when they meet in convention at Dubois in March for the purpose of entering upon a two-years' wage agreement.

Indiana County has been the weakest county in the district, so far as membership is concerned, and an effort is being made to unionize the mines there.

If there is any opposition to the work of the U. M. W. of A. on the part of the operators it is not apparent on the surface. It is the contention of some of the operators that they have better success in the operation of their mines when they deal with the union than when they endeavor to make individual agreements with the men. Both the operators and the men are making preparations for the best possible working agreement when they meet in joint convention to Dubois in March.

There are four important demands which the miners will make at the joint conference. They will ask that the system of pushing cars to and from working places to the entries by the miners be abolished; a uniform day wage scale for all labor inside and outside the mines; a more strict rule enforcing the eight-hour day, and an eight-hour day for all engineers and firemen. There may be other demands made by the miners, but it is intimated that the men will insist upon those four things going into the next wage agreement.

The members of the United Mine Workers throughout the state are making arrangements to send delegates to attend the convention of the organization to be held at Indianapolis on Jan. 20. This is the 24th convention, the meetings having been held annually heretofore, but are now being convened biannually, so as to come in the January before the March on which the two-years' wage contracts entered into with the operators expire. The wage agreements in every mining district on the American Continent, between the United Mine Workers of America and the operators, expire in March next, except the new agreements recently made in West Virginia and the anthracite region of Pennsylvania.

PENNSYLVANIA

Anthracite

Lykens—The school boards of Lykens and Wiconisco are considering a proposition to start a night school for the people of the two towns. The activity in this line is the direct result of the formation of the Miners' Institute several weeks ago. Mr. Aulman, superintendent of the mines and Mr. Kutzner, mining engineer at the mines, both members of the institute served as a committee to meet the board.

Tamaqua—All employees of the Lehigh Coal & Navigation Co. in the Panther Creek Valley, with the exception of those at the Nesquehoning colliery and the washeries, recently went on strike as the result of a new order issued by the company. Heretofore, inside men have worked from 7 a.m. to 4 p.m., without a noon hour, for a day's work, while under the new order the company desires all employees to take 45 minutes off for lunch and end the day at 4:45 p.m. working the same hours per day, but meaning a later quit for the men.

Old Forge—The deal which has been pending for some time past for the purchase of the Sibley Colliery of the Elliott-McClure Co. by the Pennsylvania Coal Co., has been closed, and the latter company has assumed charge of the operation. The colliery is located in Old Forge, and the tract is of about 350 acres, three veins, the Red Ash, Clark and New County, being mined. Shortly after the change in ownership the employees went on strike, claiming that when the grievance committee of the union started to examine the due cards, the officials of the company ordered them to stop.

Scranton—Residents of the Green Ridge section of Scranton, aroused by the danger of mine caves and the failure of the coal companies to provide relief, have passed a resolution that a petition be sent from the residents of Scranton and vicinity, to Governor Tener, requesting the condemnation of all coal lands in Lackawanna County. It is generally understood throughout that section that what the property owners desire is that the State of Pennsylvania take over all coal lands and operate them, thus displacing the companies and officials about whom the people complain.

Plains—Residents in the vicinity of Henry St., between Merritt and William Sts., Plains, are becoming frightened at the number of cracks appearing in the surface in that vicinity, and in the concrete foundations of several houses nearby, caused by mine settlings. The Madeira-Hill Co. and the Delaware & Hudson Co. have coal lands in this section.

The miners at the Madeira colliery of the Wilkes-Barre Coal Co., who have been on strike, have decided to return to work pending an adjustment of their grievances. The men claim that under the schedule of rates in force between them and the company, for the removal of fire clay from the Ross vein $1.21 per yard should be paid. The section of the vein now being worked does not contain clay, but there is a stratum of rock which must be removed. The men claim they should be paid the same for removing the rock as for the clay, but this the company refuses to do.

Bituminous

Nanty Glo—The mines of the Springfield Coal Co., which were closed recently through the destruction of the boiler house and tipple by fire, have resumed operations. Repairs have been completed and the company starts again with better equipment than previously.

Conemaugh—The Park Hill Coal Co., which is driving a slope into the "C" coal vein, is taking out about 3 ft. of fine grade limestone in the process. The stone is being removed principally to furnish room for the headings, but the material is a valuable byproduct, as it can be used for several purposes, notably ballasting of tracks, in the blast furnace, and on the new state highway. The output of the new mine is about 500 tons a day at a minimum, with an ultimate capacity far in excess to that figure, when the company taps the "B" coal seam, as is planned later. Three shifts will be kept busy in development work for some time.

Morrisdale—The Morrisdale Coal Co. has disposed of its electrical plant to the Penn Service Co. and is paying the electrical plant for the power used to operate the mines.

Dubois—About 800 miners employed at the Eriton mines, of the Northwestern Mining and Exchange Co., are on strike, tying up the mines. The trouble is that the men insist upon the "closed shop." At the time of the walk-out, all of the employees, with the exception of four, were members of the union.

Pittsburgh—On Dec. 7 Judge Buffington, of the U. S. Circuit Court, granted a receivership to the Pittsburgh-Buffalo Coal Co., one of the largest independent coal concerns operating in the Pittsburgh district. This action was taken upon the petition of F. R. Babcock, J. W. Ailes, and John H. Jones, of Pittsburgh. At the same time Judge Dayton, of the U. S. District Court at Philippi, W. Va., granted the petition of the same men for a receivership for the Four States Coal & Coke Co. The Pittsburgh-Buffalo Co. operates properties at Marianna, Canonsburg, Burgettstown, and Bruceton, while the latter firm operates mining properties in the Mannington and Cabin Creek districts of West Virginia.

WEST VIRGINIA

Charleston—According to a report of the mine department of the state, there are 70,321 miners employed in West Virginia mines. Of this number 36,612 are of American descent, 14,000 are negroes, and 23,709 foreigners, of whom the majority are Italians.

It is the general opinion here that the 50 million dollar coal deal in the New River field will be consummated shortly. It is said that 85 per cent. of the owners and operators in the New River field have verbally agreed to the conditions imposed by the English syndicate. It is the desire of the purchasers that all operators in the New River field join them, and 50 million dollars in gold will be paid between the time the contracts are delivered, and June 1. This price is to cover operations and coal lands in Fayette, Raleigh. Greenbrier and Nicholas Counties.

Huntington—Arrangements for the employment of a large number of men to work in the mines of the Marmet Coal Co., near Marmet, W. Va., is being made by officials of that firm. Improvements are to be made by this company including the building of boarding houses to be constructed for the use of the laborers to be employed. Application has been made to the municipal employment bureau for both mine and other labor, and it is understood that a large number of men will be put to work about the first of the year.

TENNESSEE

Spring City—Col. George Wilkinson, of Philadelphia, Penn., is reported to be planning the purchase of a large acreage of mineral land in the vicinity of Spring City, Tenn., for immediate development, the work proposed including the operation of coal and other mines, the construction of coke ovens and a byproducts plant, the ultimate investment contemplated being in the neighborhood of $3,000,000.

KENTUCKY

Sebree—The Sebree Coal Mining Co. is planning to increase he capacity of its mine, installing a line of modern machinry. Lee Stone is manager of the company.

Sturgis—The West Kentucky Coal Co. is said to be working its nine plants to capacity, notwithstanding the fact that he mild weather and a short car supply have handicapped perations to a considerable extent. The company, which is he largest in the western Kentucky field, is planning still urther development work, which will cost between $400,000 nd $500,000.

Barbourville—It is understood that the Smith-Riley Coal o., recently incorporated, has acquired a plant in this viinity which is already in active operation, and that it will pen up other mines shortly.

OHIO

Columbus—Coal operators, at least a few of them in Ohio, are taking up the agitation to secure the passage of a law, similar to that of Canada which is designed to prevent harmful strikes in all lines of business. In the coal mining industry the danger of strikes is one of the worst features o contend with. The Canadian law provides that neither can the employee strike or the employer lock out his men, until 30 days after the controversy arose and only then after the arbitration commission has made every effort to secure a compromise and when all of the facts in the case are published. The law takes into account three parties to every labor controversy, viz.; the employer, the employee and the public. It is believed such a bill will be introduced in the coming session of the Ohio General Assembly.

New Philadelphia—Suit has been brought in the courts of Tuscrawas County by the Goshen Coal Co. against the Royal Goshen Coal Co. to collect $12,957.56 alleged to be due for coal illegally mined under the property of the plaintiff. The two properties adjoin each other in Goshen Township in Tuscrawas County.

Murray City—State Mine Inspector J. C. Davies accompanied by several of his deputies has opened Pittsburg Mine No. 8, which was sealed up last March because of a fire. The fire was found to be out and the mine will be placed in operation soon.

INDIANA

Linton—The new Summit-Linton mine, employing 200 men, is expected to be in operation the first of the year.

Sullivan—The old Shelburn mine, working vein No. 5, caved in recently, breaking the props and covering the tracks, making it necessary to abandon it. About five acres of land sank. The mine had had trouble with gas. The Citizens mine will be reopened about Christmas. A new tipple is being built. The shaft has been leased to J. R. Risher. It was formerly the property of the Monon Coal Co.

The last pay day to the miners in this vicinity brought them $20,000. Prospects are said to be good for steady work for the next six months. Miners at the Glendora drew $4500; at the Union, $5000, and at the Paxton, $5600, the balance being distributed among the smaller mines.

Indianapolis—The miners' washhouse law, passed by the last Indiana legislature, has been held constitutional by the supreme court of the state, but was appealed to the United States Supreme Court, where it is pending.

ILLINOIS

West Frankfort—The Chicago, Wilmington & Vermillion Coal Co. is commencing to produce coal at its new mine at Orient, north of here. The producing company has built a small sized town so as to have its miners right on the ground and reports have it that Orient is one of the latest and most sanitary and comfortable mining settlements in southern Illinois.

The new mine of the Old Ben Coal Co., formerly the Buchanan Coal Co., is down to coal. This new shaft is being sunk southeast of this place in a coal field that has never yet been touched, and it is understood that the coal shows up considerably better in quality than that from the field west of here.

Royalton—The Chicago, Burlington & Quincy R.R. has completed its branch to this point, and coal is now being loaded out from the mine of the Franklin Coal & Coke Co.

Marion—The White Ash mine, which has been abandoned and allowed to fill up with water at White Ash, three miles north of here, is being pumped out, and all the mining material such as rails, cars, etc., will be removed and the mine abandoned and sealed up. It is also understood that the tipple and washer are to be offered for sale to be torn down and removed.

Edwardsville—The Henrietta mine, which cost $65,000 to sink, has been sold for the second time for a price that would indicate that it was not worth even junk money. In August, 1912, the Federal Trust Co. bought it for 45c. and assumed a debt of $11,500. It was operated for a short time at a loss and was leased to W. S. Walker, who also operated it and failed, owing the miners several thousand dollars wages. The last sale is to Mrs. Philipina Kraft, of East St. Louis, and the records show that she paid $1 for it. However, it is understood that included in the deal was some real estate in St. Louis valued at $30,000.

A small local mine, operated by the City Coal Co., is being flooded by a stream from a nearby creek through a fissure in the air shaft. The mine inspector has ordered the mine closed.

ARKANSAS

Spadra—The West Spadra Coal Co., which has been sinking a new shaft for several months, has finally struck a 4-ft. vein at a depth of 245 ft. The coal is pronounced of superior quality.

Hartford—The strike which has been in effect for some time at mine No. 4 of the Central Coal & Coke Co., has been settled and the men returned to work on Dec. 1. The miners' contentions that a guard be placed at the fan house during the entire time the men were at work, has been granted by the operators.

Clarksville—The Sterling Anthracite Coal Co.'s property here has been ordered shut down on account of poor ventilation. This is one of the largest mines in Johnson County and has been employing non-union men.

OKLAHOMA

McCurtain—There is a probability that the mine of the Sans Bois Coal Co., which was the scene of a disastrous explosion several months ago in which 70 lives were lost, will soon resume operations. The mine has been closed since the disaster, and the company has gone into the hands of a receiver; but it is believed that operations will soon be resumed.

COLORADO

Trinidad—Workmen from outside districts are now arriving in considerable numbers to take the places of the striking miners in the southern Colorado fields. These are, for the most part, convoyed from the trains to the mines by military escorts.

Denver—The acquisition and operation of municipal coal mines suggested by the City Council to combat high fuel prices is entirely practical, but not demanded immediately. Such was the report rendered by the Public Utility Commission, following an investigation requested by the council into the advisability of such a proposition. It is the opinion of the Commission, however, that coal should cost considerably less in Denver than the prices now charged.

FOREIGN NEWS

Juneau, Alaska—The land office at Juneau recently decided that 21 coal claims of the so called McAlpine Group of 200 on Cooks Inlet should be held for cancellation because of fraud. The Promotors of the McAlpine Group were indicted in Detroit on Mar. 6, 1911, for a conspiracy to defraud the United States.

Cardiff, Wales—Fifteen thousand coal miners in southern Wales were thrown out of work Dec. 4 by the strike of engine drivers and stokers on the Great Western Ry. All traffic on the Welsh branch of the line was disturbed. Leaders of the strike, which began through the dismissal of an engineer for refusing to handle Irish freight, are trying to extend it to other lines.

PERSONALS

L. C. Crewe, general manager of the La Follette Iron Co., has been on a trip during the past week to Knoxville and Chattanooga, Tenn., and Birmingham, Ala.

Col. Harvey M. La Follette, president and general manager of the La Follette Coal, Iron and Railway Co., has been spending some time in New York on business for his firm.

A. P. Goedecke, for 28 years general outside superintendent for G. B. Markle Co., at Jeddo, has resigned, and will leave the service of the company on Dec. 20. His successor has not been named.

George Hartshorne, formerly fire-boss in the mines of the Atlantic Coal Co., of Boswell, Penn., has been promoted to the position of mine foreman, while George Watson, formerly fire-boss in the same mine, has been promoted to the position of ass't mine foreman.

Hywel Davies, formerly of Louisville, but now residing in Lexington, Ky., who is well known among operators in Kentucky, being president of the Kentucky Mine Owners' Association, recently resigned as a member of the board of trustees of the Kentucky State University.

Mrs. Sophia Coxe, widow of Eckley B. Coxe, is preparing again to make happy the 3000 children of the miners at the Coxe Brothers & Co. operations (now owned by L. V. Coal Co.) by distributing gifts of clothing, toys and sweets among them the day before Christmas, as has been her custom for nearly half a century.

George P. Lindsay, of Plymouth, secretary of the Parrish Coal Co. for many years prior to the merging of that corporation with the Lehigh & Wilkes-Barre Coal Co., has leased from the Turner Estate a tract of coal land about 25 acres in extent, near the old Jersey mine in Plymouth Township, and arrangements are now being made to develop the tract.

Stephen J. Hammon has recently been appointed superintendent of the Dorrance, Prospect and Henry E. collieries of the Lehigh Valley Coal Co., at Wilkes-Barre, Penn., to fill the vacancy caused by the death of Joseph Jones. Sheldon Jones has been appointed to fill the place formerly occupied by Mr. Hammond, as superintendent of the Franklin and Warrior Run collieries.

Elmer O. Long has tendered his resignation as assistant chief engineer of the Consolidation Coal Co., at Somerset, Penn., to engage in a private engineering partnership with Frank B. Fluck. The new concern will be known as Fluck & Long, with offices in Somerset. While they will carry on all kinds of engineering they will make a specialty of examination and reports on coal-mining properties, installation of coal-mining plants, and municipal work.

F. G. Tice, one of the best known coal men in the Appalachian District, recently resigned as general sales manager of the Carter Coal Co., of Johnson, Tenn., and will move to Colorado. This step was taken on account of the state of his wife's health. He will probably form a connection with some operating company in the Colorado field. Mr. Tice has been in the coal business for years, having been connected formerly with the East Jellico Coal Co., later becoming general manager of the Interstate Coal Co., which was acquired by the Carter Coal Co., with which he has since been associated.

CONSTRUCTION NEWS

Nanticoke, Penn.—Contractor Charles Breeme, of Wilkes-Barre, is at present at work on the new boiler houses that are being erected by the Susquehanna Coal Co. at the No. 7 Colliery.

Martins Ferry, Ohio—Work was started recently on the extensive improvements at the Webb Mine by the Pennsylvania R.R. and will continue for several months. This work includes moving the tracks at that place and changing the channel of Wegee Creek to accommodate the output of the new mine. A number of company houses have been erected at this mine during the summer and a force of men is now at work erecting the steel tipple.

Huntington, W. Va.—It has been announced that a firm to be known as the Ohio Valley Co., will shortly install an electric power plant at Logan, W. Va. Power lines will be laid over the entire Logan coal field, and will be run up and down the Guyan River, Main Island Creek, Buffalo and Dingess Runs. The plant will ultimately be of 30,000 kw. capacity composed of turbine units of 5000 kw. each. It is expected that work will be started upon this plant within three weeks.

Barbourville, Ky.—For some time past there have been persistent reports of a new coal railroad to be built in Tennessee or Kentucky for the purpose of connecting some extensive properties near Barbourville with the Louisville & Nashvile R.R. at Beattyville, a distance of about 65 miles. As the result of a recent conference between the parties interested considerable progress was made toward active operation. The new road will traverse one or two counties which have no railroads at present.

Bluefield, W. Va.—Aside from the erection of the gigantic power house at Bluestone Junction, which is now under construction for the purpose of supplying current for the electrification of the Norfolk & Western R.R. between Bluefield and East Vivian, it is understood that the erection of another building is contemplated which will be used for a machine shop and car barn combined. Nothing definite has as yet been made known regarding this latter structure, but a building of this kind will necessarily have to be erected at some point along the line between the two towns.

NEW INCORPORATIONS

Portage, Penn.—The Martins Branch Coal Mining Co., of Portage, has been organized with a capital stock of $20,000.

Pittsburgh, Penn.—The Pittsburgh-Syracuse Coal Mining Co., of Pittsburgh, has been incorporated with a capital stock of $50,000.

Barbourville, Ky.—The Smith-Riley Coal Co. has been formed by local coal men to operate the Blue Gem mine in the vicinity of this city. A plant already established has been taken over by the new organization.

Columbus, Ohio—The John M. Taylor Coal Co. has been organized at Columbus for the purpose of mining and dealing in coal. The capital stock is $45,000, and the incorporators are John M. Taylor, John W. Moore, J. E. Ridenour, E. G. Thornton, and E. E. Learned.

Charleston, W. Va.—The Bengal Coal Co. has been incorporated with an authorized capital stock of $100,000. The incorporators are E. P. Hopkins, A. E. Morgan, W. H. Cunningham, T. F. Bailey, Jr., and Frank Enslow, all of Huntington. The offices will be in Huntington, and the chief works, in the Triadelphia district.

INDUSTRIAL NEWS

Newcastle, South Wales—The coal exports from Newcastle, South Wales, for the first nine months of 1913 were 3,786,432 tons valued at $9,645,727, increases of 166,756 tons, and $409,625 respectively.

McKinney, Tex.—E. G. and S. E. King of this city have closed the deal exchanging their coal mine at Como, Texas, to D. M. Lovelace of Oklahoma City, for a plantation in Mississippi and $75,000 in cash.

Pittsburgh, Penn.—The Secretary of the Treasury has recommended the appropriation of $762,000 for the Bureau of Mines. Of this $10,000 is wanted for the steam and electric equipments of the Pittsburgh testing station.

Bluefield, W. Va.—Local railroad men say that Dec. 3 was one of the busiest days in the history of the Pocahontas division. Practically every engine and every crew in Bluefield were mustered into service to assist in moving the heavy tonnage out of the field east bound.

Hebron, N. D.—The Lignite Briquetting Plant operated here by the state was destroyed about midnight, Dec. 3, with a loss of $10,000 by fire of an unknown origin. The destruction of this plant will seriously hamper the state's investigation into the possibilities of lignite.

Springfield, Ill.—Trouble which threatened to result in a general strike in the Peabody coal mines in this vicinity has been amicably settled. A strike of miners at the Peabody No. 8 mine at Kincaid, resulting from a disagreement over the wage scale, caused the trouble.

Uniontown, Penn.—It is reported that a company is to be formed by the owners of the Youngstown Sheet and Tube Co., to operate the large coal area in Green County, Penn., recently purchased by the latter company. The new firm will be known as the Buckeye Coal Co., and it is the intention to start the manufacture of coke to be used in the plants of the Youngstown Sheet and Tube Co.

Martins Ferry, Ohio—Although many boats are still operating on the lakes, little coal is being shipped. As a result coal companies are contracting for vessels to be used for storage purposes during the winter. Operators figure that regardless of whether there is a suspension or strike next spring when the wage scale agreement is to be taken up, they will have a long shut-down to face. Accordingly, they are obtaining leases on boats and will load them this winter at the docks.

COAL TRADE REVIEWS

GENERAL REVIEW

Markets generally steadier as a result of the change in eather conditions. Anthracite stocks low and an active arket expected. Bituminous production curtailed. Prices ding steady to firm, but trade dull and shipments on conacts slowing up.

The customary order of business in anthracite has been eatly demoralized by the unseasonable weather, but lower mperatures the first of the current week had a steadying fect upon the situation. As a rule the market has been markably well maintained, but it was becoming evident at a continuance of unseasonable climatic conditions ould soon necessitate a curtailment in production, a most nusual procedure in hard coal at this period of the year. he final general adoption, by practically all the companies, an increase in the circular to cover the new Pennsylvania tate tax on hard coal, has put business on a more equitable asis. It is clear that stocks on hand are meager and it will ot take much cold weather to create an active situation.

The bituminous market continues listless, with an entire bsence of new business apparent on all sides, and the price st softening. The well stocked condition of consumers enerally has removed any fear of an immediate shortage, that contract demand is lighter. However, the situation by no means as serious as might have been expected, and is clear that operators are making the most determined ffort in the history of the trade to maintain prevailing rices. But in spite of the restricted production, coal is acumulating on track at a number of points, instances of emurrage are frequently reported, and even the good grades re occasionally in the market at reduced prices. These ases are more the exception than the rule, producers being enerally cautious about shipping except on specific orders.

The announcement of a receivership for one of the most owerful companies in the Pittsburgh district is evidence f the fact that better prices must be obtained for coal. Vhile the advent of cold weather promises to create a more ctive demand in that section, the market is quiet and not articularly well maintained; operations continue on about 60% basis, a large decrease from that previous to the losing of lake navigation.

A curtailment in iron and steel, and the decilne in general nanufacturing demand have restricted operations in Ohio and rice shading is now the rule all along the line.

The long continued warm weather also had a depressing ffect on the market, while at the same time materially failitating the movement. Lake shipments at Toledo for the eason, now definitely closed, exceeded all previous records. ome surpluses are accumulating at the Hampton Roads piers ut these are all well covered by contracts, and are only vaiting tonnage to move them. A remarkable record was nade by the Virginian Ry. in November, the movement exeeding that for the same month last year by over 100%.

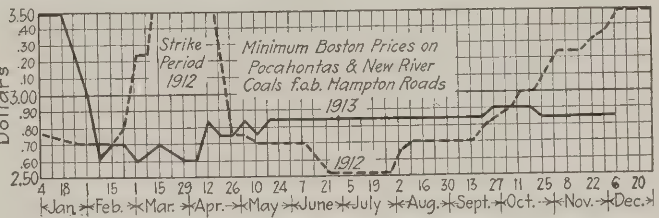
Business in St. Louis seems to have touched the bottom nd has not experienced much change in the past week, but he Chicago markets showed a decided slump. Consumers re restricting orders on contracts often canceling entirely r specifying deferred delivery. Mining operations are beng restrictel, and occasional congestions are reported in raiload yards.

EASTERN MARKET

BOSTON, MASS.

Bituminous market still inactive. Absence of inquiry for spot coal continues. Further decrease in offshore business, and government requisitions are fewer. Contract lemand less insistent. Georges Creek continues strong and in uniformly fair supply. Pennsylvanias are weak. Anthracite strong but momentarily affected by the warm weather.

Bituminous—There is no appreciable change in the market which is still listless. At Hampton Roads, with the exception of the Norfolk & Western piers, there is still an accumulation of coal in excess of chartered tonnage. This, together with the dissappearance of free coal from New England waters, the light government requirements and the decrease in the offshore business should tend to soften the market here. The New England consumers' well stocked condition and the absence on their part of any fear of an immediate shortage of coal have made contract demand lighter. However the circular price for Pocahontas and New River continues firm at $2.85 f.o.b.



The Pennsylvanias are, of course, affected, as far as tidewater shipments are concerned, by the above mentioned superabundant supply of the Southern coals. All-rail Pennsylvania shipments exhibit diminution on account of weather conditions and the plentiful supply of water power. Prices on these coals range from $1 to $1.60 f.o.b. mines.

Georges Creek continues to move regularly on contract and the price for any surplus of this grade is rather more than firm.

Quotations are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New River
Mines*	$1.00@1.55	$1.25@1.60	$1.67@1.77	
Philadelphia*	2.25@2.75	2.50@2.85	2.92@3.02	
New York*	2.55@3.05	2.80@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.72@3.82
Providence†				3.72@3.87

*F.o.b. †On cars.

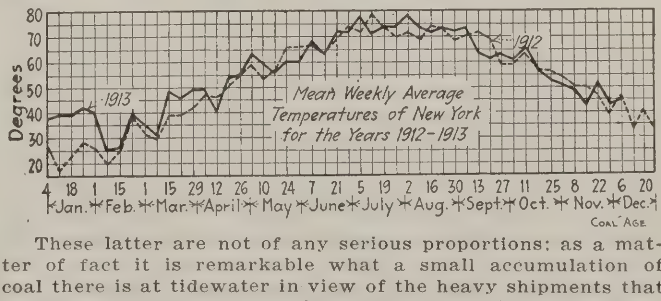
Anthracite—The postponement of the hoped for cold snap has caused a momentary quiescence of the market, the retailers having been unable to move but little of their stocks.

The marine freight market has undergone no material change. But few coastwise charters have been reported and shippers appear to be devoting their entire attention to providing for regularly chartered bottoms. Rates from Hampton Roads to Boston are 70 to 75c. per ton.

NEW YORK

Colder temperatures steadying up both anthracite and soft coal. Bituminous mining restricted, operators fearing to overship the market. Hard coal slow getting started, due to the backward season.

Bituminous—The New York market has been the last to feel the effect of the changed conditions in the soft-coal business, but the difference has been clearly apparent the current week in spite of the changed weather conditions. The slump is by no means of serious proportions, however, and the lower temperatures of this week will no doubt do much to steady things up. While lower prices are more frequently heard, this is, as usual, confined more particularly to certain tonnages threatened with demurrage.



These latter are not of any serious proportions: as a matter of fact it is remarkable what a small accumulation of coal there is at tidewater in view of the heavy shipments that have been coming down. Operators as a rule are cautious about shipping, except on specific orders, and as a result there is some slowing down of operations in the mining districts. It is clear that producers are making a more determined effort to hold prices than ever before in the history of the trade.

With the curtailed operations in the mining district, cars are now in plentiful supply, as is also labor. In view of the somewhat depressed conditions, we quote the New York market off 5c. all along the line from quotations for the past few weeks, as follows:

West Virginia steam, $2.60@2.75; fair grades of Pennsylvania, $2.70@2.80; good grades of Pennsylvania, $2.80@2.90; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—Conditions are rather quiet in hard coal, and supplies easy, in practically all sizes. Stove coal is as short as ever, but the situation is much easier, because the demand has dropped off; conditions are about the same on chestnut. Egg coal is in long supply and is the heaviest of any of the prepared sizes at the present time. Pea coal is active and in the best demand of any of the steam grades. As a rule, nearly all the upper port steam coals are difficult to move at the circular price, while the lower ports are flooded with the cheaper grade steam sizes. The line business continues the best feature in the anthracite trade.

As a rule business is slow in getting started this year, due to the unpropitious weather conditions, but the fall in temperature the first part of the current week will no doubt do much to relieve the situation in this respect. It is clear that stocks on hand are down to a minimum and the advent of real winter weather will create an active business immediately.

We now quote the New York market on the following basis, with prices usually steady:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$5.05	
Egg	5.25	$5.10@5.25	5.30	$4.75@5.20
Stove	5.25	5.25@5.50	5.30	5.20@5.45
Chestnut	5.50	5.50	5.55	5.40@5.45
Pea	3.50	3.50	3.50	3.35@3.45
Buckwheat	2.75	2.70@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

BALTIMORE, MD.

Trade conditions are rather chaotic. Stoppage of call on contracts disturbs the market. Prices are weaker. Warm weather unfavorable.

That trade conditions in this section are unsettled is freely admitted. Considerable business is being done on contracts, and the export trade is gradually strengthening, but nevertheless there is a lack of new business apparent on all sides and the price list keeps softening. Curtailment of work by the steel and iron industry, the cement trade, and other lines of industry that touch the coal trade first is having a marked effect. A number of branches of business have stopped taking coal on contracts, while others that have relied on a certain amount of purchasing in the open market to supplement their contracts, seem to have dropped entirely out of the spot business for the time being.

In West Virginia prices are probably five to 10 cents off what they were a week or ten days ago. Low-grade steam coals were being offered in some mining districts at 80c. The gas market for run-of-mine is about on a par with this and three-quarter is quoted around 85 to 90 cents.

Pennsylvania line coals are selling uncertainly at prices ranging from 90c. to $1, and even the best grades are moving slow when offered as low as $1.30, mine basis. Many salesmen are being recalled from the road because new business is so poor as not to warrant the effort for the time being.

As outlined last week the hard-coal market is also unsatisfactory. Small yards are suffering most. There is plenty of coal on hand at local yards to meet the lightened demand.

PHILADELPHIA, PENN.

Changed weather conditions materially helped the hard coal business, and avoided the necessity of restricting production. Prices close to the circular and well maintained.

There has been a most welcome change in the situation in anthracite, in that the weather conditions, which have been anything but propitious, showed a change for the better. The week just past has done more to inject a little life into a situation which was rapidly approaching a mid summer condition, than anything that could have taken place. Dealers were becoming much discouraged, owing to the unseasonable temperature, and orders were slowly dwindling. This, of course, was effecting the operating companies, and it is safe to say that a week or two more would have meant curtailed mining, an unusual condition at this time of the year. October, November and December are generally looked forward to as being splendid coal distributing months, and the extension into the winter season of practically late Spring climatic conditions, has nearly upset the usual order of things.

As it is the anthracite market has held itself together in a remarkable manner. There has been no cessation of mining, and the output has, with few exceptions been taken care of. In fact, some of the companies were compelled to dip into their storage piles to supply the demand for certain sizes, notably pea and chestnut, but even these were getting easy at the close of last week. Rice coal seems to be about the only laggard, and the fact that bituminous is more easily obtainable, coupled with the fact that there is a slowly diminishing demand for rice coal in this market, doubtless explains this situation. The only satisfaction that the dealers have lies in the fact that, taking the years as a whole, there is always a certain amount of anthracite consumed, and what is left of December, together with January and February, will more than likely balance up the trade.

As to prices, the trade generally is now on about an equal basis. The general application of the state tax, either in the form of an additional price, or its equivalent, has put all operators on about the same basis, and trade that has been diverted into other channels owing to this difference, is likely to return. Anthracite prices rule as follows:

	Line and City Trade		
	Circular	Individual	Tidewater
Broken	$3.50	$3.60	$4.75@4.85
Egg	3.75	3.65	5.00
Stove	4.00	4.10@ 4.15	5.00@5.25
Chestnut	4.15	4.00@ 4.10	5.25
Pea	2.50	2.50	3.25
Buckwheat	1.50	1.50	2.25

The bituminous trade seems to continue along the lines of lower prices, and poor demand. New business is not easy to secure, and the output is being disposed of on old contracts. The inception of colder weather has not added the impetus to the bituminous market that was expected.

TORONTO, CAN.

Large stocks on hand and trade dull. New Pennsylvania state tax on anthracite added to retail prices.

Owing to the long period of unusually mild weather for this season, trade is rather quiet. Dealers have large stocks on hand in all lines, as since the close of navigation heavy shipments are being received by rail.

The increased freight rate of 5% on rail shipments via Suspension Bridge, which was announced to come into effect last month has been suspended until Mar. 12 next, and it is hoped that it may be further delayed.

The retail price of egg, stove and nut sizes of anthracite has been advanced from $8@8.25 per ton, and pea coal from $6.50@6.75, the reason assigned being the increased price at the mines, owing to the imposition of the Pennsylvania state tax on coal. Quotations for bituminous are unchanged.

BUFFALO, N. Y.

Still a strictly weather market. Too much coal everywhere. Sellers trying to hold prices, but find that there are a good many cuts made. Anthracite lake shipments concluded.

Bituminous—There is no help for the bituminous-coal market unless winter steps in and obliges consumers to buy. It is reported that large consumers, like the railroads, which commonly use a dozen or more cars a day at a single receiving point, are now taking only six or eight. This appears to be the rule with practically all concerns that are buying coal for heating purposes and even steam is made much easier than it would be if the weather was seasonable.

Meanwhile there is a steadily increasing accumulation of coal on track and the word "demurrage" that had scarcely been heard for a year, is again becoming common. It is a hard matter to get consumers interested in coal even where their jobber friends are trying to get tonnage off their hands. There are a good many strikes all through the bituminous fields but operators are rather inclined to welcome them, as the mines will not then turn out more coal than can be sold. The miners, on their part, are of the opinion that the producers are making too much money and are making all sorts of demands.

At present it is doubtful whether the summer prices can be held in any form much longer unless the recent cold snap steadies the market up. Jobbers report that they have given way, but operators deny this and say they are obtaining summer prices, at least after a fashion, and are of the opinion that former prices should continue. Quotations are at the moment weak on a basis of $2.90 for Pittsburgh lump, $2.89 for three-quarter, $2.65 for mine-run and $2.25 for slack, with slack rather firmer accordingly than sizes.

Coke—The coke market is not any stronger and promises to continue its former weak condition till there is a turn in the iron market. Dealers are finding a good many prices to contend with, as they seldom know whether the reductions are accompanied by corresponding cheapening of the product. Quotations remain weak on the basis of $4.70 for best Connellsville foundry, f.o.b. Buffalo.

Anthracite—The closing lake season finds that the an-racite shippers are not satisfied with the movement during e regular season, and are willing to pay extra insurance r December cargoes. During the first week in December ey shipped 67,500 tons by lake and another cargo will ing to their credit a round 5,000,000 tons by lake from this rt exceeding the previous record by more than a million ns.

The demand for anthracite is quite as slack as it is in the tuminous trade. There will also soon be as great a surplus, ough it will be easy to store it for awhile yet, as lake ves-ls can be loaded. Retail dealers are much discouraged over e situation and outlook.

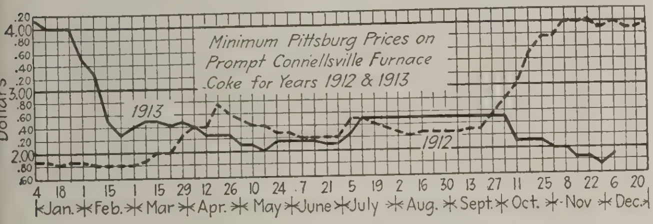
CENTRAL STATES

PITTSBURGH, PENN.

Receivership for prominent coal company. Market con-nues quiet with operations at the recently reduced rate of per cent. Prices fairly well maintained. Coke slightly wer, but buyers and sellers still far apart.

Bituminous—The receivership of the Pittsburgh-Buffalo o., secured Saturday, Dec. 6, by certain creditors, reflects in art some special losses which were incurred early in the ear by flood, but also in large part the fact that it requires onsiderable gross profits per ton of coal mined to carry the arge investments in plant and coal acreage demanded by resent mining conditions. The company has expanded rapidly n the past few years and for several months past it has een known that it was relatively short of working capital. t is generally expected that the receivership will protect the roperties and eventually restore the business intact to its wners. The move was precipitated by the fact that notes of he company were about to be offered at a discount. During he past year the operators of the Pittsburgh district have een endeavoring to secure better prices than formerly for heir product, and the present involvement of the Pitts-urgh-Buffalo Co. shows how well taken was the position hat a larger margin was requisite.

The market has been quiet the past week and prices have not been overly well sustained, though there has been no general cutting from the season list, to which the market lately declined from the premium prices put out in October. Manufacturing demand has remained relatively light, and so has domestic demand, but Sunday a near-blizzard visited the district and this week's domestic demand promises to be large. Operations continue on about the 60 per cent. basis estimated in last report, showing a large decrease from the rate before the lake season ended. We quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55; per ton at mine, Pittsburgh district.



Connellsville Coke—Prompt furnace coke has been available at lower figures, even $1.75 having been shaded in at least one instance. There is little demand as shipments on contracts are usually ample. Negotiations on contracts for the new year are proceeding slowly, and buyers and sellers are even farther apart than is frequently the case. The majority of sellers retain the idea that they should secure $2 on furnace coke contracts, but there are indications that they are nearing a conclusion to depart from this figure. Other sellers are quoting down to $1.85 and occasionally this figure is shaded, as it is reported that one contract was closed for 5000 tons a month over first half at $1.75, the seller being a furnace interest not intending to operate its furnace for some time. Foundry coke is in fair demand. We quote: Prompt furnace, $1.75; contract furnace, $1.85; prompt foundry, $2.50@2.75; contract foundry, $2.50@2.75, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 29 at 344,108 tons, a decrease of 11,132 tons, and shipments at 356,785 tons, a decrease of 22,119 tons. The "Courier" figures have shown a net excess of shipments over production for many weeks past, which is not easily explained.

COLUMBUS, OHIO

Further weakness characterized the local trade due to the continued warm weather in all sections. The coal market now dependant absolutely on the weather. Recent cold snap will keep the situation from complete demoralization.

Operators and shippers generally made an effort to maintain circular prices but were not successful. Shading was the rule all along the line, and a large tonnage could not be moved at any price. Bins of dealers all over the country are full and consequently low quotations fail to attract them. Cancellations of orders placed some time ago have been the rule and in many cases consigned coal was rerouted after shipment. There was considerable demurrage coal reported at centers such as Chicago, Toledo, Cleveland and Detroit and which still further weakened the market.

The car supply is now all that can be desired, the closing of the lakes causing a much better supply. Eastern Ohio reports about 90 per cent. and the Pomeroy Bend district about the same. In the strictly domestic fields the car supply has been adequate and the same is true of the Hocking Valley. Shutting down of a number of iron and steel concerns has had its influence on the steam business. There is a noticeable decline in demand from many factories. Railroads are not taking as much as formerly as the freight movement has slowed up appreciably.

A most successful lake season for Ohio operators has come to a close. Only a small tonnage was loaded during the past week and since insurance is off, no more cargoes will be loaded. The reports of the Hocking Valley docks at Toledo shows that 2,719,958 tons were loaded during the season as compared with 2,328,963 tons for 1912 and 2,253,069 tons in 1911. In Eastern Ohio the increase was even more marked. Many of the larger operators increased their tonnage from 70 to 85 per cent. over the previous year.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00 @ 1.85	....	$2.25 @ 2.15	$1.90 @ 1.75
3-4 inch	1.75 @ 1.70	$1.30 @ 1.20	2.00 @ 1.90	1.70 @ 1.60
Nut	1.30 @ 1.20	....	1.75 @ 1.65	1.30 @ 1.25
Mine-run	1.35 @ 1.30	1.15 @ 1.10	1.50 @ 1.40	1.35 @ 1.25
Nut, pea and slack	0.85 @ 0.80	....	0.95 @ 0.90	0.80 @ 0.75
Coarse slack	0.75 @ 0.70	0.95 @ 0.85	0.85 @ 0.80	0.70 @ 0.65

TOLEDO, OHIO

Long continued warm weather had a bad effect on the market. Circular well maintained despite slack demand. Movement good and cars plentiful.

Business in Toledo is quiet although the recent cold snap has had a beneficial effect. This section has rarely experienced such a steady run of warm weather at this season as has been the case this year. In some ways this has been a good thing as it has prevented congestion of railroad yards and given the roads a chance to get squared around following the rush of the sugar beet season. Cars are fairly plentiful now and most of the shipping troubles is due to yard congestion at some points and a lack of motive power rather than to a lack of equipment. However, there has been a car shortage reported until recently, railroads urging the hopper cars upon operators.

Despite the short demand prices have held fairly firm and are still being maintained very close to the list. While there are, of course, some sales below the circular, quotations have not broken nor show any indication of doing so. There is little coal left here on the docks as the amount shipped in seems to have been closely figured despite the extraordinarily heavy lake shipping this season. Steam coal is in fair demand.

Prices are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massillon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$2.00	$2.75	$2.25	$2.50	$1.50	$1.40
Egg	2.50	1.35	2.75	1.50	2.50	....	....
Nut	2.00	0.80	2.25	1.75	2.50	1.35	....
⅞ lump	....	0.90	....	....	....	1.30	1.20
Mine-run	1.60	1.50	....	....	....	1.20	1.20
Slack	....	0.70	....	....	....	0.80	....

DETROIT, MICH.

Heavy shipments coming in and coal is occasionally reported on demurrage. Dealers canceling orders or requesting that shipments be deferred.. Prices slump in spite of determined efforts to maintain the circular.

Bituminous—All jobbers feel that they will need coal when the heavy weather appears but they are, at the present moment canceling all orders possible or asking operators to postpone deliveries indefinitely. A great deal of coal is coming in and there have been instances where demurrage has been paid for as high as seven and eight days. The others bought domestic coals heavily during the car stringency and these are now in poor demand. Car supply is excellent at the moment but there is a feeling that this may be of short duration. Production in the Hocking and Pomeroy districts is about normal on both steam and domestic coal. Prices are shaded to move coal on demurrage and this has weakened the market all along the line, in spite of the strenuous efforts of the operators to maintain the circular. Hocking and Kanawaha domestic lump have both suffered a decline from their circular price of $2. Three-quarter lump which was quoted at $1.50@1.75 is now being offered at $1.15 while mine-run, which was held at $1.25 is down to $1 and slack is between 75 and 80c. per ton.

The following is approximately the market at the moment:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.50	....	$1.50	....	....	$2.50	$2.50
Egg	1.50	....	1.50	....	....	2.50	2.50
Nut	1.30	....	1.30	....	....	....	....
Steam lump	1.20	....	1.20	....	....	....	....
¾-in. lump	1.10	$1.15	1.00	$1.10	$1.10	....	....
Mine-run	1.00	1.00	1.00	1.10	1.10	....	....
Slack	0.76	0.85	0.65	0.75	0.75	....	....

Anthracite—Stove coal is short and is commanding a ready premium in this market. Other grades are coming in freely.

HAMPTON ROADS, VA.

Dumpings for the week fair. Coal shortage somewhat improved. Accumulation of coal at tidewater about normal.

The dumpings from tidewater piers for the week have hardly been as heavy as was expected. The movement both foreign and coastwise will be considerably behind the figures for the first week in December.

With a number of large government colliers due in the next few days, some shippers are accumulating coal at the different piers, and while there may appear to be a surplus at tidewater this is really not the case as the coal on hand is practically all contracted for and only waiting tonnage to move it. However, a few shippers have some free coal. Prices during the week have ranged from about $2.85@3, which is about the same as has been in effect for some weeks.

The Virginian Ry. ran a close race with the N. & W. for dumpings for the month of November, falling behind the latter road only about 5000 tons. At one time during the month the Virginian was considerably in the lead. The total dumpings of the Norfolk & Western were 345,727 tons, the Virginian 340,769, and the C. & O. at Newport News, 207,778 tons. The Virginian's dumpings is a record for that road, and is nearly one hundred per cent. over their November, 1912, figures. The N. & W. figures, however, are about 1500 tons behind their November, 1912, dumpings. The Norfolk & Western would have been considerably heavier had they not been hampered by having a large number of their coal cars tied up in the congestion on the various Western roads.

LOUISVILLE, KY.

Dullness prevails in both domestic and steam business. Mild temperatures up to the current week delayed consumption. Stocks heavy but prices are holding moderately firm.

The market is governed entirely by weather conditions which, up to the current week, were strongly adverse to an active trade. As the result, stocks are abnormally heavy and the volume of business is much below that customary at this period of the year.

An incipient car shortage is still being felt, eastern Kentucky mines having been idle for two days last week from this cause. However, this is of little consequence because of the flat market, but with the change in the weather conditions this week, the possibility of a continued shortage is regarded with anxiety. The light demand has effected a further decline in prices, but such declines do not represent the real market as operators appreciate the futility of attempting to force buying by abnormal cuts. Eastern Kentucky block of the better grades can be had at $2.15 a ton, as compared with the top price a few weeks ago of $2.50. Block and lump are rather slow at around $2, and round is worth $1.65@1.75. Better grades of nut and slack are offered at 75c.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

Coal market quieter than for several months. Blacksmith coal normal. Furnace and foundry coke dull. Car supply still inadequate.

The market on steam coal is quiet, and some stock is accumulating on track, which is unusual for this season of the year. While business is slow, prices are remaining about stationary. Domestic coal is dull, due to the continued warm weather, and while the regular schedule on the higher grades is from $3 to $3.25 per ton, some interests are offering domestic lump as low as $2.75, while one interest has offered spot shipment at $2.50. This condition cannot last long, however, and all operators believe that the next few days will see a decided improvement in both steam and domestic business. The usual holiday rush orders have not yet come in, and, as the mines usually close down for several days during the holidays for lack of labor, operators are looking for a brisk demand for the balance of the year.

Blacksmith coal is moving in about its normal tonnage. Both furnace and foundry coke are quiet, though some tonnage of foundry coke is moving regularly Although some recent articles have stated that Birmingham iron is offered at $10 f.o.b. Birmingham, this is in error. While the market is very dull, and only a small tonnage being booked, the prices are from $11 to $11.50 per ton basis 2F f.o.b. Birmingham, the manufacturers believing that the price will go higher instead of lower. The car supply is still short of the requirements, especially on some of the large contracts, which require a heavy daily tonnage to move regularly.

NEW ORLEANS

Warm weather takes life out of city market. Texas orders fall off. Bunker trade shows decrease. Plan to bring Alabama coal by water proves failure for present.

A stagnant conditions of the city coal market has resulted from the continued warm weather and is responsible to a great extent for the unusually large stocks being carried at this time of the year. Demand from other sources has been light during the past week. Bunker business has been slow while the demand from western Louisiana and eastern Texas is falling off. The only activity in the week's business was the filling of several orders for Latin America.

The local market is being affected adversely by the increased practice of European-bound ships to take only a portion of their coal supply here. By taking aboard a supply sufficient to reach Norfolk, considerable additional cargo space is provided. This is more than offset, however, by the increasing number of direct sailings to South and Central American ports.

So far as the first barge load of coal from the Alabama field is concerned, the experiment is an abject failure. The cause, however, does not reflect on the fundamental ideas of the plan. Failure on the part of the government to complete the locks at the time specified, makes the navigation of the Warrior and Tombigbee Rivers practically impossible for a loaded barge. A year at least must elapse before the locks are completed during which time the expensive handling machinery must remain idle.

CHICAGO

Marked slump in the Chicago trade, due to continuation of warm weather and a recession in general business conditions. Shipments are curtailed and operators are reducing their output. Many orders are being canceled and requests for delayed shipments are frequent. Demand for anthracite is small. Coke market dull.

Continued warm weather up to the present week, and a general slackening in business conditions has produced a decided slump in the Chicago market. Dealers complain that sales of domestic coal have fallen off in a marked degree and in the steam-coal trade there has been a substantial decline in the volume of orders.

Market observers declare that a sharp recession in production is necessary to prevent a general slump in prices. The storage capacity of a majority of the retail dealers is taxed to the limit and many of them have ordered more coal than they have room for. Many canceled orders and requests to delay shipments have been reported. Some operators who sold coal at $2 or better have had all unshipped orders canceled within a few days.

There is comparatively little demand for anthracite coal and a number of all-rail shipments are now subject to demurrage charges. No changes in the price list have been noted, but sales are light. The price of smokeless mine-run is being held at $1.40 by the larger producers, who are cutting down shipments as much as possible. A small amount of off-grade fuel is being moved, but practically no free coal is reaching the Chicago market. Some of the large smokeless buyers are making an attempt to drive the price of mine-run to $1.25, but so far their efforts have not been successful.

Shipments of Hocking coal are also being curtailed. Smaller shippers have been forcing sales at sacrifice prices, in some instances as low as $1.50, the mines. Operators in the Springfield district are handling steam coal on contracts chiefly, and devote little attention to domestic business at present. Prices for domestic lump range between $1.35 and $1.50. Indiana domestic sizes vary between $1.40 and $1.50. There has been a slight improvement in screenings, but the olume of business is far from satisfactory. Carterville perators have been reducing their shipments and lump and gg sales range from $1.50 to $1.75, the mines. Franklin ounty lump and egg are down in price to between $1.50 and 1.75. The coke market is soft.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
omestic lump	$2.17@2.32	$2.55@2.80	$2.12@2.27	
team lump	1.92		1.97	
gg		2.55@2.80		$4.20
ine-run	1.87	2.40	1.87	3.45
creenings	1.12	1.70	1.27	

Harrisburg—Domestic lump and egg, $2.55@2.30; steam ump and mine-run, $2.25; screenings, $1.55; No. 1 nut, $2.55@ .80; No. 2 nut, $2.55.

Carterville—Lump, egg and No. 1 washed, $2.55@2.80; No. washed, $2.55.

Coke—Connellsville, $5.25@5.50; Wise County, $5@5.25; yproduct, egg, stove and nut, $4.90@5; gas house, $4.75@ .95.

ST. LOUIS, MO.

Market unchanged but more seasonable weather condiions will have a beneficial effect. Demand satisfied at the oment and some mines closing down. Large accumulations f coal.

Continued warm weather has brought about no change in he market. However, this week started off inclined to be ore favorable to the coal trade, and from now the situation hould improve. Conditions are much the same as reported ast week, with the exception that what little demand there was at that time has long since been taken care of and several operators found it more economical to shut down than to continue producing.

Retail yards are still piled up with storage coal, and railroad yards at all diverting points are loaded to capacity with unbilled coal. The screenings market started the latter part of last week to get into its own again, those in the Standard field advancing as much as 10c. in one day. They are still bringing better prices and this condition will likely continue now for some time.

There seems to be plenty of cars on the big coal carrying roads, but the Southern and the M. & O. are in bad shape and the Wabash is about the same. There is no coke market, no demand for anthracite, and no inquiry at all for smokeless.

The prevailing prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	$1.00*
3-in. lump	....	....	$1.40*	....
6-in. lump	$1.30 @ 1.50	....	1.50*	1.20*
Lump and egg	1.85 @ 2.15	....	....	....
No. 1 nut	1.40 @ 1.60	....	....	....
Screenings	0.40 @ 0.50	....	....	....
Mine-run	1.10 @ 1.20	....	....	....
No. 1 washed nut	1.75	$2.25	1.40	....
No. 2 washed nut	1.35	....	1.60	....
No. 3 washed nut	1.15	....	....	....
No. 4 washed nut	1.05	....	....	....
No. 5 washed nut	0.50	....	....	....

* Asking price.

INDIANAPOLIS, IND.

Teamsters' strike has cut off domestic deliveries. Mild weather reduced running schedule of mines about one-third. Plenty of cars. Isolated cases of price shading, but general tone firm.

Mild weather and the teamsters' strike in this city continue to be the chief influences in the coal industry. The strike had little effect on the factory consumption, but it stopped the delivery of coal to domestic users. The net results during the disorder were about one dozen killed and wounded, and as much excitement centered around efforts to deliver coal as in all other lines combined. The disorder would have been much worse had not the police been well organized and had the assistance of about 3000 special police made up largely of employers and loyal employees. No rioting lasted more than long enough to give the police time to reach the scene in speeding autos. Only two or three dealers attempted deliveries, and these were few. The general policy of employers was to stop business, awaiting the end of the trouble. The strike was declared in effect Sunday midnight. There had been a great rush of deliveries in anticipation, the bustle extending through Sunday up to the hour for striking.

The mild weather is a depressing influence throughout the state and has cut down the running time at the mines about one-third. There are plenty of cars, now that they are not badly needed. Reports are heard of cut prices here and there, but the operators in general hold firm. There is little use in lowering prices, they say, when consumers have their bins full. The standard price for screenings is 60@65c., mine-run $1.25@1.35; steam lump, $1.45@1.55; domestic lump, $1.90 @2. Retail prices in this city hold at the basis of Sept. 20, when the winter rates went into effect.

The average temperature recorded in the Indianapolis bureau for November was 47.6 deg., and this was a fair index of the weather generally over the state.

KANSAS CITY, MO.

Operations being restricted due to warm weather. Market remains steady though dull. Colorado strike not affecting the local situation.

Rain and warm weather have failed to form a favorablle combination in Kansas and Missouri and business has been at a low ebb during the past week. Most of the operators are working on part-time basis, being unable to keep their plants in continuous operation under present conditions.

The market has been steady in most cases, despite the lull. The Denver situation is having no bearing on conditions in Kansas City. Reports from Denver recently were to the effect that a shortage in coal is prevailing there. However, there is plenty of coal being mined in Colorado, and there is little or no probability of Kansas coal being shipped into Denver or other Colorado points as a result of the strike. The only possible result is a heavier shipping to western Kansas, should the Denver disagreement be prolonged.

OGDEN, UTAH

Only colder weather will bring renewed activity to the coal market. Surplus of nut at mines causes drop in quotations. Car supply sufficient to handle present shipments. Strike situation in Colorado not improved.

All the mines in Wyoming and Utah have been keeping up on their shipments and making efforts to stimulate the market. Mild weather continues throughout the territory and coal is moving slowly. Many standing orders have been reduced or canceled. This light demand for coal has caused a surplus of nut at the mines and there seems to be no market for this grade. Nut is a summer coal and there is little call for anything except lump at this time of the year.

A few salesmen still believe that a cut price will move a surplus of coal on the stagnent market and consequently this grade has been offered below quotations. This method might bring temporary relief in some cases with other grades of coal, but nut coal is sold entirely to retail dealers who buy a car at a time and only when they have sufficient orders in sight to handle same. The cut price may induce the dealer to order a few days before he intended to, but it does not increase the sale of this grade.

The ideal fall weather has allowed the railroads to handle coal shipments in record time, which has been one item effecting the car supply. Cars are plentiful and there is no indication of a shortage.

Shipments to Nebraska and Colorado from the Wyoming mines continues slightly above normal, except for nut coal.

Quotations remain unchanged as follows:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.25	$2.75
Nut	2.50@3.00	2.50	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

PORTLAND, ORE.

Report that railroads may take advantage of reduction in duty on foreign coal by purchasing from mines in Canada. Strike there has reduced output and considerable coal has been shipped from this side into British Columbia.

It was reported here this week that railroads in this part of the country have been investigating the possibilities of importing coal from British Columbia. It is understood that instead of quoting the price, minus the 40c. per ton duty, the miners were not inclined to make more than a 30c. reduction. It has been impossible to verify the report at this time.

It was recently announced that the Boston Pacific line will inaugurate regular fortnightly steamship service between Boston and ports on the Pacific Coast, including Portland, as soon as the Panama Canal is thrown open for commercial traffic; and in this connection it has also been announced in a private telegram, on what appears good authority, that the canal will be open and ready for business in April or May of next year, about ten months earlier than former reports have indicated. To begin with eight steamers, representing a total carrying capacity of 50,000 tons, will be placed in commission, two of them now being built at Boston, each of 9000 tons carrying capacity.

The coal market here at present is without change, as to prices, but as the winter advances the demand for domestic purposes is becoming keener. So far the weather has been against heavy consumption throughout the Pacific Northwest.

FINANCIAL DEPARTMENT

St. Louis, Rocky Mountain & Pacific Co.

Under date of Aug. 1 Pres. J. Van Houten sent out a circular which we abstract as follows:

Agreement to Sell Railway Property to Atchison Topeka & Santa Fé

The mortgage securing your bonds is a first and direct lien upon all of our coal properties, coal mines, mining and coking plants, which constitute the principal security for your bonds (and will so remain), and is also a lien upon the stock and bonds issued by the St. Louis Rocky Mountain & Pacific Ry. Since the execution of the mortgage, the company has purchased further coal land and rights, has opened and equipped four additional mining plants (making five in all) and one new coking plant (making a total of two), all of which new property has come under the lien of the mortgage. These additions and improvements have increased our capacity from about 1500 tons daily in 1905 to from 7000 to 8000 tons, and a present actual daily coal production of 5000 to 6000 tons.

The railway has 106 miles of main line of standard gage, well built and maintained, with 523 freight cars, 2 passenger cars 2 combined passenger, express and baggage cars and 7 locomotives. It does not enter directly any of the markets for the company's fuel, except local points of small importance, and the divisions of through rates which it has been able to obtain are so small, owing to the short haul, that it has not been a paying proposition. In fact, there has been a considerable and increasing annual deficit which has had to be provided for out of earnings from the coal business. Under the present laws, discrimination, either as to rates or service, is practically impossible; hence, the control of the railway by this company gives no advantage which we would not otherwise enjoy. Moreover, we actually suffer a disadvantage in times of car shortage on account of the limited equipment of the railway.

Heretofore, notwithstanding the large annual deficit of the railway, which during the past six years has caused a loss to the company in interest on the railway company's bonds and in money advanced for operating expenses amounting to $900,000, this company has been able not only to provide for this deficit and meet its own expenses, taxes and fixed charges promptly, but has also accumulated a substantial surplus from earnings of the coal business the greater part of which has been reinvested in the extension and improvement of the coal properties.

After a careful consideration, the directors have decided that the company should go out of the railroad business and devote all its resources to the enlargement of its fuel business. The company accordingly has negotiated an agreement whereby the railway stock and bonds or the railway property may, upon release of said stock and bonds from said lien, with the consent of bondholders, or, if necessary, through foreclosure of the mortgage upon the railway, be disposed of to the Atchison Topeka & Santa Fé Ry. Co. for the consideration mentioned in the inclosed agreement. Such disposition will bring four decided advantages for this company's bondholders: (1) A valuable asset readily convertible into cash and bearing a regular return in place of the nonproductive stock and bonds disposed of. (2) The assurance of ample transportation facilities at all times and the active coöperation of a great railway in the promotion and extension of our fuel business. (3) Freedom from embarrassment in the future should Governmental legislation compel the disposal of the railway without possibly giving adequate opportunity to make favorable terms. (4) The proceeds of the property to be disposed of will be used for your benefit either by retiring a large amount of the company's outstanding bonds, or else the securities received as part of such proceeds will be held by the trustee subject to the lien of your mortgage.

Present Mortgage to Be Closed Except as to $1,000,000 Available for Future Coal Developments, Etc.

Under this company's present mortgage, additional bonds amounting to $6,301,000, par value, are authorized and may be issued for railway purposes. It is proposed so to amend the mortgage that upon the disposal of said railway stock and bonds or of said railway, the authority to issue such additional bonds will terminate. The mortgage securing your bonds will thereupon become substantially a closed mortgage, as no further bonds could be issued thereunder, except not to exceed $1,000,000 for developing and improving the coal property.

Sinking Fund to Be Inc'd from 1c. to 3c. a Ton, to Retire Bonds by Maturity

The company proposes also to increase its sinking fund payments to 3c. per ton of coal mined each year instead of 1c. per ton as now. Considering the constantly increasing business and that a large amount of outstanding bonds will be retired as a result of the disposal of the railway property, it is believed that the proposed annual payment of 3c. per ton will be adequate to retire the entire bonded debt at or before maturity.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Dec. 6.

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	83	83	8 3	87	80
American Coal Products Pref.	..	..	105	109¼	102
Colorado Fuel & Iron	28¾	27¼	28	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102¼
Lehigh Valley Coal Sales	190	175	175	....	....
Island Creek Coal Com.	47	45½	47	53½	47
Island Creek Coal Pref.	83	81½	83	85	80
Pittsburgh Coal	19¼	18¾	19¼	24⅜	14½
Pittsburgh Coal Pref.	88½	87½	87¼	95	73
Pond Creek	18	17⅛	18	23¾	16½
Reading	163⅜	159⅝	162⅞	171	151⅜
Reading 1st Pref.	84½	84	84½	92½	82½
Reading 2nd Pref.	87	86	87	95	84
Virginia Iron, Coal & Coke	..	..	40	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	90	93	91½	91½	90	99⅛
Colo. F. & I. gen. 6s	102	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.	75	78	77½	Nov. '13	77½	85
Cons. Ind. Coal Me. 1st 5s	76	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	86½	92	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	87⅝	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	76	Sale	76	76	73	80½
Tenn. Coal gen. 5s	97⅛	97¾	97⅛	97⅛	97	103
Birm. Div. 1st consol. 6s	101⅞	101½	101	Nov. '13	100⅝	103
Tenn. Div. 1st g 6s	101⅞	101½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	84	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	Nov. '13	92	98

No Important Dividends were announced during the week.

⁂

Canadian Coal & Coke Co.—It is stated that this company will shortly issue two-year notes, to the amount of $750,000, and it is further stated that the American bankers interested in the financing, will advance an additional $500,000.

FOREIGN MARKETS

GREAT BRITAIN

Nov. 28—Strong conditions continue to rule. The demand for all classes of coal is good, and collieries are heavily booked for December.

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.20@4.32
Best seconds	4.68@4.87	Seconds	3.96@4.08
Seconds	4.50@4.62	Best Cardiff smalls	2.58@2.70
Best dry coals	4.56@4.80	Seconds	2.40@2.52

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

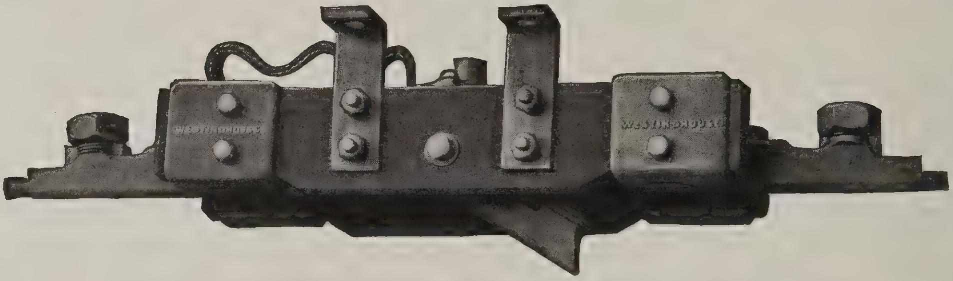
Volume 4, No. 25
Issued Every Saturday
Hill Publishing Company

NEW YORK, DECEMBER 20, 1913

Ten Cents per Copy
Contents, First Page
Advertising Index, Last Page

Cutting Band of Slate from Middle of a Coal Seam

Westinghouse
Line Material for Mines



Automatic Section Insulator. When locomotive passes into section where this insulator is used, the line is automatically energized; current is turned off when the locomotive passes out.

THE Westinghouse Electric and Manufacturing Company manufactures not only a complete line of suspensions, ears, splicers, insulators, rail bonds, pole line hardware, and other line material for outside work, but also special devices designed particularly for mine work.

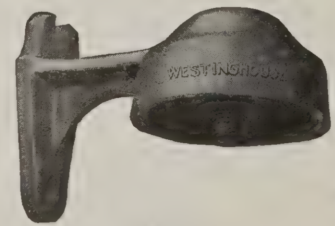
The insulating material used is made at our East Pittsburgh Works. It is moisture-proof, heat resistant and of high mechanical and dielectric strength. It is moulded into shape under great pressure, so that it is very dense and capable of resisting heavy strains.

All malleable-iron and steel parts are sherardized, absolutely preventing oxidation.

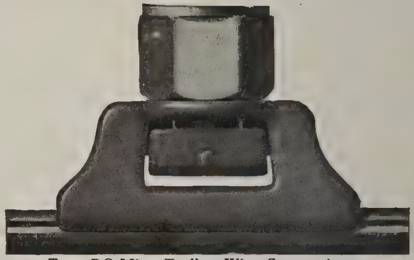
Ceiling Suspension

Type BL Ceiling Suspension

Bishop Mine Suspension

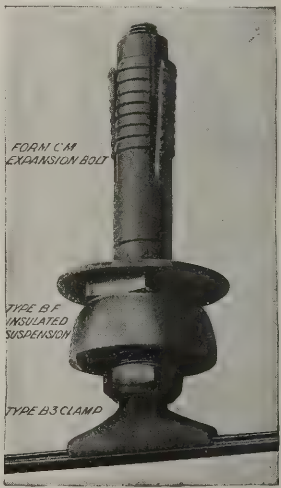


Wall Suspension



Type RC Mine Trolley-Wire Suspension

Type HB Mine Trolley-Wire Suspension



Type B-3 Mine Suspension

Three-Way Trolley Frog
Made only in Bronze

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Bluefield, W.Va.
Boston, Mass.
Buffalo, N.Y.
Butte, Mont.
Charleston, W.Va.
Charlotte, N.C.
Chicago, Ill.
Cincinnati, Ohio.
Cleveland, Ohio.
Columbus, Ohio.
Dallas, Tex.
Dayton, Ohio
Denver, Colo.
Detroit, Mich.
El Paso, Tex.
Houston, Tex.
Indianapolis, Ind.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Louisville, Ky.
Los Angeles, Calif.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
New Orleans, La.
New York, N.Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Rochester, N.Y.
St. Louis, Mo.
Salt Lake City, Utah.
San Francisco, Calif.
Seattle, Wash.
Spokane, Wash.
Syracuse, N.Y.
Tacoma, Wash.
Toledo, Ohio.
Washington, D.C.

Member Society for Electrical Development "Do It Electrically."

COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

Will *You* Write This?

The Weekly Ad-Talk Page

What have you bought through the advertising pages of Coal Age?

It's a long time since we have asked any questions and we sometimes wonder if all the little talks which appear on this page accomplish all we hope they do.

The advertising pages of Coal Age contain the business messages of concerns which make things you can use to advantage in coal mines.

The ads no longer shout in big bold-face type the name and address of the advertiser but tell why the advertised goods should be bought.

In a great many instances the advertisers offer to ship their goods on trial.

In others, working samples are offered. In every case the advertisers put their propositions before you in a straightforward businesslike way, no ifs, ands or buts, no calling on the imagination, no exaggerated claims, no knocks.

Now, are you taking full advantage of the opportunities for improvement held out by the advertising section?

Are you using the ad pages for all they are worth?

Does the vast improvement in advertising in technical paper advertising mean all it should to you?

Are you buying goods for your plant from the selling section?

What have you bought in this way?

Write us a letter telling what and why—we will publish it on this page and pay regular space rates for anything we use.

Extracts from the Coal Age Advertising Code

1 No misstatement of any kind can appear in the Coal Age.

2 No gross exaggeration can appear.

3 The name or address of a competitor cannot be mentioned in an advertisement.

4 No advertising of any product (or services) that cannot be used to advantage in a coal mine can be inserted in the Coal Age.

5 We reserve the right to refuse the advertising of any concern, if in our judgment the product is not ready to be marketed, or if the would-be advertiser is not financially able to continue advertising long enough to make his investment worth while.

COAL AGE

Vol. 4 NEW YORK, DECEMBER 20, 1913 No. 25

Christmas in a Mining Town

By Berton Braley

Written expressly for Coal Age

Christmas in a mining town—dreary sort of time,
  Snow is rather dingy and the hills look bare,
Life is just the baldest prose—not a bit of rhyme,
  Scarce a sign of Santa, though he should be there;
Children in the miners' homes whisper in the night
  "Tell us he is comin', say it ain't no fake!"
Well, sir, will you turn away, hold your money tight?
  Or will you loosen slightly for a small child's sake?

Christmas in a mining town—life is pretty hard
  Many is the hovel where the cupboard's bare,
Mothers toil unceasingly—this is their reward
  To meet the Christmas season with a face of care;
Well, sir, will you turn aside, clutching tight your roll,
  Or fill a portly basket as a good sport should?
Charity's a joyous task—soothing to the soul,
  Why not try it, brother?—Ah, I thought you would!

Christmas in a mining town—money's not enough,
  Give some love and kindness and a heart of cheer,
Help to smooth the pathway, where the going's rough,
  Give your songs and laughter—let them ring out clear!
Brighten up the dreary homes where the lives are gray,
  Frolic with the children till they shout with glee,
Christmas in a mining town—make this holiday,
  Something like the Christmas that it ought to be!

A New Type of Coal Cutter

By C. E. Warbom*

SYNOPSIS—A machine which cuts a 15-ft. room to a depth of 8 ft. without being unloaded from its truck. Since the cutting is done in a shale parting, which may then be entirely removed, no "bug dust" is made and the coal is secured clean from slate.

⁂

A novel and economical type of coal-cutting machine has been recently placed on the market by the Jeffrey Manufacturing Co., Columbus, Ohio. This is known as the Jeffrey-Drennen adjustable-turret coal cutter, and was designed by the Jeffrey company's engineers at the request and with the coöperation of Everett Drennen, manager of the Consolidation Coal Co.'s mines in the Elkhorn Division, to meet certain conditions existing there, also to enable the mining company to economically produce coal and increase the quality thereof.

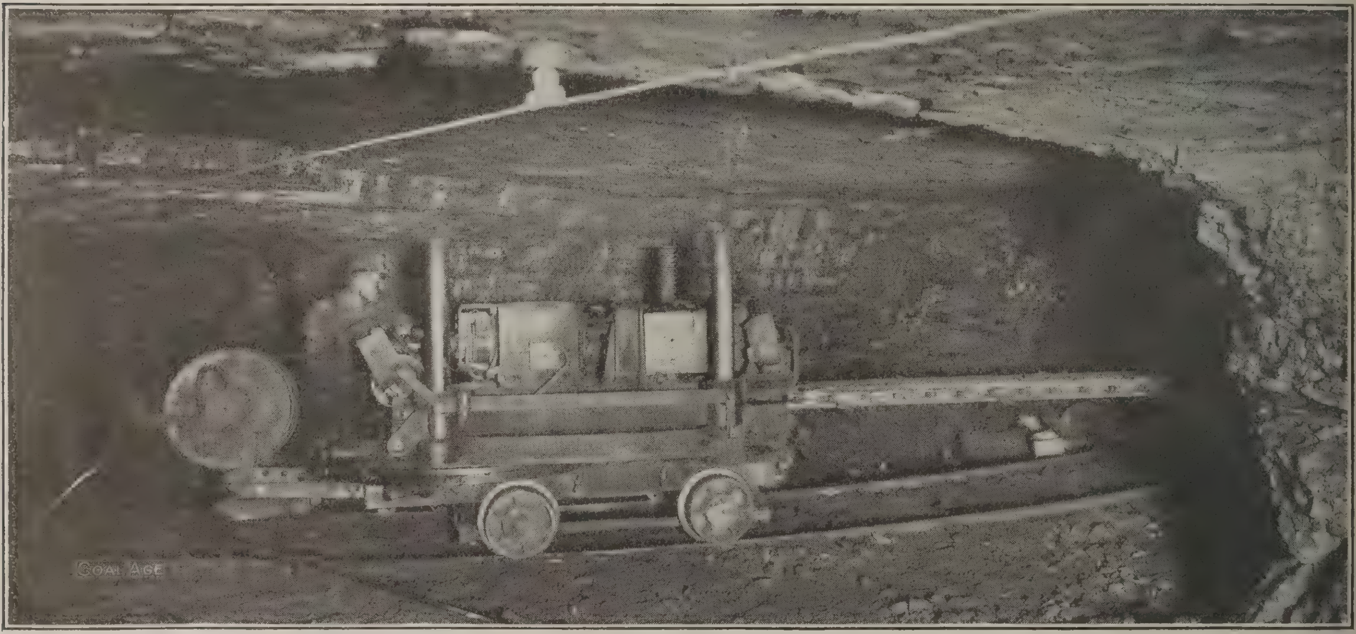
The coal seam at Jenkins, where the mines are located, varies from 6 to 8 ft. in thickness. It is clear, bright and free from sulphur or other impurities with the exception of a band of shale located at a height of from 2 to 5 ft. from the bottom. This varies in thickness from nothing to 19 in.

With the customary methods of undercutting it would be impossible when shooting to prevent this shale from becoming mixed with the coal, but by the use of a machine adapted to cutting out or removing this parting before the coal is shot down this difficulty is overcome.

How the Machine Is Built

The machine is mounted on a turntable truck, which carries four heavy standards or uprights, on which the machine proper is raised or lowered or adjusted to the desired height at which to cut out the dirt seam. The cutter is designed for a minimum height of 2 ft. from the bottom, and can be adjusted to cut at any position between 2 and 5 ft. The raising or lowering of the machine is accomplished by power through a disk friction clutch, which enables the operator to absolutely control the elevation of the machine to a nicety, 3 ft. of a vertical movement being accomplished in about 25 seconds.

A cable reel is provided which automatically reels up or unwinds the cable as a room is entered or left. The machine is arranged for self-propulsion and has a maximum speed of 350 ft. per minute; the rapidity of travel being controlled by the operator through a disk friction clutch, thus enabling him to run at any desired speed from nothing up to the maximum. This is a great advantage in going over frogs and switches since it minimizes the danger of derailment and consequent delay.



The Machine Entering a Room

The overall dimensions of the machine are as follows: Width, 5 ft.; length with 8-ft. cutter bar, 17 ft.; height, 5 ft. 6 in.

It has been found that by cutting the coal seam in the center it requires only two small shots for the top and two for the bottom bench, which lessens the danger of damaging the roof, and practically eliminates blowouts. The machine has been the means at these mines of giving a cleaner product, more rapid cutting at less expense per ton, and a much safer method of mining coal.

The entries in these mines are driven 10 ft. wide and the rooms 15 ft. wide. The operation of cutting is as follows: When the machine is moved into the room, an anchor hole $2\frac{1}{8}$ in. in diameter is first drilled in the coal under the band to be cut, and about on line with the left-hand rail; an anchor is fitted into this hole, and the feed rope attached. The machine is then turned on the turret by hand toward the right rib, making an angle of about 15 deg. with the track where it is automatically locked.

---

*Engineer, Columbus, Ohio.

The machine is then started and pulled toward the face, forcing the cutter bar into the coal to a depth of about 8 ft. When the cutter bar has reached its full depth in the coal, the feed rope is attached to an extension arm, which is securely bolted to the lower part of the truck, the rope being taken around a sheave and the end fastened to the machine proper. With this hitching the cutter bar is swung across the face, the speed being about 32½ in. per minute at the extreme end of the bar.

The cut across the face is complete when the bar stands at an angle of about 20 deg. to the left of the track, where it is again automatically locked. The feed rope is then carried to the machine over proper sheave wheels and attached to a jackpipe set about 20 to 30 ft. from the face, between the track and the left-hand rib.

The feed is then started and the machine with its truck pulled backward, cutting the left-hand rib as the machine leaves the face. When the cutter bar is clear it is swung into a central position, the machine lowered, and the self-propelling gear thrown in. It is then in readiness to proceed to the next working place.

Cutting Is All Done in the Shale

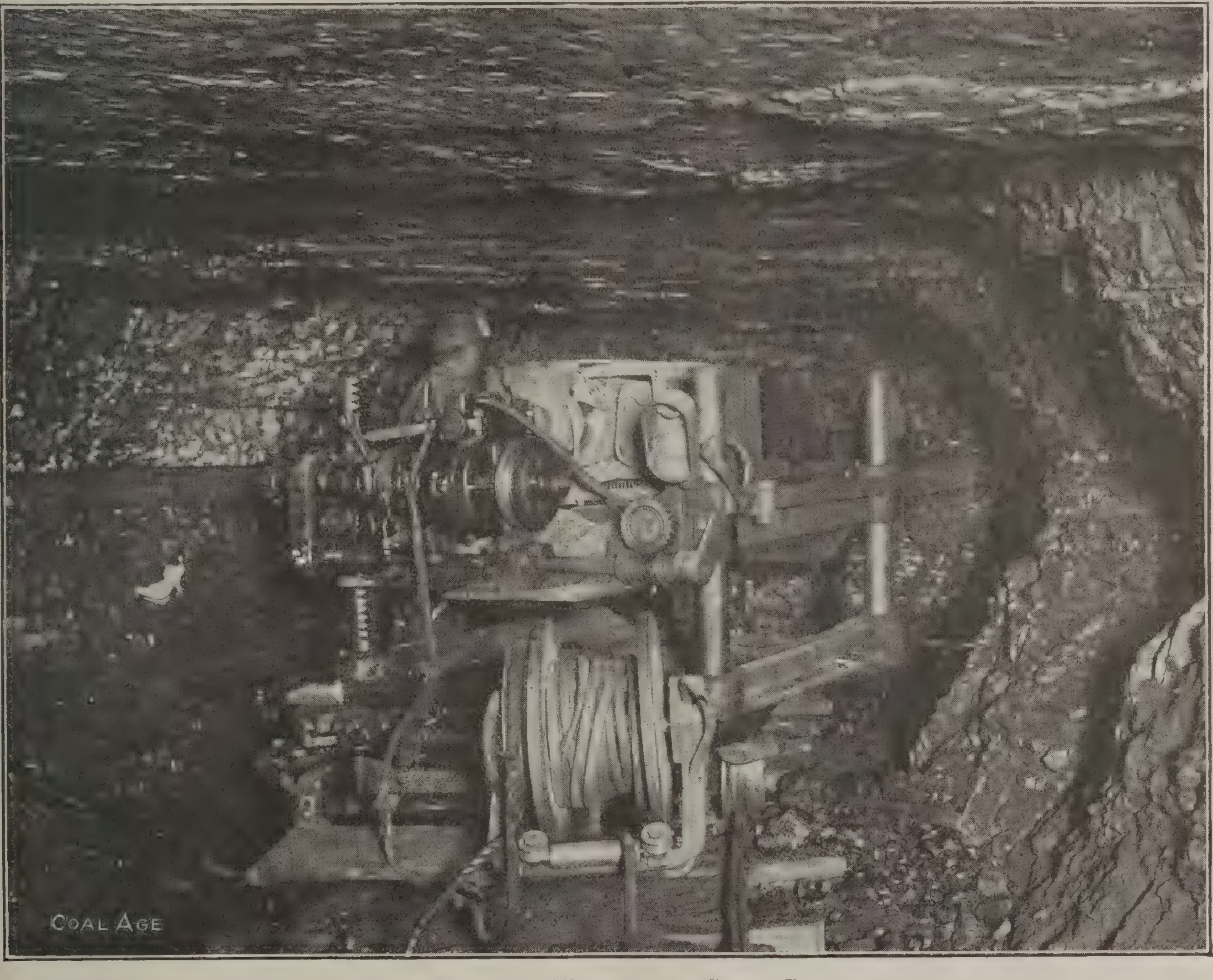
The cutting is done in the shale at the bottom of the band with the lower nose of the bits cutting into the coal about ¼ in., which causes the shale to fall down in the kerf, after which it is cleaned out, loaded in cars and hauled out of the mine. This insures an absolutely clean product.

Some idea of the performance of this machine can be obtained when it is considered that a 15-ft. place can be cut in 11 minutes from the time the machine enters the room until it is ready to leave. Twenty-five rooms have been cut in a shift of 10 hours. Since the installation of the first machine some eight months ago, the above company now has in operation 26 of these cutters.

Recently there have been numerous suggestions for a safer method of coal mining, especially in localities where the roof is faulty. Several coal companies have adopted the method of cutting the coal in the center, the object of this being to minimize the danger of blownout shots, and to lessen that of damaging the roof, also to secure increased production at lower cost.

The accompanying illustrations, together with the front cover of this issue, show the machine in various stages of the work and cannot fail to convey a good idea both of the make-up of the apparatus as a whole and the method of its manipulation.

It may be readily perceived that a machine so arranged as to require no unloading from its truck with the time losses incident thereto, has a great advantage over those of other types.



The Cutter at Work in the Shale Band

Banquet of West Virginia Coal Mining Institute

The banquet of the West Virginia Coal Mining Institute was held in the Hotel Kanawha, Charleston, W. Va., on Dec. 9, after the conclusion of the winter session. The hosts were the local mine operators. Considerably over 100 persons were present and the after-dinner speeches were exceptionally good. Joseph Holt Gaines, the ex-congressman, was toastmaster, and proved exceptionally witty.

Neil Robinson, mining engineer, Charleston, W. Va., delivered "Reminiscences of the New River Field"; Dr. I. C. White, state geologist, spoke on geology; E. W. Parker, statistician of the Geological Survey, discussed the need for having an organic union between institutes; Carl Scholz urged the claims of the American Mining Congress; Fred Paul Grosscup called on the operators to support the Panama-Pacific Exposition; Judge Ira Robinson testified to the value of industrial enterprises in building up the state of West Virginia; Fred Blue, state tax commissioner, declared that West Virginia had the lowest taxes and best system of handling its money in the United States; Fred Stanton spoke for the banking interests and Dr. J. E. Beebe wound up the speechmaking with a short but lively address, complaining that the bankers, politicians, geologists, statisticians and judges had told the coal men what they should do while the coal interests themselves were silent and were not offered a chance to reply.

⁂

The Kentucky Mining Institute

Judge H. S. Barker opened the Kentucky Mining Institute at 1:30 p.m., on Dec. 8, 1913, with an address of welcome on behalf of the State University, of which he is president. In the course of his remarks he urged the operators to use their influence and money in extending the duration of the school sessions in their mining villages and emphasized the value of subordinating legal rights to human needs. At least one company in Kentucky is providing one-half the cost of extending the school year, the other half being paid voluntarily by the employees.

W. L. Moss, the president of institute, responded in the briefest possible manner. Then R. D. Quickel read what might be well termed the strongest paper of the meeting. Mr. Quickel is fuel agent for the Cincinnati Southern Ry., and his subject was the "Clinkering of Mixed Coal under High Temperatures." Then followed "Problems Encountered in Mining Coals in the Western Coal Field of Kentucky," by Newell G. Alford, assistant engineer of the St. Bernard Mining Co., Earlington, Ky., a good article, if not quite equal to many others he has written. Prof. C. J. Norwood then read an article by W. C. Whitcomb on "The Use of Gasoline Motors in Coal Mines," a conservative appreciation of the value and use of such locomotives. Thomas Robinson read a paper by Dr. S. R. Collier, of West Liberty, Ky., on the "Oil Fields of Northeastern Kentucky," and Prof. W. E. Freeman, of the State University, read a paper on "Safeguards in the Use of Electricity in Mines." Otto A. Rothert, the historian of Muhlenburg County, talked interestingly on "The Bearing of Coal Mining on Local History," showing how early was the development of the West Kentucky field.

Senator J. E. Bosworth, of Middlesborough, Ky., was not present, so E. B. Wilson delivered an address on "The Old and New Way" of mining coal, illustrated by some 60 slides.

The Summer Meeting

A resolution supporting the Foster bill in Congress, which aims to provide national aid to mining schools for educational extension and investigation, was passed unanimously. The next meeting will be held at Lexington, probably in accord with the constitution, on the second Monday in June. There has been some disposition to violate the provisions of the constitution and to meet at the winter session in some other place than Lexington. It seems a pity, however, to hold the winter meeting in the mining districts, for the weather is then usually unsuited for traveling around the mines. If the constitution is to be amended or broken it should be done for the purpose of transferring the *summer* meeting to the coal-mining regions.

The Smoker

The evening session of the Kentucky Mining Institute was a smoker in the Hotel Phoenix, tendered by the Mining Society of the College of Mines and Metallurgy. The meeting was opened by President Moss, but as he had to leave on an early train, the chair was later occupied by B. F. Hutchcraft. At the suggestion of W. L. Moss, T. J. Barr opened the discussion by a statement of the difficulties in deciding what constitutes a "mine accident"? when is a death in the mines to be listed as a "fatal mine accident"? what constitutes a "serious mine accident"? and what accidents should be reported for the mine inspector's record?

What Is a Mine Accident?

Mr. Barr instanced the deaths at the Taylor shaft. Several men went to an abandoned coal pit to see whether the water being drawn away from the neighboring mine had any effect on the water in the shaft. One man became asphyxiated by the bad gas in the pit and was drowned. Those who attempted a rescue suffered the same fate. Mr. Barr stated that as the shaft was completely abandoned the question arose: Was that occurrence classifiable as a mine accident?

Some injuries, properly attended to, would not result in death but complications often arise, such as pneumonia, and it then becomes, according to the speaker, questionable whether or not the death should be classed as a fatal mine accident. Again, Mr. Barr would not call any injury serious which is not likely to produce permanent disability. Smaller accidents, such as the mashing of finger with a hammer, should not be reported.

The Kentucky Ambulance Chaser

W. L. Moss stated that he reported no accidents where the injured were able to return to work within a week. Other speakers were Alexander Frost of the North Jellico Coal Co., Wilton, Ky., and W. B. McCord Johnston, general manager Belljellico Coal Co., Belljellico, Ky. The latter stated that he had made a complete settlement with a man whose leg was broken, for $250, and the satisfying of certain store and tenement bills totaling in all $300. The court decided that the figure was too small and gave the matter to the jury, which awarded $6500.

Johnston's blacksmith recently ran after a mule which had run away. He received a scalp wound and the doctor put two stitches in his head. Within an hour an ambulance chaser was on the ground who offered him $425 cash for his case, the attorney agreeing to meet all the costs of the suit and stipulating that he should receive all the damages collected. Mr. Johnston declared that some men did not wait on an accident, but brought suit to recover for impaired health due to bad air. In fact, Mr. Johnston declared that all accidents were "fatal" in Kentucky, a few to the mine worker but all to the coal operator.

Operators Demand That Mine Workers Abide by Contracts

Because the "Mine Workers" in central Pennsylvania have repeatedly violated their labor contracts, such conduct resulting in more than 100 strikes since the present scale agreement went into effect, the operators have issued the following letter to the "Union" officials, giving the latter ten days to comply:

THE ASSOCIATION OF BITUMINOUS-COAL OPERATORS
OF CENTRAL PENNSYLVANIA
301 BETZ BUILDING
Philadelphia, Dec. 12, 1913.

Mr. Patrick Gilday, President,
Dist. No. 2 United Mine Workers of America,
Morrisdale Mines, Penn.

Dear Sir:

The Executive Board of the Association of Bituminous Coal Operators of Central Pennsylvania held a meeting here today, approved and directed that the following communication be forwarded to you at once:

Whereas the Association of Bituminous Coal Operators of Central Pennsylvania, hereinafter called the Operators, entered into an agreement bearing date April 20, 1912, with the United Mine Workers of America of District No. 2, hereinafter called the Mine Workers, for the purpose of governing their relations as to wages, general rules and regulations for the period of two years, expiring March 31, 1914, and

Whereas this agreement was consummated and entered into by the Operators on the expressed assurance that this contract would be faithfully kept and performed by the Mine Workers, and that the officials of your organization guaranteed the full performance of this contract on the part of the Mine Workers, and

Whereas, Rules 12 and 13 of said agreement provide, "Should differences arise between the Operators and Mine Workers as to the meaning of the provisions of this agreement, or about matters not specifically mentioned in the agreement, there shall be no suspension of work on account of such differences, but an earnest effort be made to settle such differences immediately: First, through the management of the mine and the Mine Committee; Second, the first method failing, the matter shall be referred to the Operators' Commissioner and the Mine Workers' Commissioner" and in the event of a failure of such commissioners to reach an agreement, then to be referred to a permanent Board of Arbitration whose decision shall be final, nevertheless the year 1913 has resulted in an absolute disregard of these covenants on the part of the Mine Workers, and

Whereas, notwithstanding the fact that Rule Number 15 provides, "the right to hire and discharge, the management of the mine, and the direction of the working forces are vested exclusively in the operator, and the United Mine Workers of America shall not abridge that right," the Mine Workers have absolutely disregarded this rule in that they have at numerous times served notices on substantially every operator belonging to our Association, that unless all of the employees working for such operator should become members of the Union on or before certain dates mentioned in said notices that they, the Mine Workers, would close or shut down the Operators' respective mines, and in many instances did close the mines for this reason, and refused to return to work unless such non-union employees were discharged. This conduct is in direct violation of your contract and specifically interferes with and abridges the right of the Operator to hire and discharge, of the management of the mine and of the direction of the working forces; this conduct and violation of contract on part of the Mine Workers, as well as that mentioned in the preceding paragraph, has resulted in more than 100 strikes during the life of our Scale Agreement, and

Whereas, notwithstanding the fact that the Operators appealed to you as President of the United Mine Workers of America of District Number 2, to enforce and carry out your contract, and your repeated admissions that the Mine Workers were not living up to their contract, but that you individually were doing all in your power to compel performance thereof, nevertheless it has been open and notorious that your sub-officials, organizers and like employees have been continuing this line of conduct down to the present date, and

Whereas, notwithstanding the fact that the Operators have appealed to John P. White, National President of the Mine Workers of America, for the performance of this contract on part of the Mine Workers, and that he has replied that full authority has been given to you to deal with the situation, still such conduct continues down to date, and

Whereas, these violations of contract have become so notoriously defiant and continued that the membership of this Association have frequently and determinedly notified its Executive Board, that unless this conduct ceased at once, they would withdraw from this Association on the ground that it was useless to contract with a body that absolutely refused to carry out their contract and with no person sufficiently in control of the Mine Workers to enforce the performance of the same, BE IT THEREFORE RESOLVED:

That the Operators enter a vigorous protest against the line of conduct hereinbefore mentioned, and demand of Patrick Gilday, President, and the Executive Board of the Mine Workers of this District, an immediate cessation of the conduct hereinbefore recited, and that they strictly enforce on the part of the Mine Workers their covenants contained in said contract, and in event of the failure to cease such conduct within the next ten days, that the President and Secretary of the Operators' Association shall call a special meeting of the members thereof for the purpose of considering the final dissolution of its Association on the specific ground that it is useless to enter into contract obligations with a body that steadfastly refuses to fulfill the same and which no official apparently has power to enforce.

Yours truly.
W. R. ROBERTS.
Secretary.

The Pittsburgh-Buffalo and Allied Companies

Under date of Dec. 10 the *Boston News Bureau* makes the following comments on the insolvency of the Pittsburgh-Buffalo Co.:

Suit for appointment of receivers for the Washington Investment Co., of Pittsburgh, was begun in the Federal court at that city yesterday by the Cleveland & Pittsburgh Coal Co. The complainant asserts that the Investment Co. is solvent but temporarily embarrassed. Earlier in the day James K. Cassiday had been appointed receiver for the Coal Co. by the Federal Court at Cleveland on complaint of the Pittsburgh-Buffalo Co., of Pittsburgh which went into receivership Saturday. Later James Bryan was appointed receiver by the Pittsburgh Court of Common Pleas for John H. Jones, president of the Pittsburgh-Buffalo Co. The application was made by the Goodman Manufacturing Co., of Chicago, a creditor. Immediately afterward the Sharon, Penn., Saving & Trust Co. began suit against Mr. Jones for $10,000 on a promissory note secured by Pittsburgh-Buffalo Co. stock.

The actions yesterday followed the appointing of receivers for the Pittsburgh-Buffalo Coal Co., a $6,000,000 corporation, and the Johnetta Coal Co., Saturday in Pittsburgh by United States Circuit Court Judge Joseph Buffington and for the Four States Coal & Coke Co., a $6,500,000 corporation, by Judge A. G. Dayton, of the United States District Court at Philippi, W. Va.

Strikes, explosions, floods and other incidents to coal mining are given as the causes of the temporary embarrassment of the coal properties.

Anecdotes of the Mountain Folk

By Neil Robinson*

SYNOPSIS—Amusing stories concerning the mountaineers of West Virginia and Kentucky who have been aroused from their primal mode of life by the encroachments of the mineral man prospecting for coal.

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The West Virginia Coal Mining Institute begins its sessions this morning in a very serious mood. Our estimable secretary, E. N. Zern, has arranged to lead you through a maze of profound discussions relating to chemistry, salesmanship, the influence of public sentiment, scientific mining and the enforcement of the prohibition law: we will travel to Panama with former Governor MacCorkle; Hon. Lee Ott will tell us the story of the humane compensation law; and Governor Hatfield, for many years a distinguished medical practitioner, will speak on sanitation and the protection of health in mine villages.

A few years ago, institutes were unknown in our state. Our gatherings were limited to political conventions, meetings of various grand lodges and occasional camp-meetings. The individual manager and operator never visited the plant of his neighbor. It would have been regarded as impolite—possibly as spying. There was very little traveling to the so called backwoods or "up the creek." The operator journeyed from the mine to the banking town for a payroll and sometimes visited the general office of a railroad to sell some fuel. The motive power at a mine was a mule; the best mining machine was Irish and for ventilation we sometimes lighted a fire at the bottom of a mud-daubed frame stack proudly called a furnace.

It would be interesting to trace the development of the mining industry from these crude beginnings and make a contrast with the goal which the eminent men in our profession are now seeking to attain, but I prefer to carry you away for a few minutes from the symbols of chemistry, the wonders of electricity and the constructional work of man for a little journey to the lands beyond "the head of the creek."

A Trip to the Mountains

I count it as a bit of rare good fortune that professional duties called me into the mountains while the men and women there were still natural, the spinning wheel in use, handmade rifles in service, good old sorghum served in coffee, and celluloid collars and patent-leather shoes unknown. There was always a cordial welcome for the stranger and many a time the head of the house has called from the door of a cabin "get off your horse and come in and warm up—you know pore folks have pore ways but we're glad to see you."

Once I entered a field that had evidently been visited by several coal seekers, for the following loudly shouted conversation took place. (The man who owned the coal opening I was endeavoring to locate was plowing far down on a hillside below the ridge road:)

"Hello! Are you Mr. Frank?"

"Yes; and who mout you be?"

"I am Mr. Robinson from over at Charleston in Kanawha County."

Mr. Frank made a megaphone of his hands and literally yelled back:

"Air you one of them dern mineral men what goes through the country a lookin' at coal seams and a leavin' down fences?"

Of course, it was useless to deny my guilt and we finally compromised by his election as boss of the rail-fence gang with the right to discharge himself if the work was not well done. No one was discharged.

Traded His Wife for a Rifle and Dog

Two days later I came to the clearing of an old settler who had been there "ever sence it was a case of one blaze from home and two blazes fer home." The cabin was without a window and as we sat by the log fire, our light from the open door was cut off by a tremendously large woman, barefooted and smoking a pipe, who stood on the step watching some kittens at play. My local guide looked up in some surprise and said: "Why, Mr. Lotts, I did not realize that your wife was so big—I thought she was a thin woman." The old man put his hand to the side of his mouth and said: "Smith, I reckon you're thinkin' of the t'other one. That 'un was a powerful worker, but she was thin es a fence rail, but you know I traded her 'n a rifle for this 'un an' a coon dog—an' 'fore God, Smith, I jes wish you could see that coon dog."

Many times in my travels I have met men who under more favorable circumstances might have graced the highest courts in our land or have become masters in the world of commerce and finance. These really great men in many instances were lost to the great world through a fine sense of duty to dependent women and children in their little world. As the poet has said: "Full many a flower is born to blush unseen and waste its sweetness on the desert air"—and many acts of devotion in the depths of the mountains are unknown to mankind. Let us hope that they are recorded in the Great Book of Life.

The typical mountaineer of the older school is nearly always logical in his processes of reasoning. He reaches his conclusions without mental finessing and has a why for every wherefore. I recall passing a camp-meeting ground in the early morning and afterward passing scores of men and women hurrying to the services. It seemed to me that every house on the mountain would be deserted and that all thought of dinner might have to be abandoned, but a little before noon we heard an old-fashioned flail resounding from a barn and knew the owner would soon eat and perhaps we might be able to join him.

While the meal was progressing, I asked my host how it happened that he was not at church. "Well," he said, "I ain't there fer two mighty good reasons. In the first place I been usin' my stock purty consid'ble this season and I ain't had no time fer to corn cob 'em down and get 'em fittin' fu' swappin'; and in the next place I was born and raised in this here county and I know there ain't enough religion among the perfessin' Christians fer to

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Note—President's address, West Virginia Coal Mining Institute, Charleston, W. Va., Dec. 8, 1913.

*Coal expert, Charleston, W. Va.

save one soul and I don't perpose to go down to that air meetin' and git my chances of heaven mixed up with them dog-gone perfessin' Christians."

Burned Wood Even though a Coal Seam Outcropped in His Back Yard

There was a fine seam of coal six feet in thickness showing in the outcrop by the barn but wood only was burned in the house. This fact, however, was easily explained: "Bein' a man of sense and jedgement as I 'low ye are, ye can see for yourself that that coal is too dern fur fer me to go pack it and it ain't fur enough to hook up a team and go haul it—so we jes burn wood." In justice to his wife it is only fair to remark that she handled an ax with great skill.

Down on the Cumberland Plateau, in Tennessee, I stopped at a cabin that was overflowing with children and when we all sat down to supper the table was lined on both sides from wall to wall. Of course, a reference was made to the fine large family and the pride the parents must have in this possession, when the old man by way of reply explained everything: "Yes, sir, it's a big family, but it ain't a matter of choice—it's a matter of need-cessity. Us folks on the mountain hev to hev big fambleys in order fer to git a fair sprinklin' of boys. Ef you have a passel of boys around the house some of 'em will do a leetle kase they're fond of their maw, some kase they're feard of their paw—and some kase they ain't got no better sense—and 'tween them boys doin' a leetle and me and the old woman here doin' a h— of a site we manages to live."

There is a charm about the mountains that is not equaled by the prairies with their monotonous levels; and I have had days at sea when the entire ocean would have been gladly traded for a single knob in the Alleghenies. There is a wonderful charm in our clear, cold streams; in the hills when tipped with clouds; the drumming of a pheasant; the play of the squirrels; the flight of birds—all these please the eye.

But there is another pleasure in store for the lover of the woods. Imagine a long day drawing to its close, twilight deepening into dark. You are traveling a strange trail in a strange land, when the tinkling of a cow bell or the barking of a dog is heard in the distance and presently the sweet aroma of the "frying pan and bacon" floats down the valley. That is a blissful moment. You are nearing a home for the night and a long hour's talk before a big log fire with all the family present and perhaps a few of the neighbors who have stopped on their way from a grist mill.

One night like this in the Pine or Cumberland Mountains of Kentucky I tried to harvest a little information for use on the following day, but every inquiry addressed to the head of the cabin brought a stereotyped reply, "I don't know nuthin' about them things, but I allow as I know as much about matermunny"—meaning matrimony—"as any man on the crick." My host was so full of this subject that after supper I naturally asked for particulars and this was the tale that he told.

An Authority on Matrimony

"I've been married three times—and still a livin'—and that's mor'n most of my neighbors can say—and eight of my children are livin'—and most of 'em here now."

They were all there, commencing with two grown girls and ending with a baby a year old.

"The very fust time I married I got a woman with lots of sperrit. She had the reddest head this side the mountain and one of her eyes was a leetle crossed and she had more temper than me—and I got some. We fit frequent. We surely did—and finally I got to norating round that I was the only man on Kaintuck waters what could live with her. In them days a feller what had lost his last wife lived in that old clearin' next mine and he 'lowed he could live with her at least six months and was willin' to bet a crackin' good young steer against a colt I was raisin' that he could. Me and my wife that then was, talked it over and she was agreeable to goin' pervidin' we could git a de-vorce—and we done it easy, kase the squire what married us wuzn't one of the book-keeping kind and we jes tore up the old stificate in the presence of the two Ramsey brothers who was some of her kin.

"She hitched up with the other feller and I made a run of moonshine and took things sort o' ca'm and easy like fer a spell. Onst in a while I'd go down to the line fence and look over to see how the steer I was going' to get was comin' on, and then I got to meetin' the other feller who was still a stickin' and had took to watchin' my colt. I seen he was gettin' powerful interested, as the six months was nigh up, and it made no diffunce how many cockleburrs that colt wore it looked good to him, and I was gittin' mighty much worrited.

"He sure was game. The day before the time was up I knowed that somethin' had to be did—and did quick—and I raked up all the green apples and green corn and collicky stuff I ever heerd of and commenced stuffin' that colt—and it took—and afore midnight I went after the feller to come and help do some doctorin'. He swore a site and said it would die afore mornin' and he was goin' home—and he went that way—but he never stopped and he never come back—and I druv the steer over into my lot before 'red-top' turned out to git her breakfast!"

The talk was general for a little while, the men said they remembered the affair, and "red-top's" two girls remained quiet, apparently taking the adjustment of affairs as perfectly natural. Without any urging the old man took the floor again.

"Lots of things is wuss and yit sometimes maybe you find 'em wusser—and too much sperrit in a woman ain't so bad when you got one what ain't got any—like my second wife. She was com'fble fat when I got her and kep gittin' fatter and fatter and I 'lowed I'd hev to git the guv'mt to help feed her, when she up and died rising three hunder pounds in weight. We had to knock down a lean-to off'n the barn to make a box, and it took that other feller's steer and one of my own to sled her up on the p'int whar she still is—but I bet she ain't no lazier dead than she was afore it happened."

"I ain't goin' to say nothin' 'bout this little woman here now, kase she's young and spry and I'm getting stiff in the jints and mout have a leetle trouble in gittin' another if she'd run off."

There was neither a lamp nor a candle in the house and the children lighted slivers of pitch pine for illumination. Some of the rich pitch spluttered into the corn bread and gave the latter a flavor that was never known in modern cooking schools—but perhaps it was introduced to prevent the "last chance" wife from following in the

Jumbo-like footsteps of number two. Our eminent conservationist, Doctor White, would have commended my economy in food consumption—at that time.

Religion of the Mountaineers

Upon innumerable occasions I have been asked about the religion of the people in the mountains, but the question is hard to answer. Earnest men and women are found in every community. The services of preachers are well attended and the only songs one will hear on a long journey are those taken from hymnals. Great consideration is always given to a minister of prominence and the housekeepers, if notified of the coming of a presiding elder or bishop, will spend days in preparing food.

Some five or six years ago I was planning a trip through eastern Kentucky when the itinerary of a presiding elder was made known to me by the enthusiastic brother who had perfected the arrangements. I at once showed appreciation of the skill of this brother by destroying my own plan and accepting the one made for the elder, but to avoid a conflict in dates and overcrowding in small houses, I made the complete circuit two days in advance. That was the time I gained in weight at the rate of 16 oz. a day. The elder lost about 20 lb. on his trip, which is hard to account for as I found the living conditions unusually good.

But I must sand the track, sprag the cars and stop the train. It would please me to tell you about the amateur geologist over in Buchanan County, Va., who accounted for an immense mass of broken stone on a slope of the mountain by declaring that he had "studied about it a site and finally 'lowed that when the Lord was in these here parts sowin' rocks he must have drapped his apron string in a-comin' over the pint."

The neighborliness of the people could be exemplified by the attitude of a good old friend in a Southern county. He was divorced and at once married again, and the divorced wife immediately married and went to live on the adjoining place. When my host was asked how he got along with his ex-wife, he said: "Fine, mighty fine. We are the very best of neighbors. Why, there ain't a family on the mounting we borrow as much from as we do from them folks."

At the risk of being called a bad neighbor, I will cease borrowing from your time and will now turn the institute into its accustomed channels, at the same time hoping that your stay in Charleston may be pleasant, that old-time friendships may be renewed and that your deliberations may result in great good for the thousands of men whose welfare and safety rest so largely in your hands.

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Purchasing Coal under Specifications

By Reginald Trautschold*

SYNOPSIS—Some notes on the impracticability and inconsistencies of this method of coal buying. Behavior of the coal in the particular furnace in use is a more important consideration than its theoretical heat value. Complications in methods of sampling and the impossibility of devising an adequate specification are among the troublesome features of the method.

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Among the claims made by the advocates of purchasing coal under specifications is that, being paid for on a quality basis, the coal dealer is incited to prepare the coal more carefully. This result, though not the only or greatest advantage claimed, undoubtedly is the object desired and is also the result upon which the feasibility and practicability of the policy must depend. To the average dealer, however, increase in his trade is sufficient incentive to keep him supplying the best grade of coal, and the larger the buyer the greater the incentive to give individual satisfaction. Therefore, the claim that the dealer would be incited to more careful preparation of his product seems hardly convincing.

Some Inconsistencies in Coal Specifications

Carrying inspection of a commodity to the extent of ascertaining its chemical characteristics, while perhaps of exceeding interest, would often, in the case of commodities purchased continually and in large quantities, prove neither practical nor feasible. In the case of coal, the impracticability, for the average consumer—he who buys in lots of not over three or four carloads at any one time—would seem obvious. Such consumer would have no conveniences for analyzing and would have to spend from two and a half to ten per cent. of the cost of the coal in having the necessary tests made at a laboratory—almost as much as any reduction he could expect in price should the coal be found to be considerably below specifications. Furthermore, as occasional consignments may be reasonably expected to show better results than the specified requirements, instances would crop up when the expense of the analysis would prove not only a dead loss, but the coal would be unnecessarily increased in price thereby.

It must be considered also that the cost of mining coal at any mine is not in any way regulated by the heating value of that coal and, therefore, a valuation based on heating value and chemical characteristics would place an unfair profit on certain grades of coal and entail a loss on others. As a result only the more profitable grades would be dealt in and the others, many of which possess high heating value and other desirable characteristics, though possibly failing to meet certain chemical requirements, would only reach the consuming public when other coal could not be procured.

For instance, the prices of anthracite coal at the mines, which may be considered as indicating the relative cost of mining and preparing the various sizes, shows chestnut to be much the most expensive as far as heating value is concerned. Anthracite of larger size decreases in cost, per heating value, fairly uniformly, broken costing but about 80 per cent. as much as chestnut. In the sizes below chestnut, the decrease in cost per heating value is much more marked and shows greater variations, pea costing about 62.2 per cent., buckwheat No. 1 about 38.1 per cent., buckwheat No. 2 about 19 per cent., barley about 14.1 per cent. and culm about 13.8 per cent. as much as chestnut for the same heating value. Different grades of bituminous coals show somewhat similar variations, not to quite such a marked extent, it is true, for a large proportion of this class of coal is sold as mine-run and is crushed at the consumer's plant, thereby placing a more uniform price on the heating value of the coal.

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*Consulting and contracting engineer, 160 Waverly Place, New York.

Practical Considerations in Coal Purchasing

The behavior of different coals in the furnace has considerable weight upon their power-producing capacity and this cannot be ascertained by chemical analysis, thereby detracting considerably from arguments in favor of purchasing coal under specifications. One coal of relatively higher ash contents and lower heating value than another may prove to be the much more satisfactory and economical on account of its ash not clinkering while the better coal, as far as heating value is concerned, might clinker to such an extent as to make its use uneconomical; or, at a high rate of combustion, ash may clinker in a given coal, while at lower rate it may not. Under the ordinary specification system, the customer could not refuse the clinkering coal but would have to pay a higher price for it than for a poorer (?) grade that might have proved more economical and satisfactory for his particular use.

The relative percentages of fixed carbon and volatile matter have differing results on the heating value of coal and though the B.t.u. test may show this, it cannot ascertain the actual results in the ordinary furnace. Volatile matter may be combustible or noncombustible; a coal with a lower fixed carbon content and greater volatile matter constituent may have a higher heating value than one in which the fixed carbon is proportionally greater and the volatile matter less or *vice versa*. This the B.t.u. test will bring out, but the behavior of the coal under actual operating conditions is another matter. Volatile matter may prove an advantage or a disadvantage irrespective (without apparent definite effect) to its proportion of combustible qualities or the heating value of the coal.

Moisture in coal is customarily limited under the specification system, the dealer guaranteeing a maximum moisture content which if exceeded, calls for a reduction in the price of the coal. The presence of moisture in coal is largely accidental and can no more be guaranteed or controlled by either the dealer or the miner than can the weather, so why complicate conditions which cannot be provided for? The allowable percentage of sulphur is also usually specified, a reduction in price being called for if the sulphur content exceeds the percentage called for. The proportional part of sulphur in combination with other metals and minerals in the ash is what usually causes trouble, a relatively large proportion of free sulphur or easily reduced compounds of sulphur not having the same detrimental effect as certain other combinations containing less sulphur.

Some Complications in Specification Buying Methods

The yearly spring reduction in the price of coal at the mines, a practice that has done much to regulate and steady the coal trade of the country, would also be complicated by any universal adoption of the specification method of buying. A reduction in cost per heating value of coal, similar to the present reductions in the cost of coal per ton, would be conducive to numerous complications. It would also tend to increase the congestion of expensively mined coal, much of which would have high heating value, and the shipment of the coal upon which the greatest profit per heating value would be realized.

The advantages claimed for "purchasing coal under specifications," though theoretically justified in great part, could only be fully realized by the adoption of complicated and detailed specifications; and even then it could be severely criticized, while there are unanswerable arguments to be advanced against such a method—business reasons, that bear considerable practical weight. For instance, irrespective of the merits of the case, the average coal dealer can well afford to contract with a large consumer to supply coal over a long period at a considerably lower price than if each consignment requires a distinct bargain or contract. In fact, should he be able to contract with a few important customers to take a sufficient amount of coal during the year, he could afford to sign up at a price that would simply cover his expenses, depending upon trade from other customers and smaller business for his profit. To arrive at his minimum price, he would figure on the known cost of his supply and the approximately known expenses to which he would be subject. That is, he would figure in known quantities and so closely as to prohibit the taking of speculations as to the value of his stock, invariably having obtained his contract as a result of previous satisfactory service and the incentive of continuing such service as far as he is able in order to secure future business.

Under the specification method, not only would his expenses be increased by the frequent tests necessary to check the claims of his customers, but the speculative risk of a certain consignment of coal from the mines falling below specifications would have to be taken. To avoid the possibility of this latter, he would have to base his price on a coal of less heating value than the average fuel to be supplied to his customer, and the latter is called upon to pay such a price for coal as would protect the dealer against loss and cover the expense of the analysis by the dealer and himself.

The relatively small customer would be under a serious disadvantage in purchasing under specifications for he could ill afford the expense of frequent tests; neither would he have the necessary influence with the dealer to insist upon his rights and would, in many instances, be forced to take coal that had proved unsatisfactory to the more important of the dealer's customers.

The rejection of coal or the reduction in its market value, on account of its failure to live up to certain chemical specifications or meet a laboratory-heating test, may be justified in some cases, but in others it does not necessarily follow that such failure means unsatisfactory coal under working conditions. Visual inspection can be just as reliable at times and no sample testing can be taken as conclusive evidence that the mass of coal is similar in all respects.

Certain effects of the adoption of the specification system, disadvantages that are just as important as the advantages may then be summarized as follows:

Summary of Disadvantages

1. Impossibility of a purchaser contracting for his

entire coal supply for an extended period at as advantageous a price as under the "tonnage system," owing to the dealer having to assume the speculative risk that the coal will not fall below specifications.

2. The failure of chemical analysis and laboratory-heating tests to ascertain the behavior of coal under the purchaser's operating conditions, the "specification system," however, compelling the purchaser to accept any coal that met the specifications, irrespective of its behavior in the furnace.

3. The injustice to the small consumer who cannot afford to assume the expense of careful tests, increasing the liability of his having to accept coal that had proved unsatisfactory to some other, and larger customer of the dealer.

4. The increased difficulty in the disposing of coals that entailed heavy expenses in mining and the unfair impetus given to business in the coals that have been mined at least expense, tending toward general elevation in the price of all coal.

5. The tendency to cause congestion of unsalable coal at the mines, even that which may have excellent heating value but fail to meet certain of the requirements of the ordinary specifications.

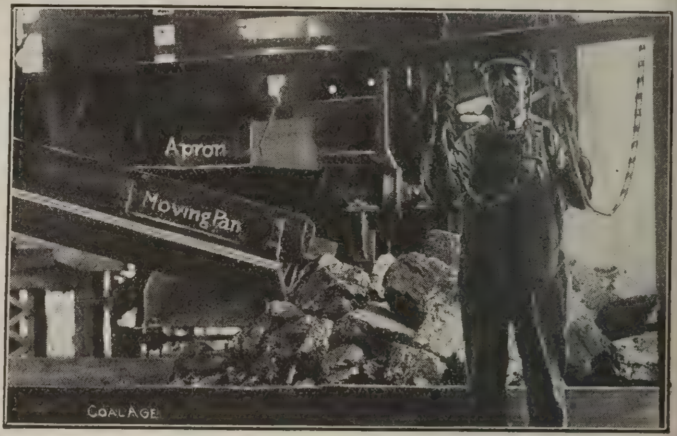
6. The danger of disputes as to the accuracy of various tests and the ill-feeling between dealer and customer that continual claims and disagreements would bring about.

7. Annoyance, expense and loss of time brought about by disputes and in the replacement of unsatisfactory coal by other coal that may or may not prove satisfactory.

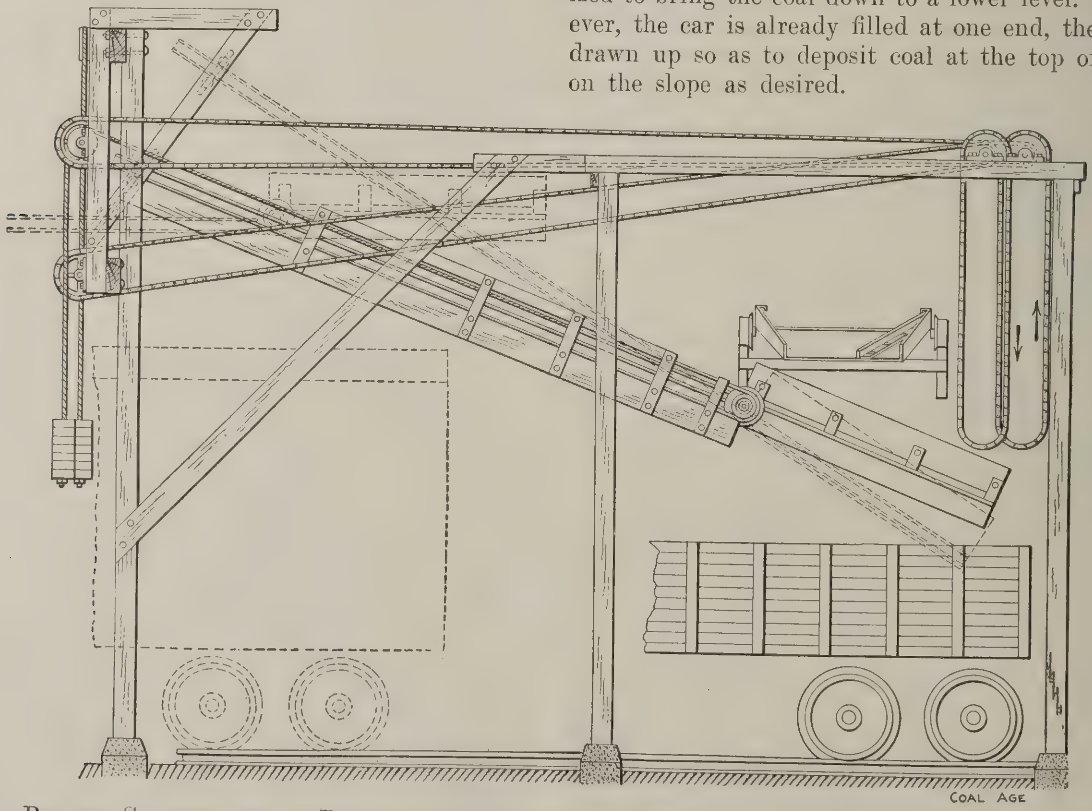
8. The added expense to the small consumer by the adoption of the "specification system" and the probable difficulty of his ability to enforce his claims.

A Loading Boom

In the southern Illinois field a number of operations are putting in the loading boom, manufactured by C. C. Hatfield, of Duquoin, Ill. At right angles to the main pan, which discharges diametrically across the track is placed another pan which lies parallel with the rails and which can be pulled backward and up or forward and down. Thus the coal can be placed in the car with the minimum of breakage. When the car is empty it can be loaded with the pan slidden forward to its extreme distance. Thus a long length of the sliding pan will be utilized to bring the coal down to a lower level. When, however, the car is already filled at one end, the pan can be drawn up so as to deposit coal at the top of the pile or on the slope as desired.



An Illinois Loading Boom



By the Sliding of the Boom, the Coal Can Be Deposited with Minimum Breakage

The wide range of motion and the possibility of tilting it at will is shown in the drawing. It can be used for cars of varying elevation with equal facility. The drawing shows a wooden tipple but the device has been applied to more modern and permanent construction.

Discussion of Election of Mine Inspectors

SYNOPSIS—The origin of the elective system of choosing mine inspectors in the anthracite region of Pennsylvania. Reasons why the law should be abolished. Controlling power of the miners' organization under the election law. Commission appointed to revise the anthracite mine law. The elective system in Illinois discussed. Suggested appointment of inspector by the courts and for a term of good behavior. The Institute strongly opposed to the elective system. Resolution adopted.

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D. J. Roderick (*Pennsylvania*)—Mr. President and members of the Institute: I was asked this morning to lead the discussion of this question of the "Election of Mine Inspectors," because, unfortunately, I am one of those who come under the elective feature. The inspectors of the anthracite region of Pennsylvania all come under the elective system, while those of the bituminous region come under the appointive system.

In 1901, a certain element in our state conceived the idea that if they could get control of the mine inspectors of the state it would make their forces stronger. The legislature being in session at the time, they sent a large delegation to Harrisburg and secured the passage of a law making the office of mine inspector in the anthracite region of the state elective, reducing the term of office from five to three years. Previous to that time, the anthracite inspectors were appointed by the governor, after examination, but since the passage of this law, they are elected by the voters of a certain prescribed district. We must first take an examination, then register with the County Commission, and be placed on the ticket to run for the office of mine inspector.

Elective System Should Be Abolished

The elimination of this law is one of the questions that should receive the consideration of this institute. The matter was thoroughly discussed in Chicago (1910), and I think, at that time, we had one champion of the elective feature; he was also in favor of the referendum and recall. This man was later elected to the office of mine inspector; he served about three months and was recalled; so he had a dose of his own medicine. The elective feature connected with the office of mine inspector is a sample of vicious legislation. Suppose, for example, that after you have been studying for the examination, you succeed in passing the same, six months prior to the election. During that six months you must cover the whole district in a personal campaign. It would not be so bad if the elective feature was confined to the district in which the inspector belongs. For instance, I come from Luzerne County, which has six inspectors, and I must cover that whole county for reëlection. In my district about half of the territory is agricultural and the other half mining. I must see the voters, go down into common places, meet them in the saloons, hobnob with them, and try to curry favor and get their votes for the office of mine inspector. People in the agricultural section don't care who is inspector; and the man who gets the office is the man who can spend the most money and be the best fellow while running for office.

Another feature of the situation is the time lost by an inspector, in a campaign, which starts three months prior to election. There are three months lost in soliciting votes that should be devoted to the inspection of mines. This acts greatly to the detriment of the conditions that prevail in the mines. Moreover, it is very unfortunate for a man in the position of mine inspector to have to humble himself to Tom, Dick and Harry, in the saloons, and to the neglect of his work. Again, to canvass the agricultural district is not an economical situation. A man must hire a team, or an automobile, travel around the country, and meet farmers here and there, who know no more about mining than a child who never saw a mine. They have no interest in them.

The effect that the elective feature has upon the efficiency of the mine inspectors is detrimental also from the operators' standpoint. A mine inspector goes to a mine and finding things as they should not be, calls the attention of the operator to them and asks to have them remedied. It may mean a large amount of expenditure of money. You tell him it must be done regardless of the amount of money involved. That operator complies with your request; but, in his heart, he says, I will get square with you, two or three years hence, and he does. He puts money into the campaign to have the mine inspector defeated. The matter is equally as bad from the miners' standpoint. Miners, organized as they are, often make a great deal of trouble for the inspector.

Influence of the Miners' Organization

In the anthracite district, in the last agreement made between the operators and the miners, the miners put one over on them. They succeeded in the settlement of that strike, and it was agreed that the operators allow them what is known as a grievance committee, at every mine. This committee consists of three members working at each place; and they have the privilege of going with one of their officials to the office of the colliery and bringing the matter before the mine officials. The mine inspector in going around through the mines, sometimes meets this grievance committee, and this often interferes with the inspector's business. For instance, they will tell him that the air is bad in a certain section of the mine, or that it is not what it should be; that the company is not furnishing supplies to the man in certain sections of the mine, as the law requires. In fact, the methods employed by the United Mine Workers is often hard on the mine inspector, to a certain extent, bringing things to his attention some time after the matter has been remedied, and using him as a lever to adjust their grievances with the operator. Always where there is the least chance to bring in the mine inspector, he must act as umpire between the operator and the miner; in fact, on many questions in regard to which he should not interfere.

If a mine inspector gets a request from an official of the United Mine Workers, and does not act, it is heralded throughout the district; and the matter is taken up by the locals, which pass resolutions denouncing your refusing to act. If you go through the mine and see a miner violating the law by using two kinds of explosives, or find him ramming dynamite in a hole when at any moment it may explode, and you take him to task, it is

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Note—From the published Proceedings of the sixth annual meeting of the Mine Inspectors' Institute, U. S. A., held at Birmingham, Ala., June 10-13, 1913.

reported to the local; and they use the threat, "We will fix his feet."

The inspector when he is elected is used as a tool to adjust matters where it is absolutely none of his business. He is at the mercy of both miners and operators. Operators are in a position to put money into the campaign to defeat him. I read an excellent article in COAL AGE recently on the evils in connection with the election of mine inspectors, and I hope that COAL AGE will continue to fight this law. I think I have covered the matter pretty well; but this currying favor with everybody in order to retain a position of responsibility is wrong. I hope the time will soon come when that part of the law will be eliminated from the statute books never to appear again. It is a step backward toward the dark ages. To bring the elective feature into the office of mine inspector, detracts from the dignity of the position.

You all know that as a rule the mine inspector is selected, not because of any political influence connected with the position, but because of some qualification that he possesses equal to or perhaps better than that of another man. It has been the case formerly, in Pennsylvania, that when a company wanted a man as a foreman they selected the best in the company; and when the state wanted a mine inspector, the very best man among the foremen or superintendents was selected; but today the shrewdest politician is the only person who can get the office; and to hold it for any length of time he must humble himself to some people whom otherwise he would consider beneath his notice.

REVISION OF ANTHRACITE MINE LAW

MR. DUNLOP (*Illinois*)—What has the present session of the legislature of Pennsylvania done with regard to eliminating the elective feature?

MR. RODERICK—I will say that the chief of the department of mines, at the session prior to the present one, had a Commission appointed to revise the mining laws of the anthracite region. This Commission consisted of nine people, and the chief of the department of mines was elected chairman. The Commission has now been working diligently, for 18 months; upon a new code of laws to cover the anthracite region of Pennsylvania. From that new code they hoped to eliminate the elective feature of the mine inspector. They also incorporated several good features to govern the mining of anthracite coal in the future. During the last decade, or twenty years, many great changes have taken place in the anthracite region. There has been installed much new electrical machinery, air compressors, electric motors, etc., etc. The Department of Mines went into that matter very thoroughly; they employed electrical engineers to give them an outline of what should be done to improve the conditions in the mines with respect to the installation of electrical machinery. Several other good features were inserted into that proposed law and the question of examinations as conducted under the present system, was amended, besides abolishing the elective feature from the laws.

Organized locals and officials of the Union went, in a body, to the House Committee in the legislature and demanded the enactment or the presentation of a code known as the minority code. The United Mine Workers combined to abolish the feature of the miners' examinations. We did not want it abolished, but amended so as to remove the danger of issuing certificates to incompetent people. There is always some hook or crook to get around the present law. There are three boards of examiners in Luzerne County, one in my district and two in the other districts of the county. The Commission wanted to insert a clause in the law providing that if a man came from the mining countries of Europe he might be given a year's advantage over another who comes from a country where there was no mining at all. In other words, men from England, Wales, Ireland or Scotland would only be required to work in the mines one year before being able to get a certificate to mine coal in Pennsylvania. But those coming from where they never mined coal, would have to stay in the mines two years, as they do now.

CERTIFICATION OF MINERS

One thing in connection with the present law the United Mine Workers did not want touched. The Commission was willing to draft a law and have it submitted to an attorney selected by the miners, with a view to making the Boards earn their salaries by the issuing of these certificates. Some may not understand the present method. The law says the members of the examining boards shall receive $3 per day for their services; but no part of their salary shall be taken from the state treasury. Now, if only nine people apply for certificates, you can rest assured the examining board will not turn one of them down.

The Commission wanted the boards appointed either as they are now, or by the Courts of Luzerne County, or by the governor of the state; and be allowed $5 per day and their expenses, but not to sit more than four days, which would remove any possibility of the Board accepting everyone who applied in order that they might not lose. We have not had the coöperation of the mine workers in carrying out this law. When the law hurts the operator, they are satisfied for us to investigate it; but if we take a miner to task for a violation of the law, they report the fact to the Union. Instead of upholding the mine inspector they say "Let, him go to the hot place." That is the condition under the elective system. I trust that that feature will be eliminated in whatever state it may exist.

MR. DUNLOP—What is the present condition of the two codes?

MR RODERICK—The position in which the two codes are, at the present time, is this: the minority code has passed the House with but one dissenting vote. The majority code lies in a pigeon hole at Harrisburg; but it is not likely that further action will be taken on either code this session.

MR. FLYNN (*Alabama*)—If a man fails to pass the examination, is the $1 fee returned to him?

MR. RODERICK—He does not pay the dollar until the certificate is given to him. The examination consists of 12 questions, asked in the English language. If he answers these questions successfully he pays his dollar and gets his certificate. It is not a hard matter to get a certificate; the law is very lax, and the Board is not expected to know everybody that comes before it. The territory in which my Board operates is about 25 miles long by 12 miles wide. Every applicant must have a man to vouch for him, although the Board may not know the applicant or the man who vouches for him. Often a man applies who never expects to use the certificate. Some slick duck or smart aleck who can answer the questions and understands the English language will apply and sell out to his fellow countryman for $5; but when he gives his name to the Board, he is careful to give the name of the friend for whom he wants the certificate. They traffic frequently in that business; they get the certificate for $1 and sell it to their friend for $5. You will see a man working in a mine and will wonder how he got a certificate; and the board will tell you they never issued a certificate to that particular man. There is a great deal of fraud in securing these certificates.

Election vs. Appointment in Illinois

Mr. Back (*Illinois*)—I am glad to hear these remarks of Mr. Roderick's, because we have had the same difficulty in Illinois this winter, except the miners wanted to make the term one year instead of two. We are at present under civil service. In December, a convention of the miners was called and they were to appoint delegates who should pick the men for inspectors. We found that pretty strong, but they laid down on it and we have been under civil service since July. Now, the man who is out stands a better chance to be appointed.

Mr. Bolt (*Illinois*)—During the last winter there was a bill introduced into the House in Illinois, calling for the election of state inspector of coal mines. The provisions were something as Mr. Back has stated, and some of the miners were in favor of the bill. I think many still favor the passage of the bill, but they are losing strength. It is being explained to others that are not quite so enthusiastic over the bill, showing its weakness and defects. I don't believe that a bill of the kind will ever be passed in the state of Illinois. No mine inspector or anyone connected with the mining business, unless it is a miner, would favor such a measure. It would tend to retard efficiency and to make the inspector responsible but to one element in the industry; and if he did not do what the mine workers demanded, he would be defeated. On the other hand, if he was willing to prostitute his manhood and do as they wish, he might be retained, provided he made no mistakes and was not recalled.

In Illinois, we are going to oppose such a bill first, last and always. We want to increase the efficiency of the mine-inspection service rather than do anything that would be a detriment to it; and I believe that Illinois has made as rapid progress in that direction as any state in the Union. At first, we had several members who did not care to enter the civil service and make out the required reports; but they finally concluded that, after all, it was the best thing to make full and complete reports. We have not heard any complaints for a long time along those lines, and we are getting better service in the way of mine inspection in Illinois than ever before. I think each member present will indorse that statement. I am opposed to the plan of electing mine inspectors. I would be opposed to it, even though it was made elective by districts for the reason that an inspector should not be called upon to devote his valuable time to going around soliciting votes. I am opposed to the plan of politics having anything to do with the work of mine inspection. A man who renders good service to the state should be permitted to continue in office provided his service as inspector continues efficient. The kind of inspectors we ought to have is men who take an interest not because of the wages, but because of the work. There is a good deal of honor connected with work where one can render service to his fellow men.

Mr. Dunlop—I will add a few words in as much as Mr. Bolt has mentioned the civil service. It is true that since the state inspectors have been brought under the civil service law, they have been required to give closer attention to business; and those who had been inspectors for 12 or 14 years before that law came into effect did not like reporting each day. But on the whole, the requirements of civil service are good and we will be able to tell you more about it a year hence. This is a year of trial in Illinois; we have had a change of administration and cannot say whether the civil service law is for the best or not. However, it makes the mine inspector work whether he wants to or not. If a man does not attend to his duties, and does not make out his reports, etc., as they should be made out, the civil service commission can say that his services are no longer required.

Mr. Beard (*New York*)—I am glad that Mr. Roderick has referred, in the words he has, to the question of the election of mine inspectors, in the anthracite region of Pennsylvania. I am not an inspector myself, but want to say that this is a very proper question for this body to discuss. Mr. Roderick has given, better than I could attempt to do, the evils that come from the elective system. I lived in Scranton, which is in the anthracite district, for six years previous to the enactment of the law requiring the election of mine inspectors, and for ten years after the law had been passed. The law was passed in 1901. Having been in close touch with the mine inspectors' work, as an outsider, I have watched with interest the working of the law in respect to this system.

Appointment of Inspectors by the Courts

Mr. Roderick has brought very clearly before you the evils that grow out of the elective system. I don't wish to dwell further on those points, because I believe that he has made them clearer than they could be made by anyone in my capacity. But, as one outside of the inspection service, I could afford to refer to a matter, in this connection, that perhaps you gentlemen would not like to mention, and that is how mine inspectors should be appointed, and how long they should serve. A mine inspector is a man who should be as far divorced from any influence that would trammel him in his work, as possible. You know, gentlemen, there are laws that govern all natural conditions, and much the same laws control our physical work. A man who is under any influence that would trammel him in his work is obstructed in that work; just as we can obstruct the flow of air in an airway or through a mine. It is not necessary to argue the question. The main point is how can we secure the appointment of the mine inspector in such a manner as to divest him of any influence that would embarrass him in the performance of his official duties.

After carefully considering these questions, in my own mind, I have come to the conclusion, from an experience of six years as secretary of the examining board for mine inspectors, in Iowa, and from my observation in the anthracite region of Pennsylvania, that the mine inspector should be appointed on some other basis, as far removed from politics as possible. We may say there is no appointive power that would be exempt from undue influence from political sources. The only appointive power that we can go back to with any confidence is the judiciary, as represented by the Courts. Courts are not entirely exempt from intrigue; some of our Courts are corrupt. But I believe, gentlemen, and I think you will agree with me, that the Courts are the only power that is exempt, in a measure, from such undue influence. I would put it this way: They are the power most exempt from ultra influences. If, then, the mine inspector could be appointed on some judiciary basis, through the courts, after undergoing the examination and showing his ability to serve in that office—if that could be done—I believe that it would be a step in the right direction.

I believe, further, that when a mine inspector has once been appointed that his tenure of office should extend through good behavior; I might say through life, with the possibility of recall, by the same appointive power that put him in office. No man is perfect; mine inspectors are not perfect; we have evidence of that; and we should not put a man in office for life, but during good behavior. The point is this: When a mine inspector has spent five, ten, fifteen or twenty years in the service, he knows better what is required in his particular district and in those mines, than a new man who comes up for appointment or for election, as the case may be. The old mine inspector has adopted a system along the lines that have appealed to him; he has become familiar with the men in his district; he may have his enemies, of course; but if he is beyond the power of those enemies to do him harm, then he can do his work, and he will be a power in the up-lift of mining and in the development of safety. There is no question about that, in my mind, gentlemen.

I want to thank Mr. Roderick for his reference to what Coal Age has attempted and to assure him and you gentlemen, that Coal Age expects to continue that work. We have under consideration not only the appointment of mine inspectors, which we will continue to push until we can see some results, but other points, besides, that I believe will help to uplift and broaden the work of mine inspectors, in this country. One of the points to which I refer has been thrashed out, in Coal Age, recently, in respect to what is required in mining examinations, particularly; and we were snowed under with just what I supposed would come. However, we want to submit these questions for discussion, in such a manner that everyone will feel free to say what they think is right, and to argue the question from their own standpoint. Now, my opinion is only worth so much—your opinion is worth the same; but when you put these opinions against each other, and let each stand for what it is worth, a great deal is accomplished in broadening our ideas. * * *

These suggestions are not made hurriedly, but are the results of careful study and observation. While, for the past 18 years I have gone deeply into the theory of mining, my work for 19 years previous to that was spent in engineering and mining work. I have held every position in the mine and performed every task, except driving and digging; and the practical knowledge so gained has been a great help to me in studying mining questions, from a theoretical standpoint. My heart always goes out to the candidate who is a good practical man but has not learned much of the theory of mining; and I have tried to simplify for such, as far as possible, the question of what should be required of candidates in examination, in order to secure the best men for the positions of inspector, mine foreman and fireboss. While we cannot make a difficult thing easy, we can often simplify the matter, by putting the candidate under conditions with which he is familiar and to which he is accustomed in daily practice.

The work of making the examination more practical must be undertaken by degrees. In some of the states, the conditions surrounding the mining of coal are not such as to permit of a difficult examination being given candidates for the positions of mine foreman and fireboss. In every state, the examination must be adapted to the existing conditions. Where this has been done, in some cases, it has resulted in a shortage of men to fill the position of mine foreman, and it has even been necessary to allow an uncertificated man to fill the position temporarily.

Mr. Paul (*Pennsylvania*)—The question of selecting state mine inspectors is one of great importance, since the efficiency of the service to be rendered may be seriously impaired if the inspector becomes the tool of either wire pullers or mine operators, and, as a result, unduly compromises himself in the proper execution of the law. The qualifications should be capability, efficiency and aggression on the part of the inspector. While it is almost an impossibility to provide a means of selecting inspectors without the influence of some political or state governmental organization, the plan adopted should be such as to remove the inspector from such political influences, at least so far as his retention in the service is concerned. The election of inspectors appears to me to be a most unwise method of selection, especially if their tenure of office is such as to necessitate their frequent participation in political campaigns, in an endeavor to secure reelection. The sentiment of this Institute appears to be strongly opposed to the elective system, so it would appear that it would be proper for the Institute to take some action in the form of a resolution which will place the Institute on record as condemning the elective plan of selecting mine inspectors.

As a result of the discussion the Institute adopted the following:

RESOLUTION

Following an interesting and prolonged discussion of the methods employed in different states, for the selection of mine inspectors, the Mine Inspectors' Institute, U. S. A., in session June 11, 1913, at Birmingham, Ala., unanimously adopted the following:

Resolved—That in view of the nature of the duties imposed by law upon the state mine inspector, requiring him to act as agent for the state; and because the upright and conscientious performance of those duties often calls for the fearless, unprejudiced and unhampered exercise of an inspector's best judgment and convictions, in the face of threatening opposition of either operators or miners or both: Therefore be it

Resolved—That it is the sense and deliberate opinion of the members of this Institute, that the incumbent of the office of state mine inspector should be, as far as possible, removed from any influence that would tend to warp his judgment, or embarrass his conclusions, or in any manner delay his action in the interest of safety and security of mining operations under his direct supervision; and further,

Resolved—That, in securing this end, it is the unqualified opinion of this body that the elective system as applied to the selection of state mine inspectors should be condemned unreservedly and abolished. In conclusion be it further,

Resolved—That due publicity be given this action by wide-spread notice in the public press and mining journals, so as to bring it prominently before state legislators and governors, in the hope that such laws may be wiped from the statute books where they exist in any state, or may be killed if contemplated.

All mine inspectors are earnestly requested to draw the attention of the governor in their respective states to the above resolution.

POWER DEPARTMENT

Long-Distance Steam Transmission

By F. W. Brady*

SYNOPSIS—Long steam pipe lines are still extensively employed in the anthracite region. Many of the engineering problems encountered and solved in an installation of this kind are here enumerated and illustrated.

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Out-door steam pipe lines are a common feature of the landscape in the anthracite mining district of northeastern Pennsylvania. Some of these lines being poorly constructed and proportioned for the purpose in hand result in a considerable loss of power with more or less unsatisfactory service. Others are of first-class construction, are kept in good repair, and their use appears to give satisfaction.

These long steam pipe lines in most cases continue to fulfill the needs of the anthracite field, and have not been generally replaced by electrical transmission to any extent. They are not considered relics of old-time mining plants where the system has been always used as a matter of course, but are features of the newest construction work.

The accompanying illustrations and sketches show two high-pressure steam pipe lines that are just being completed for the Harleigh-Brookwod Coal Co. by the Gaylord Engineering & Construction Co., W. H. Gaylord, Jr., consulting engineer. These lines are remarkable for their length, high-grade construction, and the numerous difficult engineering problems which were successfully solved in carrying out the power scheme.

The pipes are 10 in. in diameter, and are designed for a boiler pressure of 175 lb. per sq.in. One line is 4300

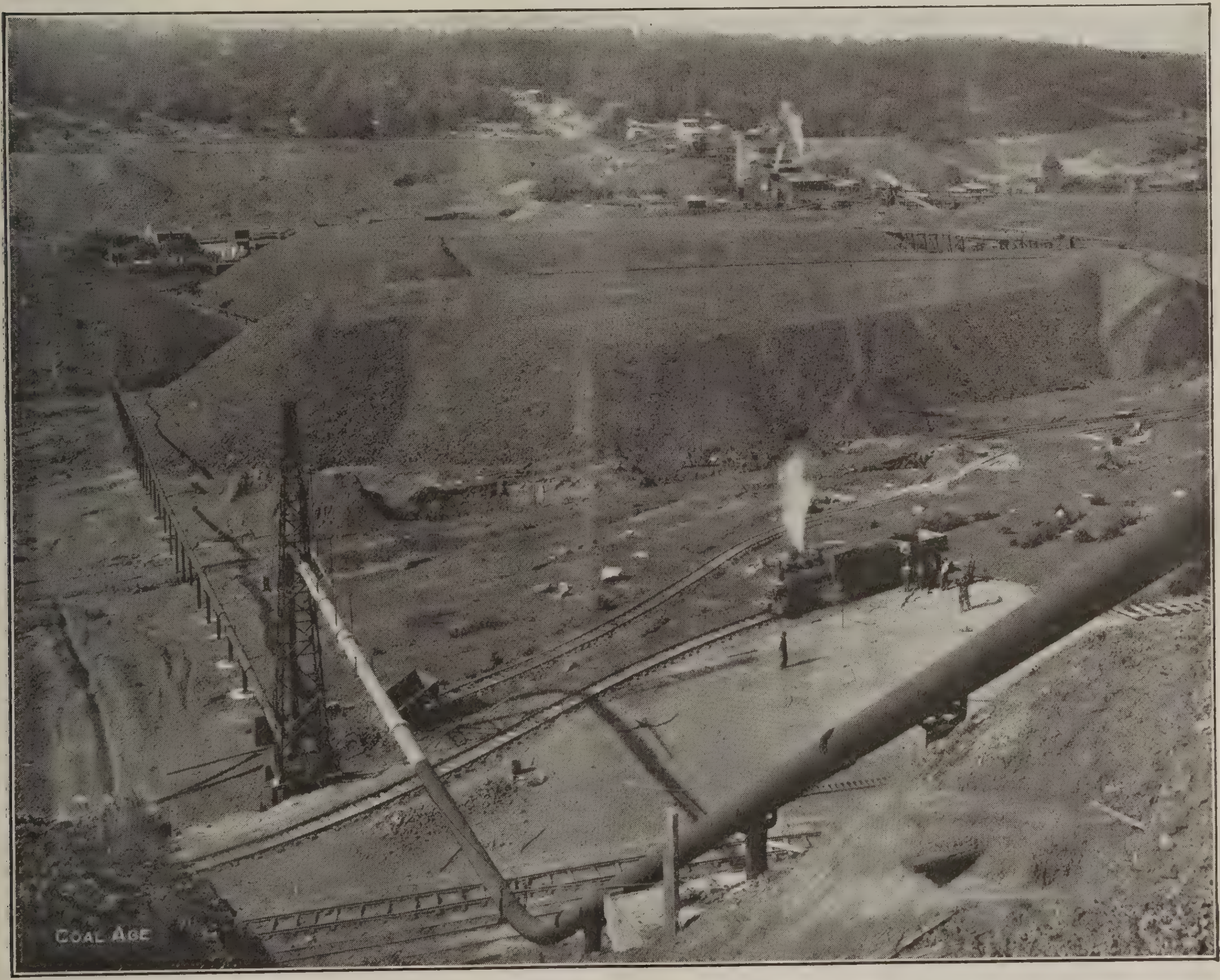

Fig. 1. General View of 10-In. Line 4300 Ft. Long

ft. long with 8-in. and 6-in. additional distributing pipes 1400 ft. long, and the other line is 7300 ft. in length. A general view of the 4300-ft. line is shown in Fig. 1, while Fig. 2 is a plan of the various lines and gives the location of the different shafts, breakers, etc., while Fig. 3 is a view along the 7300-ft. line.

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*609 Gibson St., Scranton, Penn.

The purpose of the installation was to do away with ten separate boiler plants, which were more or less out of date, and much in need of repairs. The power is used for pumping, hoisting and breaker operation at several different mines.

Provisions That Must Be Made

In the construction of these pipe lines it was necessary to provide for a large amount of expansion, to prevent so far as possible undue condensation, and to provide means for removing the steam condensed, and for keeping the pipes in alignment on the irregularities of the mountain sides over which they were laid, for anchoring the pipes on the steep slopes and for elevating them where they crossed streams or the tracks of railroads.

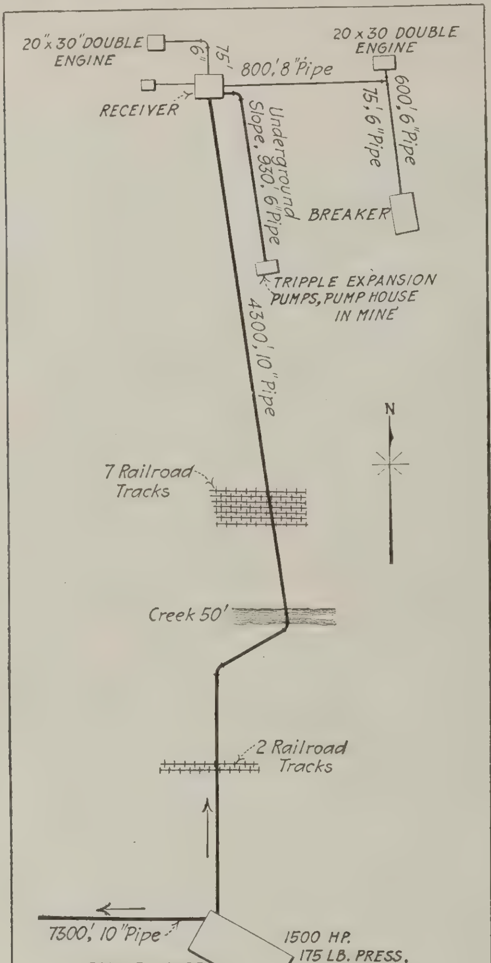

Fig. 2. Plan of One of the Pipe Lines

It was also necessary to prevent vibration of the pipe caused from the operation of the quick-acting throttle valves on some of the engines.

The 10-in. pipe employed is of the best quality of steel, weighing 40 lb. per ft. It is rolled in 40-ft. lengths and connected with Van Stone joints having extra heavy steel hubs and flanges. No threaded pipe is employed in the entire system. A triple copper gasket with red lead between joints is used in each flange connection, the joint being set up tight when cold.

Referring to Fig. 1, which is a view looking from the boiler plant, it will be seen that the 4300-ft. line drops into a valley about 150 ft. below the boilers, at the farther side of which it rises in the woods to a higher elevation than the boilers themselves. The extreme end of the transmission is at the coal breaker, which may be seen in the edge of the woods.

Fig. 4 shows the construction on the steep hill side next to the boiler plant, together with the form of steel tower used to carry the pipe over the railroad tracks. These towers have two sheave wheels over which pass cables that are anchored to the pipe forming a suspension bridge scheme of support. The double-tower suspension, where the pipe line crosses the seven tracks of the Pennsylvania and Philadelphia & Reading Rys., is shown in Fig. 5.

The terminal of the 10-in. line, the receiver and the four distributing pipes are shown in Fig. 6. The receiver, which is 4x15 ft., has welded necks with Van Stone flange joints for the pipe connections. Besides serving as a water collector the receiver acts as a regulator, preventing vibration in the 10-in. line from the quick action of the throttles on the engines above mentioned. An 8-in. feeder line weighing 28 lb. per ft. leads down a slope 930 ft. underground to a pumping station. Triple-expansion pumps are here installed to remove the water which has an estimated daily accumulation of 2,000,000 gal. The breaker at the extreme end of the 1400-ft. feeder is the farthest of any plant from the boiler house upon this line.

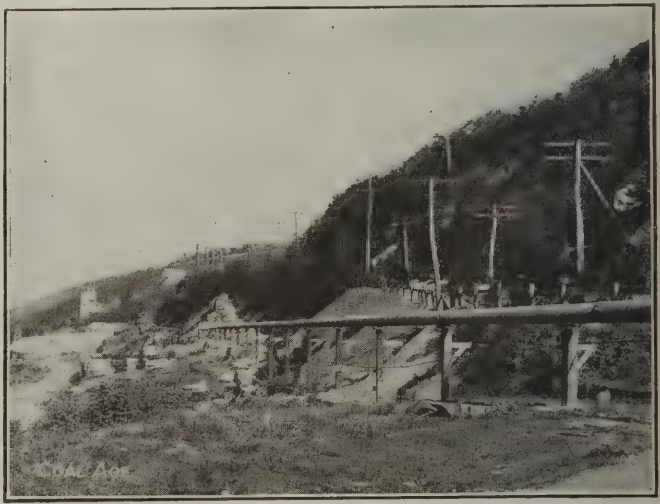

Fig. 3. View along 7300-Ft. Line

Swivel Joints Take Up Expansion

Expansion is taken care of by vertical and horizontal swivel joints as shown in Fig. 7. The details of the joints are shown in Fig. 8 and the flexible support for the pipes near them in Fig. 9. The special feature of the swivel is its 3 in. of longitudinal space for ring packing. This keeps tight while the ordinary style with only 1 in. space requires frequent renewal and constant care. The flexible hangers are made of 2½-in. pipe set in concrete foundations. There are four different arrangements of swivels used in the line so as to accommodate the deflection of the pipe at various angles in both the vertical and horizontal planes.

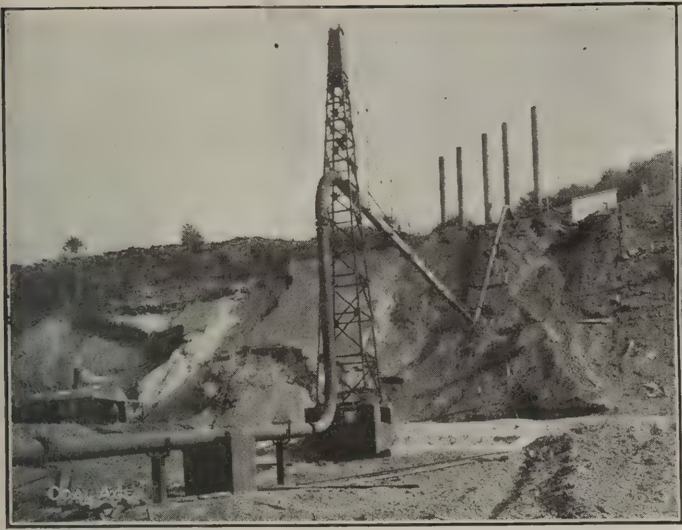

Fig. 4. Power Plant and Construction on Steep Hillside

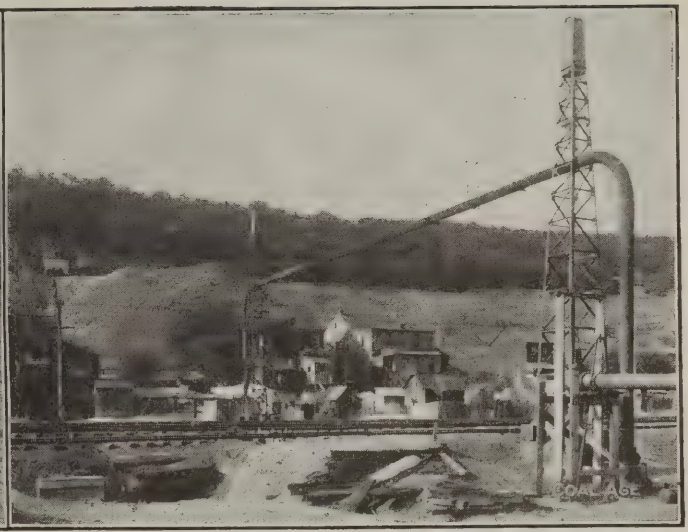

Fig. 5. Suspension Towers Carrying Pipe over Railway Tracks

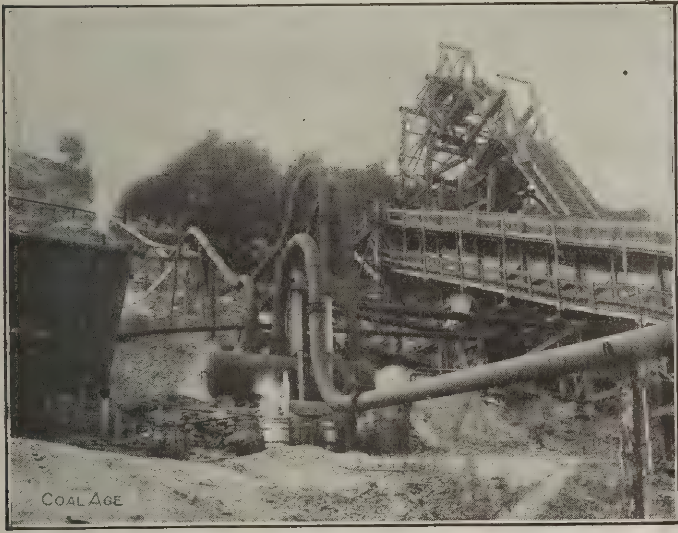

Fig. 6. The Steam Receiver and Its Connections

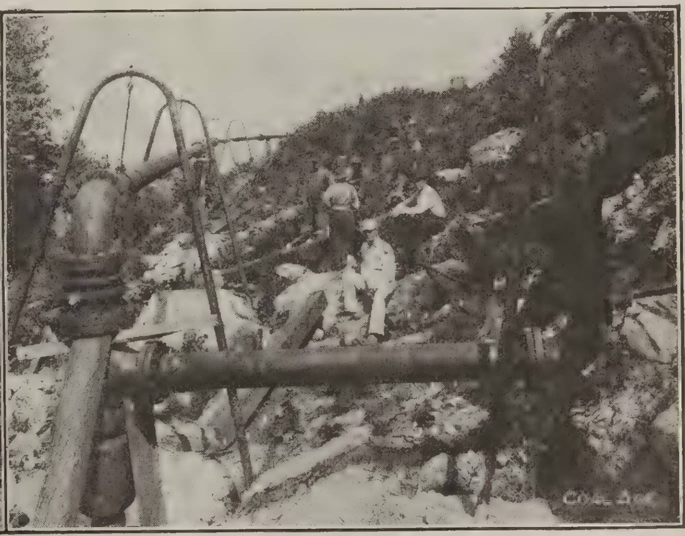

Fig. 7. One of the Expansion Joints and Flexible Supports

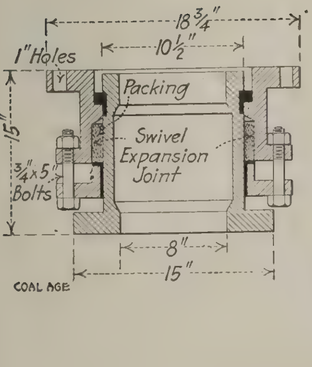

FIG. 8-SWIVEL EXPANSION JOINT

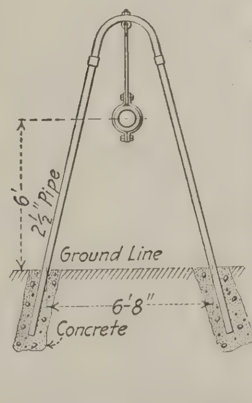

FIG. 9-FLEXIBLE SUPPORT FOR PIPE AT EXPANSION JOINTS

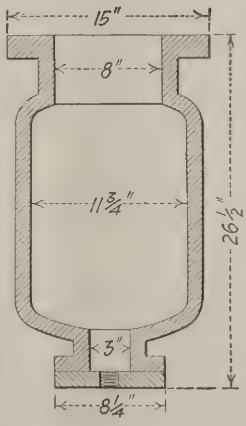

FIG. 10-DRIP POCKET

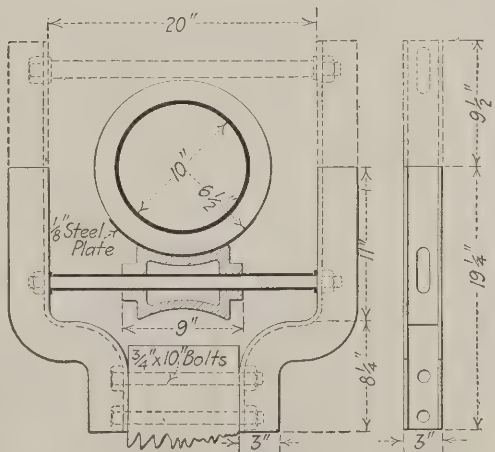

FIG. 11-PIPE HANGER AND SUPPORTS

Figs. 8, 9, 10 and 11. Details of the Pipe-Line Construction

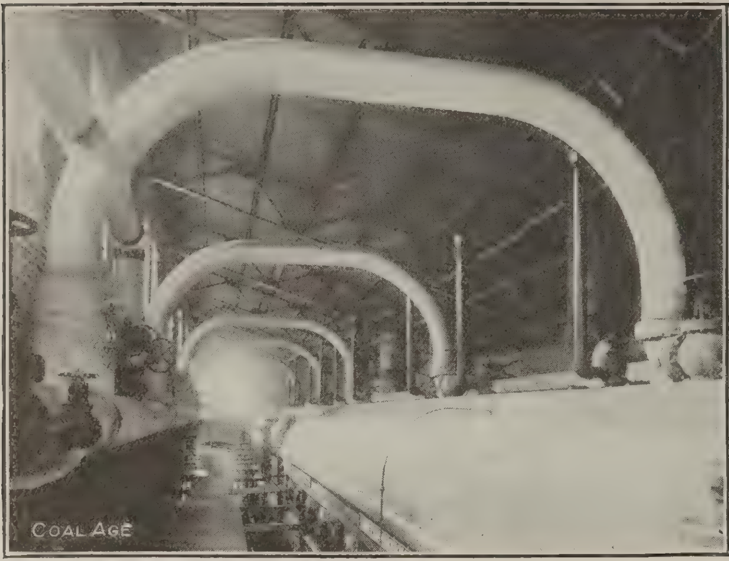

Fig. 12. Steam Header and Its Connections in Boiler Plant

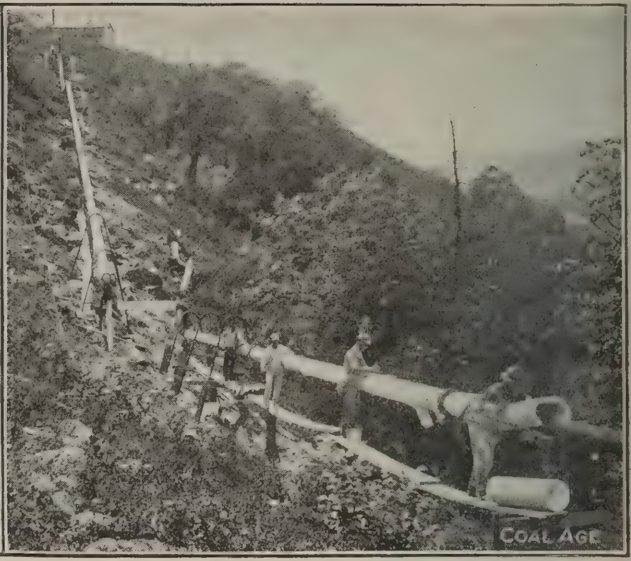

Fig. 13. Placing the Covering on One of the 10-In. Lines

Under the drop or downcomer at each swivel joint there is a drip pocket which is shown in detail in Fig. 10. The special feature of these drips is the large opening in the bottom, which is covered with a flange having the usual plug connection. This construction allows the drip to be cleaned thoroughly by removing the flange, the outlet of the ordinary form of drip usually clogging.

The regular supports and hangers along the line are shown in the several photographs and in detail in Fig. 11. They are made of 8x8-in. posts set in molded concrete foundations. This plan made the work of erection easy and promises that changes and repairs can be made with equal ease in the future. The yoke is made of 3-in. channels fastened to the top of the post with two ¾-in bolts, the pipe rests on a 3½-in. curved roller having a radius of 6½ in. This roller is fitted over a sleeve made of ¾-in. pipe, which is carried on a ¾-in. bolt. Every fourth support is double-decked as shown by the dotted line, so that a ¾-in. bolt can be passed over the top of the pipe. Special designs of brackets are used where the pipe must be supported on the side of the post.

A view inside the boiler plant is shown in Fig. 12. Here are installed five 300-hp. water-tube boilers set in battery and half battery, making 1500 hp. in all. The steam header is carried along the wall. It has welded necks with extra-heavy steel flanges for each boiler connection. Each steam feeder has a Jenkins stop and check valve at the boiler and a Best gate valve with bypass at the header. As above stated, the pressure carried is 175 lb.

The Pipe Is Carefully Covered

The insulation or covering of such long steam lines is an extremely important matter. The placing of this covering near the end of the 7300-ft. pipe line is shown in Fig. 13. It is made up as follows: 1½ in. of 85% magnesia, a cloth jacket, two layers of rosinized paper, 1 in. of hair felt, one layer of rosinized paper, and two thicknesses of weatherproofing, together with the various bands, wires, etc., required to bind this material firmly together, and about the pipe.

It may be seen, therefore, from the foregoing that steam transmission is not invariably discarded in favor of electricity in the anthracite region, that the many difficult problems of leading the pipe line across country, over streams and railroad tracks, providing for expansion and contraction, removing what small amount of water necessarily condenses from the steam, and holding this condensation to a minimum by means of a suitable pipe covering, are all problems which, in the case described above, have been successfully solved.

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When to Cut Timber

By Ernest L. Bailey*

It seems probable that few mine managers appreciate the importance of having their mine timbers cut during the season of little or no sap, that is, from approximately the middle of December to the middle of February. This, of course, applies only to entry timbers or to those for which a long life is desired.

Dry rot is by far the most prevalent of any timber discease obtaining inside the mine workings, and not only is it the most common, but, once infected, there is no efficacious treatment for the diseased stick.

Dry rot is produced by the fermentation of the sap in improperly seasoned timber, beginning at the center and working toward the surface. Timber cut during the no-sap season and subjected inside the mine to even a slight air circulation is rarely affected.

The elimination of dry rot is even more desirable from a safety than from an economical viewpoint. The surface of the stick being the last part to be affected, an almost wholly decayed timber may present to the eye a perfectly sound appearance, thus giving the workmen, and frequently, no doubt, the foreman, a false sense of security, which has unquestionably been an important contributing factor in many fatal accidents.

The manager who now has his foreman prepare an estimate of the permanent timbers to be used during the coming year and orders the woodsmen to cut and store them in the proper season, will be taking steps to ultimately reduce his cost of timbering and also to safeguard the lives of his employees.

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*Mining engineer, Crumpler, W. Va.

EDITORIALS

Two Phases of the Colorado Strike

"Life, liberty and the pursuit of happiness" are the inherent rights of all who live, dwell or sojourn within the confines of the United States. It would appear to be ridiculous that the miners of Colorado should declare, as one of the contentions for which their strike has been called, the right to board where they please, to buy their necessities or superfluities where and from whom it may suit their fancy. These are rights supposedly inalienable.

Another point for which it should be utterly unnecessary for the mine workers to contend is the enforcement of the laws of the state regarding mine inspection and hours of work. These are matters which primarily concern those who are intrusted with the enforcement of he statutes.

While the contentions of the mine workers cast insinuations upon both the executive branch of the state government and the business system of the operators, many of their methods in conducting the strike are highly reprehensible, as is evidenced by the recent findings of the Grand Jury. This body in returning ndictments against the strike leaders, charging them with conspiracy o monopolize labor, has made some pointed remarks concerning the importation of experienced or professional agitators, the furnishing of arms and ammunition to "irresponsible aliens," and the employment of methods "which all fair-minded labor organizations repudiate." One of the local labor leaders admitted under oath that he had personally given weapons to the miners at one of the tent colonies, many of whom were at the ime drunk and insisted upon immediately attacking the watchmen employed by the operators.

In arming foreigners unacquainted with our laws or customs, and whose idea of all government is that of a monarchy, these labor leaders launch a force, the amount and direction of which they admit they are unable to conrol. Under such circumstances, they should not be surprised at any far-reaching results which may follow. Almost anyone can kindle a fire; it may require several ngine crews to extinguish the resulting conflagration.

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The West Virginia Coal Mining Institute

The struggles and the strifes of West Virginia have been a matter of recent national history, and most of what the public heard relative to those ugly occurrences ame through Charleston, W. Va. The quarrel is far rom settled; the men in one camp have already broken heir agreement and are seeking a new one, and everyone xpects a recurrence of violence.

Yet a trip to Charleston to a meeting of the operating forces in an institute assembled revealed no sign of any apprehensions or festering animosities. Most creditable to the executive heads of West Virginia is it that despite a continued outburst of public condemnation, misrepresentation and scandal, there is now little sign of anger or retaliation. One compares with wonder the quiet of the meeting in the Y. M. C. A. building at Charleston, with the orgy of hate, violence and malice at Carnegie Hall, New York City, when that Jones woman, interesting and clever, preached her story of discord.

Mrs. Jones—we will not dignify her with the title she assumes, "Mother Jones"—and her followers have failed to disturb the serenity and determination of the West Virginia operators. While she has talked guns, they are discussing schools and seeking to do their whole duty to their employees. The future will record the success of the West Virginia operators in suppressing disorder.

There is no other way of winning back the state to public confidence, and it is pleasing to see that the operators have chosen it. In all the papers and discussions not one word was said which would have brought a smile or caused a frown to gather on the face of any mine worker. The favorable audience which Dr. Ira D. Shaw, of the Y. M. C. A., received and the prolonged applause when the prohibition amendment to the constitution was but casually mentioned shows that the West Virginia operators are determined to remake the state and set it right.

Coal Age
Wishes Everyone a
Merry Christmas

But from these quiet men, one turns uneasily to those unquiet souls, probably just as determined to seek the right as they have light to see it and know it as the operators. The need is great to establish in them a degree of character that will make such scenes of violence, as West Virginia has recently witnessed, impossible. Can this ever be done by inciting each and every man to be a mine official, a foreman or a superintendent? A propaganda of education which urges every man to seek to dominate his peers is ill-suited to this 20th century.

The duty of creating a desire for comfortable, clean and happy homes, good citizenship, thrift, sanitation, wholesome cooking, sobriety, decent living, first aid, rescue work and like matters, is indicated by all the symptoms of the West Virginia unrest. Let no one decry ambition, but if a man is willing to continue to be a miner and make more money than his foreman, why urge him to change? Teach him track laying, coal shooting, timbering, safety, economy and efficiency in mining, so that he can earn for himself and society a better living. It is a fact that he will be more adequately rewarded and find life easier if he remains a miner and does not put himself where the state, the operator, and the employee can combine by their reproaches to make life unendurable.

In England today the county councils' lecturers are teaching hygiene in every village. In any coal camp it would be better to teach that science than the hydraulies of mining. We rejoice to hear that Anna B. Scott has been teaching simple cooking in the Winding Gulf section, and inculcating culinary economy to the native miners' wives. The lessons, simple and fundamental, have had remarkable results. The miners in the mountains of West Virginia have hitherto not only been served with poorly cooked food, but the work has been done in the most wasteful way and Mrs. Scott has set herself to meet the difficulty in a practical manner.

The mountaineer needs much development, and some at least of the operators seem decided he shall have it. We hope that they will conclude not to develop only those who have a facility for mathematics and other book learning, but will seek to extract the best from every man and every woman in the community. If we desire juries to be just, if we would replace politicians with statesmen, if we seek to make union officials serve the best interests of their men, if we would have reason and efficiency at our mines, we must create character. When the laws are inefficient and flouted, where anarchy rules, there the need for ideals and self-constraint is most felt and unhappy is the operator who meets force with force and has not learned the more American method, education.

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The Greatest Cause of Mine Accidents

In mining, as in many other industries, the vast majority of fatal accidents occur from one or more of three causes, ignorance, indifference, disobedience.

Many of our mine workers, being more or less inexperienced are often downrightly ignorant of dangerous conditions. Others, even though experienced, and thoroughly realizing that they are in danger, evince a strong spirit to put off "until a more convenient season" the time of making adequate provision against a known risk.

The third class are those who tacitly disobey the instructions of their superiors. When told to take down a certain piece of slate or to set a prop in a certain locality, these men finish loading a car or cleaning up a place before proceeding, perhaps leisurely, to carry out instructions, or they may even leave the mine without performing the duty at all.

One of the best methods that has hitherto been devised for forestalling these evils is the appointment of a sufficient number of subforemen so that each may have only a limited number of men under his care. This number, of course, varies with the conditions and layout of the mine, but should be such that he can visit each working place every few hours.

These assistant mine foremen are to a large degree safety specialists. When a dangerous condition is discovered, it is the duty of the subforeman in whose district it occurs, not only to instruct the miners to rectify the condition, but to remain and see for himself that his instructions are immediately and implictly obeyed.

It is at once apparent that so long as human nature remains human nature, all accidents can by no means be eliminated either in mining or any other industry. Strive as we may for a clear accident record, we will still be confronted by lapses of discipline which result fatally. The fact remains, however, that the above system, where it has been adopted and conscientiously followed, has been extremely fruitful in reducing accidents. One firm, of which we have knowledge, has succeeded in reducing accidents upon a tonnage basis by means of this system somewhat over 60 per cent.

Great as have been the strides toward safety accomplished by this system, however, fully one-half of the accidents still occurring in this firm's operations are due to lapses of discipline, to the apparently irresistible tendency of all underground workers to procrastinate, to gamble with fate and take a chance.

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The "Mine Workers" and Their Contracts

The United Mine Workers of America has proved beyond doubt that as an organization it is a body without responsibility. By countenancing the continued violation of labor contracts with the anthracite and bituminous operators in Pennsylvania, the officers of the "Miners' Union" have made a most serious mistake, and one that reflects on their honor and sincerity, as well as their business judgment.

For more than a year the anthracite-coal companies have remonstrated in vain against the many serious "button strikes" in the hard-coal region. It has been left to the bituminous operators of central Pennsylvania, however, to call for a show-down, which is done in their 10-day ultimatum published on p. 929.

In such matters as this, public opinion will always ultimately control and determine the issue, and as a consequence, there can be no doubt of the outcome. All fair-minded people are certain to protest against the attempt of the miners' organization to make contracts and immediately thereafter repudiate all that is binding in their part of the agreement.

We believe in labor unions, and we are sure that, when properly conducted, such organizations are beneficial to society as a whole. It is also proper that those who represent a body of workmen in any industry should conclude the very best bargain in the matter of wage agreements that it is possible for them to obtain. But when such a contract is finally made, there should be no violation of its terms.

The present policy of the "Miners' Union" is one of which they should be ashamed. They are striking at the heart of their own organization. Mr. White, Mr. Gilday and other union officials will have nobody but themselves to blame if their present dishonorable plan of procedure proves disastrous to the campaign of organized labor in the coal industry. No social movement can succeed unless based on justice.

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May the Pot Call the Kettle Black?

The Delaware, Lackawanna & Western R.R. Co. was recently compelled to pay a fine for having committed the legal misdemeanor of hauling its own hay over its own railroad in order to feed its own mules in its own mines.

Provided that the present agitation for a Government railroad and mines in Alaska is successful, and that the road is finally built, and the mines opened, it would be interesting to know in what light the courts will view the action of the Government in transporting its own coal produced in its own mines, over its own railroad, to supply its own Navy.

SOCIOLOGICAL DEPARTMENT

How Breathing Apparatus Works

SYNOPSIS—An elementary and detailed explanation of the manner in which the Westfalia apparatus is constructed and how it works.

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The purpose of artificial-breathing apparatus is (1) to supply the wearer with oxygen and (2) to absorb the carbon dioxide and moisture which he exhales. These two requirements fulfilled, he can safely penetrate any area containing an unbreathable atmosphere. These needs are met by the Westfalia apparatus by (1) cylinders filled with oxygen, the supply from which is regulated by a reducing valve; (2) breathing bags large enough to regulate by their capacity the supply to and the discharge from the lungs; and (3) a metal container filled with chemicals for the absorption of carbon dioxide and moisture.

Rubber Parts in Front, Metal Parts in Rear

The apparatus is distributed on the front and back of the rescueman; that part which is of rubber is placed in front for better protection, and the metal parts, such as the oxygen cylinders and the regenerator, are placed behind. The hose pipes protected by wire reinforcement are all in front or under one arm. All the pipes on the back are of metal.

In the diagram, to make matters plain, the parts worn in front are placed on the left, the parts under the arm in the center and those worn on the back on the right. The breathing bag has been represented as cut open, so as to show the hose pipes which pass into it by air-tight connections. The only other parts in section are the regenerator and injector. It should also be stated in passing that what we shall call the left-hand compartment of the breathing bag is that to the left hand of the wearer and appears as the right-hand compartment in the diagram.

The Course of the Air and Its Purifying and Enrichment

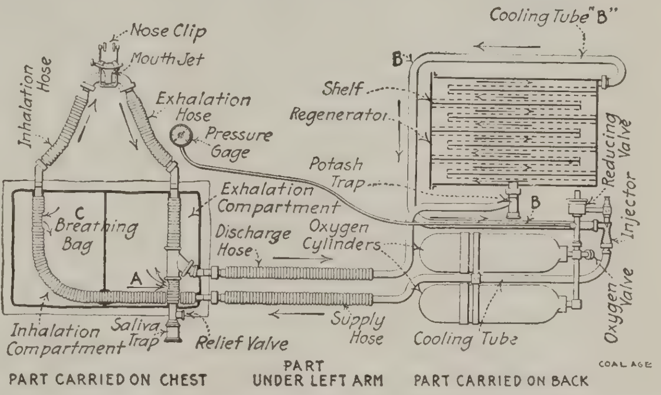
The illustration shows the circulating system of the air and oxygen in the Westfalia apparatus. The air which the rescueman discharges from his lungs goes through the exhalation pipe in front of his body into the left-hand compartment of the big breathing bag, which he carries on his chest. It passes into this bag, but the pipe is unbroken except for a slit *A*. If the air is entirely unobstructed, all of it goes forward into the discharge hose, which is passed under his left arm to the back of his body.

If, however, the air exhaled does not pass away immediately, as is always the case when the rescueman is making a full breath, some passes through the slot *A* into the exhalation compartment of the breathing bag and is stored up so that when the man is inhaling, this air can still continue to pass on. Why it is necessary to have this bag and why it is not connected to the air line with valves will be explained later.

We have traced the air into the discharge hose, by which it passes under the left arm of the rescueman at a point near his waist. It is then carried to the regenerator on the upper part of the man's back and circulates back and forth till it reaches the top of the regenerator, its moisture and carbon dioxide being absorbed by the potash on the various "shelves." It then passes, by a cooling pipe *B*, over and alongside the regenerator and then below it to the injector.

The Injector

This injector is just like a steam inspirator, with this sole difference that oxygen is used to do the injecting. A small jet of oxygen is passed through a passage, which gradually narrows and then widens out to the full diameter. The speed with which this oxygen travels into this narrow space causes the purified air to enter the narrow pipeway and then drives the air now both purified and enriched with oxygen back through a pipe between the two cylinders of oxygen to the flexible supply hose, which passes under the left arm into the right or inhalation compartment of the breathing bag.



Diagrammatic Illustration of Westfalia Breathing Apparatus

This pipe passes through the exhalation compartment on its way, but is air-tight in this part of its course. When it reaches the inhalation bag it is slit at *C*, and the air can pass right on to the rescueman's lungs if he is drawing in air, but if he is compressing his lungs, the air will go into the breathing bag and be stored up there until he is ready to draw it in. Then the air will return into the slot *C* and proceed by the inhalation pipe to his lungs.

The Oxygen Cylinders

In this manner the air passes continuously round in a circuit, being purified by the potash and oxygenated by the gas escaping in due proportion from the oxygen cylinders. Two of these are used so that the weight is distributed more evenly on the back than it would be if only one large one were installed.

Nevertheless, one cylinder is not exhausted before the other is emptied, but oxygen from both these cylinders is used at the same time and the pressure is measured by one and the same pressure gage. The oxygen is maintained at a pressure of 120 atmospheres, or 1733 lb. A single automatic reducing valve serves for both cylinders and is so arranged that the injector jet can be inspected without removing the valve from the apparatus. As the 120-atmosphere charge is sufficient for two hours, each atmosphere furnishes enough air for one minute, and the pressure gage is graduated according to that principle.

Oxygen Is Purified by Three Filters and Pressure Is Reduced to 72 Lb.

In passing from the cylinders to the reducing valve the oxygen is filtered through three sets of gauzes and felt washers so that it is impossible for any dirt or impurities to enter and clog the injector, so long as these gauzes are kept intact. The reducing valve makes a reduction in the pressure to about 5 atmospheres, or 72 lb., and is so arranged that even when the pressure in the cylinders drops down to 8 atmospheres, the pressure of the escaping oxygen is nevertheless still the same.

This oxygen flows through an extremely small nozzle, and being at the pressure described, has considerable velocity, which is utilized to promote circulation through the apparatus. The nozzle projects slightly into the trumpet-shaped opening forming an injector. The oxygen passed by the apparatus is 60 liters, or 2.1 cu.ft. per min.

The Breathing Bag

The inhalation compartment of the breathing bag stores up air ready for the deep breath or for extra demand in case of more than ordinary exertion. The bag is, in short, the regulator which turns an alternate action into a continuous one. The inflation and contraction of the lungs are reciprocating actions, and to supply and receive the air from these pulsations by a continuously working apparatus, a storage chamber is necessary, and the breathing bag serves that purpose just as does the air reservoir on a water pump.

The supply and discharge tubes, as has been said, are both connected at the bottom of the breathing bag on the left side. This obviates the need of making any connection in the apparatus after it is put on and also allows each man to examine and test the complete circulation of his own apparatus.

Why Hose Pipes Pass through the Breathing Bag

It has been noticed in this article that the hose pipes pass through the breathing bag. The advantage of this arrangement is that even if the rescueman lies down on the bag the air will not be entirely shut off and the bag will be held open so that it will have some available capacity. The man will still be able to breath freely despite his prone position. The breathing bag serves as a storage reservoir at all times; the exhalation compartment fills up and gives a steady supply of foul air to the regenerator for purification. The breathing bag is protected from being torn or cut by means of a leather cover, which is attached with straps and swivels to the shoulder straps and back carriage and is sufficiently free to allow unrestricted expansion.

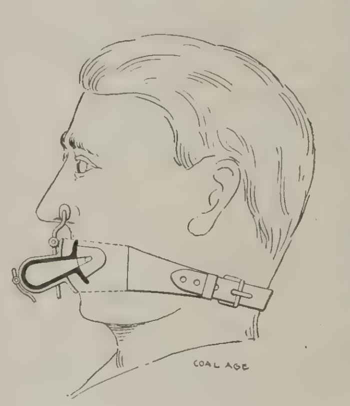
By having the hose pipes within the breathing bag the connection between them and the bag is made more simple and no valves are required. The arrangement works, therefore, without unnecessary loss of power.

The hose which connects the breathing bag with the face piece is made extremely flexible and can be quickly put on, as it is only necessary to fit the helmet on the head or place the mouth piece in the mouth and screw up the nose clip to be ready for instant service. This ability to put on the apparatus rapidly is of considerable importance in an emergency.

The Regenerator

The regenerator, as has been said, has "shelves," but the potash is placed both above and below them, being held in place by wire gauze. This gives the material a large area of contact with the circulating current.

Where the regenerator has been roughly handled or sent by train or motor car without proper packing, minute particles of the chemical will occasionally sift out of the wire cages and fall into the bottom of the regenerator. In order to prevent this dust from blocking the air entering the potash cartridge, a trap has been fitted to the pipe, by which the air is conveyed. The regenerator can be quickly exchanged or refilled, either the interchangeable or refillable type being furnished, as may be desired.



The Face Piece

The Oxygen Gage

The gage is carried just below the left shoulder in a leather case, forming a part of the harness. By unbuttoning a flap the gage can be taken in the hand and examined. The oxygen is carried from the cylinders to this gage by a small, heavily armored rubber tube passing under the left arm. It is well protected by the apparatus where it crosses the back, and, as it passes closely under the arm pit, it cannot catch in obstructions.

Many authorities believe that pressure gages should be kept close to the oxygen cylinders, feeling that flexible tubes are undesirable as conductors of any fluid at pressures of 1733 lb. When carried on the back the pressure gage can be placed below the regenerator and above the oxygen cylinders, so as to receive the protection of both. The makers of the Westfalia apparatus are quite willing to provide such an arrangement, as they believe the argument is in favor of this location for the gage. When set at the back, it is placed in a metal framework, the front being adequately protected by a metal shield.

There is this strong argument in favor of the rearward position. Rescuemen never travel into a mine alone, so it is easy for each rescueman to watch the gage on the back of his comrade. However, most users of apparatus would feel better satisfied if they could read the record of their own pressure.

Why the Air Circuit Never Reverses

There are no valves in the system, but rebreathing any of the exhaled air until it has passed through the regenerators, is impossible. Yet this result is obtained without the use of valves in the air passages. Such valves are apt to become choked with saliva, especially when the mouth-breathing apparatus is used.

There is always a higher pressure in the inhalation than in the exhalation pipe, so that when the rescueman expires air, it goes to the pipe with the lower pressure, namely, the exhalation pipe, and when he draws his breath, the air inspired comes from the pipe which is at higher pressure, to wit, the inhalation pipe. The injector thus determines the direction of flow, so that it is impossible to reverse the circuit.

The connections between the regenerator and the breathing bag on the purified-air end are quite lengthy. This is done to cool the air heated by the chemical actions taking place in the regenerator.

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Domestic Science in Mine Camps

Mrs. M. B. Scott, of Philadelphia, Penn., a famous culinary expert, has been teaching cookery at the little town of Tams, Raleigh County, W. Va. She was introduced by an officer of the mining company and declared she could make a good dinner for 4 men for 50c.

Four men were chosen having exceptional appetites. The meal opened with a beef stew, the meat of which cost 18c. As potatoes were expensive, Mrs. Scott replaced them by dumplings, at 4c., including parsley and other seasoning. A soup of stock cost 3c. and a can of peas 6c. For dessert, Indian pudding was served, at a cost of 5c. and the coffee for the four men cost 7c.

On the second day of the demonstration a larger building had to be used to accommodate the crowd. Mrs. Scott has taken a young woman from Tams to Philadelphia, to give her a thorough training in domestic economy. The student's expenses will be borne by the operators.

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Be Careful

By Alabama Superintendent

The day after a recent mine explosion, the following editorial appeared in a Southern newspaper:

> For a number of years the matter of safety in mines has been given close study by leading experts among miners, operators and governments. Numerous appliances and methods have been devised and suggested in seeking a solution of the problem and some progress has been made. Yet the tragic event of yesterday in Alabama demonstrates afresh that there remains room for improvement.

In the same issue of the paper above quoted, a statement is made that coal is shot "on the solid" by black powder. Why not meet the issue squarely instead of looking for undiscovered causes for such explosions. More attention should be given by the miner, the operator and the government, to the enforcement of rules already in force. When the miner knows that he must obey certain fixed rules and the operator knows that he also must keep his mine safe, then only will the number of mine explosions be decreased.

If the miner is allowed to put two kinds of powder in the same shot; fire shots without tamping them to the end of the hole; make up black-powder cartridges with an oil lamp on his cap; keep explosives and exploders in the same box; walk past danger boards or shoot off the solid, is there any need to look further for the cause of explosions?

If the operator allows his miners to shoot "on the solid" with black powder, or if he permits gas to accumulate in old or new workings; if he countenances the driving of rooms 200 ft. up a 15-deg. pitch in a gaseous mine omitting crosscuts to keep down the cost, or the building of overcasts of 1-in. boards which will burn like paper, is there any reason for further talk on causes of explosions?

These are only a few of the many reasons why explosions occur.

Mr. Miner, are you violating any of the company's safety rules? Mr. Operator, are you keeping your mine safe and using safe mining methods? If you are, then ask the experts to look for new causes. If you are not, then put the blame on yourselves and get to work along safer lines.

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Private Coal Cars

Investigation of the private car lines by the Interstate Commerce Commission calls attention to the coal cars owned by companies operating independently of the railroads. The attitude of the car-owning coal companies remains to be defined in the inquiry under way.

The coal cars of private companies constitute a small fraction of the total coal cars of the country. This is a different condition from the refrigerating situation, where the latest estimates of the commission indicate a percentage of ownership of about 50 per cent. for the railroads and the companies, where each own about 50,000 cars. Tank cars are 39,000, of which 9000 belong to the railroads.

The following figures are for the coal lines indicated:

Atlas Coke Co.	60
Baker-Whitely Coal Co.	150
Berwind-White Coal Mining Co.	*3,000
Boomer Coal & Coke Co.	500
Ellsworth Coal Line, C. P. R.	780
Jamison Coal & Coke Co.	1,500
Keystone Coal & Coke Co.	201
Lehigh Coal & Navigation Co.	100
Logan Coal Co.	150
Loyal Hanna Coal & Coke Co.	502
Morrisdale Coal Co.	150
Moshannon Coal Mining Co.	152
New England Coal & Coke Co.	400
New River & Pocahontas Consolidated Coal Co.	1,000
Penn Gas Coal Co.	1,418
Pennsylvania Coal Co. (Erie R.R.)	7
Pennsylvania Coal & Coke Corporation	†700
Pennsylvania Ontario Coal Line	412
Pittsburgh-Buffalo Co.	399
Pittsburgh Coal Co.	625
Quemahoning Coal Co.	400
W. J. Rainey	713
United Coal Co.	1,009
Vinton Colliery Co.	200
Washington Coal & Coke Co.	553
Westmoreland Coal Co.	2,101
Total	17,182

*Estimated. †Leased or controlled.

All repairs are at the charge of the owners. The cost of coal cars averages $700. Private car companies are paid 6 mills a mile for the use of their cars. The average time of a return trip of the cars to the mines from tidewater is fourteen days. The average haul is 300 miles to tide. This makes the return on the cars $1.80 a trip and $3.60 for the round trip. Average rates of freight in this district are for anthracite $1.40 a ton for prepared sizes, and $1.25 for steam sizes. For bituminous coal the rates are $1.55 a ton to South Amboy, Port Reading and Elizabethport, and $1.60 to Port Liberty. Boat charges from the lower ports are 18c. a ton and from Port Liberty 15c. a ton. Coal rates over the country show greater cost for anthracite than for bituminous.—*Wall Street Journal.*

DISCUSSION BY READERS

Working Coal under Sandstone Cover

Letter No. 8—Replying to the request for suggestions in reference to the best method of working coal under hard sandstone cover, Coal Age, Nov. 15, p. 745, I would say: Assuming the mine is already developed, the rooms driven up and the work "standing on pillars," as describer by Mr. Anderson, the question presented is how to draw back the pillars in a manner that will avoid a possible squeeze and the consequent loss of pillar coal. To do this and to enable one to control the squeeze should one start, I would suggest the following general method:

As shown in the accompanying sketch (Fig. 1), the pillars should be worked back in sections of three, four, or even six rooms apiece, the gob line in each section being kept about 150 ft. in advance of the line in the next section following. My reason for this suggestion is that, should any fall or trouble occur in one section, it will not result in tying up the entire line of pillar work until the fault is remedied. Where the line is continuous any slight accident at one point would affect the entire gob line and greatly reduce the output of the mine and increase the expense of operation. On the other hand, by keeping a step of 150 ft. between two sections, as *A* and *B* (Fig. 1), the trouble is localized and work in other sections is uninterrupted. At *C*, I have shown a section of rooms advancing, which, of course, does not pertain to Mr. Anderson's present proposition.

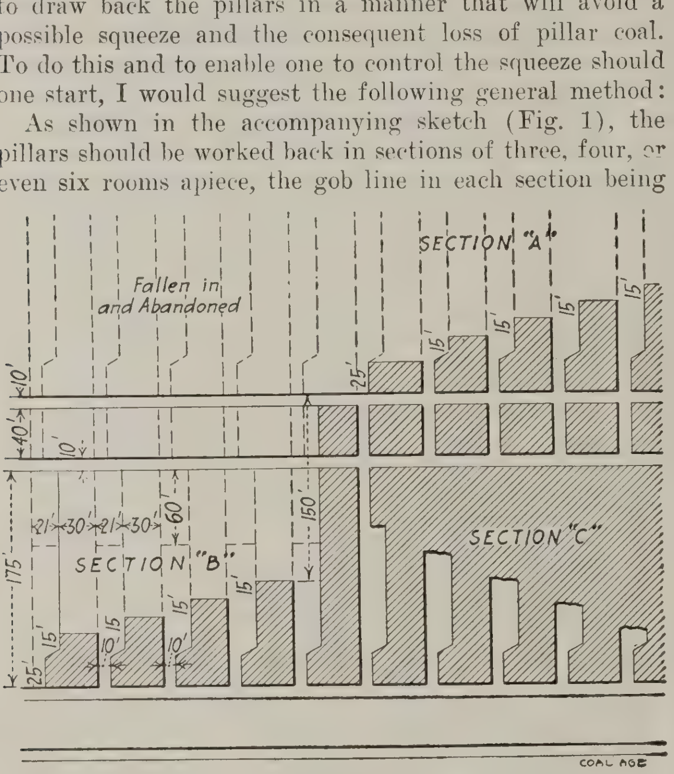

Fig. 1. Proposed Plan of Drawing Pillars in Sections

An important point that will greatly assist the ventilation of the mine and should be adopted in any new development is that the cut-throughs in adjoining pillars should never be opposite one another, but should be "staggered." For example, the cut-throughs, as measured from the entry in room No. 1, center to center, are 70, 140, 210, etc., ft. In room No. 2, these distances are 35, 105, 175, etc., ft. In room No. 3, they are the same as given for room No. 1, and thus continue to alternate in each consecutive room.

Another important point has reference to the extraction of the chain pillar. This should not be split, as is often done, but chutes or rooms should be driven up through the pillar in consecutive order and located so as to line up with the regular rooms. It should be remembered that many a squeeze is started by the extraction of the chain pillar. It is important, also, to give proper attention to the drainage of the mine, so as to keep the rooms dry, especially if the bottom is soft. Another important feature is to consider the width of each separate step or slice taken off the ends of the pillars in the several sections. I would not advise a greater width than 15 ft., under ordinary conditions. I have seen the method, as outlined, worked successfully. It requires close attention, however, on the part of the mine foreman to see that the crosscuts in the butt headings are correctly measured and correspond to the rooms turned off the butts, so as to preserve a uniform straight line of rib.

For the mine described by West Virginia Engineer, I would suggest the adoption of the same plan as outlined above, except that where practicable I would vary the room centers so as to proportion the width of pillar to the depth of cover. Thus, under 400 ft. of cover, 60-ft. room centers could be used, which could be increased 10 ft. for each 100 ft. additional depth of cover.

Pennsylvania Superintendent.

Oliphant Furnace, Penn.

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Letter No. 9—I was much interested in the inquiries of W. F. Anderson and West Virginia Engineer, in respect to working coal under sandstone cover, and would like to give my own experience in similar work.

First, in regard to Mr. Anderson's mine, I consider 30-ft. pillars are too small for safe and efficient working under such conditions as he describes, especially as the sandstone roof is apt to crumble on exposure to the air. However, as this mine is largely standing on pillars, it is too late to discuss that aspect of the question. What must be considered now is, how to draw back the pillars, so as to obtain the largest recovery of coal, with safety.

In drawing pillars, under these conditions, I would take the coal out in two separate benches wherever the thickness of the seam was greater than 6 ft. Start at the upper end and drive a crosscut through the 30-ft. pillar close to the barrier, taking only the six feet of coal next to the floor. The width of the crosscut should not exceed 12 ft. In driving the crosscuts in the bottom coal, the place should be well timbered with posts set in regular rows parallel to the face. It is my experience that, in general, if plenty of timber is used in the first working, it can be almost wholly recovered in good condition. In some instances, I have seen entire pillars removed with the use of no new timber except that required for the working of the first slice or skip. This is a great saving in districts where the cost of timber is a large item in the expense account. In the present case, I would set the first row of timbers as close to the face as possible, and space the other rows not to exceed 2½ or 3 ft. apart.

Having thus crosscut the pillar in the bottom coal, I would set two or three long props with good cap-pieces against the sandstone and proceed, then, to take out two or three rows of the props supporting the top coal and permit it to fall. A little experience will be required to ascertain the best amount of top coal to drop; and it is in this part of the operation that good timbering in the first working is of the greatest advantage. If the timber is well set and in sufficient quantity, the last row left standing will always act to break the roof coal, which will drop without trouble. On the other hand, if the place is not sufficiently timbered the roof pressure, instead of acting to break the coal, may work back and destroy the props which are too weak for its support. When the top coal has been loaded out, two or three more long props can be set to support the roof. All that is required here is sufficient timber to prevent the roof caving too close to the pillar, which would cause loss of time and make the work more difficult, besides producing dirty coal.

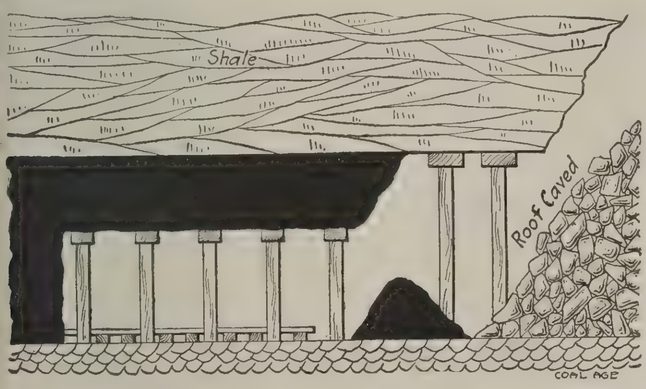

Fig. 2. Section Showing Support of Top Coal

When the work is well in progress, two miners can drop and load from 8 to 12 tons apiece a day. Allowing, then, 30 cu.ft. per ton of coal in place and estimating on 4 ft. of top coal, the weight of coal dropped in a single crosscut 12 ft. wide and 30 ft. long will be $(12 \times 4 \times 30) \div 30 = 48$ tons, which would give two miners work for from three to four days.

It is not advisable to crosscut the pillar a greater width or to take off a slice of coal wider than 10 or 12 ft. at a time, for the reason that the timbers on the goaf side are too far from the solid coal and are apt to be crushed before they are drawn. Moreover, too long a time would be required for driving a wider crosscut and trouble would result from the settlement of the roof too heavily on the timbers. The work requires considerable experience, and I have found it best to keep regular men employed on this work. When properly executed, the work is easier than ordinary hand mining. It may look dangerous to one unfamiliar with the system; but I have found the work can be more safely done and better results obtained when the coal is thus removed in two benches.

I have shown in the accompanying figure (Fig. 2) a section taken across the pillar separating two rooms and showing the top coal supported on rows of posts. Two long posts are shown supporting the sandstone roof beyond the top coal.

The case of the West Virginia Engineer differs from that of Mr. Anderson's in that the roof is a hard sandstone, which I consider is a battle half won. Since a soft bottom and small pillars generally spell disaster, I would lay out the mine, in this case, with pillars not less than 70 or 80 ft. square. The main roads and air courses should not be more than 12 ft. wide, while the ordinary stalls should not exceed 18 or 20 ft. in width. There is no economy in driving stalls wider than this, as it increases the cost for timber and subsequent upkeep and repair, while there is gained thereby but a few extra tons of coal, which would not be lost by making the pillars a suitable width.

In drawing pillars, in this case, I would take the full thickness of the seam, in one working. As each slice was taken off, I would draw as much of the timber as possible and allow the roof to fall before starting the next slice. By so doing, the pillar coal is relieved of excessive weight and the coal is more easily mined and in better condition.

James Dickson.

Nanaimo, B. C., Canada.

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Letter No. 10—Having had a number of years' experience in drawing pillars in a mine, under a solid sandstone roof of 40 ft. in thickness, with a bottom that gave some trouble by heaving, I was much interested in the inquiry of West Virginia Engineer, relating to such work. In our case, we found the best method to employ was to drive the headings to the boundary line. These headings were driven from 12 to 14 ft. wide, and the chambers were turned on 50-ft. centers. The chambers were 24 ft. wide, making the width of the room pillars 26 ft. The pillars were crosscut every 50 ft.

As shown in the accompanying sketch (Fig. 3), a solid block of coal was left between each set of five chambers. This coal was to be worked when coming back. When the work had progressed to the boundary line, or barrier pillar, the robbing of the pillars in the first five chambers at the inby end of the heading was commenced. The system gave good success and little coal was lost. At times, the roof would not cave until we had taken out the full length of three pillars. It would then break off at the pillars, leaving it in a condition that, by setting a few props, we could get out that pillar and then get back at the next one. In this system, we did not have to use many props in driving up the chambers; but when

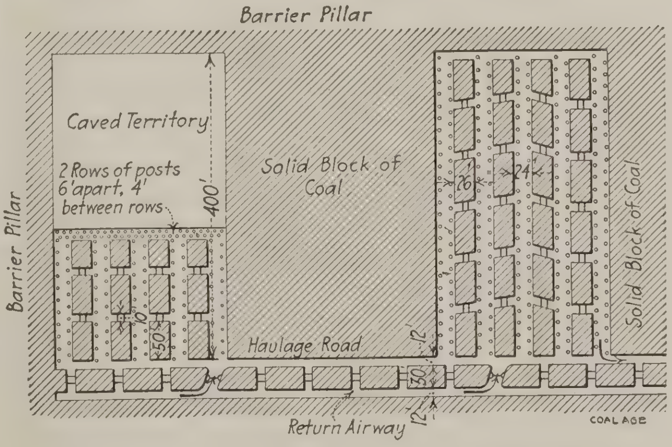

Fig. 3. Drawing Pillars in Panel System

starting to draw back, we would set timbers at the end of every pillar, across the entire place, as I have shown in the sketch, in the inby section where the pillars are being drawn (Fig. 3).

Owing to the strong roof, the chambers were turned their full width and the track was carried up as close to one rib or side of the chamber as possible, so as to be convenient for loading the coal when robbing that pillar. These chambers were driven from 400 to 600 ft. long. At times, we would bring back 10 chambers or two sets of rooms at a time; but the best results were obtained when each set was drawn back separately. The most competent and reliable men were employed on this work, four men working on each pillar—two miners and two laborers. The four men would put out 12 cars a shift. The seam made little waste and this was thrown on the opposite side of the track from the pillar to be robbed. Heavy props were used, varying from 12 to 16 in. in diameter. Overlying this seam was a cover, varying from 100 to 350 ft. thick.

In the seven years I was robbing pillars, in this mine, we lost not over 3 per cent. of the coal; and it is my opinion that if this system is followed of driving the headings to the boundary before starting to rob, 85 per cent. of the pillar coal can be reclaimed. After the room pillars have been robbed, each solid block of coal is worked out and the pillars drawn in turn. The entry pillars ar drawn back as each section is finished.

Thomas R. Pierce,

Scranton, Penn.

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Loss in Pillar Work

In my recent article on the method of drawing pillars in the Fairmont region, published Nov. 22 in Vol. 4, p. 762, I note that the introductory synopsis stated tha only about 2 per cent. of the coal was lost in pillaring. Theoretically this may be true, but I do not wish to hav this statement misconstrued by your readers, because w know that it is practically impossible to obtain this percentage in actual pillar work.

I believe it bad policy for the mine operator to boas of his recovery of pillars or to exaggerate its percentag of the coal exploited, because there is always the possibility of such a statement being used against mine operator by lessors of coal properties, and it is my opinion that i 90 per cent. is secured as an ultimate recovery, it wil probably be the limit of what we may expect.

A. W. Hesse,
Assistant Chief Engineer,
West Virginia Division, Consolidation Coal Co
Fairmont, W. Va.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Similar Airways—Two airways are similar to each other when their cross-sections are similar; the term "similar" has no reference to the length of the airway.

The cross-sections of airways are similar when their corresponding dimensions are proportional, each to each, and their perimeters parallel throughout or can be so placed.

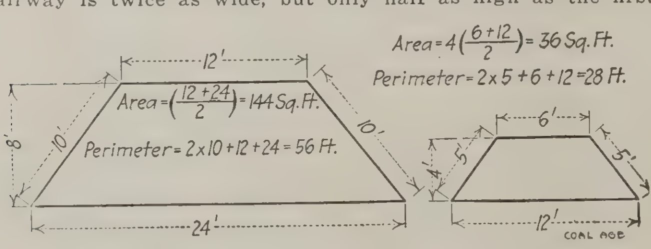
Illustration—All circular or square airways are similar, because they have but one dimension—the diameter of the circle or the side of the square, and these dimensions are, therefore, always proportional.

For example, one circular airway may have a diameter twice or three times as great as that of another circular airway; or the side of a square airway may be two or three times that of another square airway; and their perimeters can always be placed so that they will be parallel, each to each.

On the other hand, the rectangle, trapezoid and ellipse each have two dimensions; and while one of these dimensions may be two, three, etc., times as great as the corresponding dimension of another airway of the same form, it does not follow that the other dimensions of the two airways have the same proportion; and unless they do the airways are not similar. Thus, a 6x8-ft. airway and a 9x12-ft. airway are similar, because their corresponding sides have the same ratio, or are proportional and may be written

$$\frac{6}{9} = \frac{8}{12}; \qquad or\ 6:9::8:12$$

A 6x8-ft. airway and a 3x16-ft. airway, however, are not similar airways, though they have equal sectional areas ($6 \times 8 = 48$ sq.ft., and $3 \times 16 = 48$ sq.ft.); because the second airway is twice as wide, but only half as high as the first.


Area = 4 (6+12 / 2) = 36 Sq. Ft.
Perimeter = 2x5 + 6 + 12 = 28 Ft.
12'
Area = (12+24 / 2) = 144 Sq. Ft.
Perimeter = 2x10 + 12 + 24 = 56 Ft.
8'
10'
10'
24'
6'
5'
5'
4'
12'
COAL AGE

An Example of Similar Trapezoids

It is important to observe that, in all similar airways, the ratio of the sectional areas of the airways is equal to the square of the ratio of the corresponding dimensions. For example, in the above figure showing similar trapezoidal sections ,the top, bottom and sides of the larger airway are each twice those of the smaller, and the area of the larger section is $2^2 = 4$ times that of the smaller.

The Coal Age Pocket Book

Principle of Similar Airways—Since corresponding dimensions of similar airways have a fixed ratio, which is the sam for each dimension (diameter, side, height or width) it i possible to compare similar airways with respect to any o these dimensions.

Application—Assume, for example, the same pressure (p is applied to each of two similar circular airways, and it i required to find how the quantity of air will vary in the tw airways. First write the formula for the quantity (q), i terms of the pressure (p) and the dimensions, area (a), perimeter (o) and length (l) of the airway, and the coefficien of friction (k):

$$q^2 = \frac{p\,a^3}{k\,l\,o}$$

Now, if the two airways have the same length p, l an k are all constant and

$$q^2 \textit{ varies as } \frac{a^3}{o}$$

But, the area of a circle varies as the square of its diameter (d^2) and the perimeter varies as the diameter (d); henc

$$\frac{a^3}{o} \textit{ varies as } \frac{d^6}{d} \textit{ or simply as } d^5$$

In the same manner, it can be shown, in respect to al similar airways of any form, that the square of the quantit varies as the fifth power of any corresponding dimension (d) whether diameter, side, height, or width;

$$q^2 \textit{ varies as } d^5$$

which gives the following:

Rule—In comparing similar airways of equal length, fo the same unit pressure, the square of the quantity ratio i equal to the fifth power of the dimension ratio; and, for th same power on the air, the cube of the quantity ratio is equa to the fifth power of the dimension ratio.

Example—If 100,000 cu.ft. of air is passing per minute, i a 6x9-ft. airway under a given pressure, what quantity of ai will the same pressure circulate in an airway 8x12-ft. of th same length? What quantity will the same power circulate

Solution—These airways are similar because their corresponding dimensions are proportional 6:8::9:12. Therefor calling the required quantity x,

$$\left(\frac{x}{100{,}000}\right)^2 = \left(\frac{8}{6}\right)^5 = \left(\frac{4}{3}\right)^5 = \frac{1024}{243} = 4.214$$

$$\frac{x}{100{,}000} = \sqrt{4.214} = 2.0528$$

$$x = 100{,}000 \times 2.0528 = 205{,}280 \textit{ cu.ft. per min.}$$

Assuming a constant power on the air:

$$\frac{x}{100{,}000} = \sqrt[3]{4.214} = 1.6152$$

$$x = 100{,}000 \times 1.6152 = 161{,}520 \textit{ cu.ft. per min.}$$

An Interesting Crossover Problem

Solution by A. F. Allard*

[In reply to the request of a correspondent who submitted the interesting problem in trackwork, Coal Age, Nov. 15, p. 745, a number of answers have been received. From this number, in accordance with our promise, we have selected and give below the simplest and most direct method of solution of the problem submitted.—Ed.]

The Problem

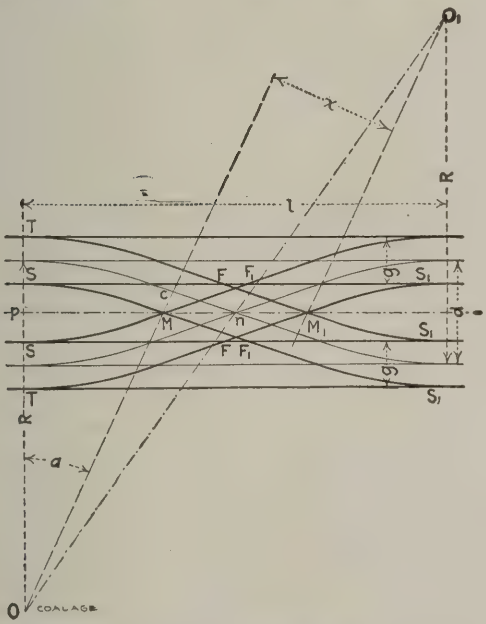
Given:

Entire length of crossover	l;
Distance between track centers	d;
Gage of track	g;
Radius of all curves	R;

all dimensions being expressed in feet.

It is required to find the following:

1. Length (x) of straight rail at center of crossover;
2. Angle (a) that subtends the curved track or rails.
3. Radius and length of outer curved rail.
4. Radius and length of inner curved rail.
5. Frog angles at F or F_1 and M or M_1.
6. Frog distance (SF or S_1F_1), measured on straight rail.
7. Length (TF) of lead (outer) rail.
8. Length (SM) of follower (inner) rail.



Plan of a Double Crossover Switch or "Diamond"

Solution—Referring to the accompanying figure:

(1) To find the length of straight track x:

$$oN^2 = On^2 - Oc^2$$

but

$$On^2 = Op^2 + pn^2$$

therefore,

$$cn^2 = Op^2 + pn^2 - Oc^2$$

But, $cn = x/2$; $Op = R - d/2$; $pn = l/2$; $Oc = R$; and substituting these values given in the last equation gives

$$\left(\frac{x}{2}\right)^2 = \left(R - \frac{d}{2}\right)^2 + \left(\frac{l}{2}\right)^2 - R^2$$

$$x = \sqrt{l^2 + d^2 - 4Rd}$$

which is the required length of straight rail at the center of the crossover.

(2) To find the angle (a) subtending the curve:

$$SOM = SOn - cOn;$$

but,

$$\tan SOn = \frac{l}{2R - d}$$

and

$$\tan cOn = \frac{x}{2R}$$

From these three formulas, the angle SOM or a is readily calculated.

(3) The radius of the outer curved rail of each switch is $R + g/2$. This curve is subtended by the angle a; and its length calculated by the formula

$$\frac{a}{180}\pi\left(R + \frac{g}{2}\right)$$

(4) The radius of the inner curved rail of each switch is $R - g/2$; and the length of this curve is calculated by the formula

$$\frac{a}{180}\pi\left(R - \frac{g}{2}\right)$$

(5) The frog angle at F and F_1 is equal to the angle SOM or a; because SO and OM are, respectively, perpendicular to the straight rails of the crossover and those of the main track.

The frog angle at M and M_1 is exactly twice the frog angle F or F_1.

[This is true when $(2R - g)(1 - \cos a)$ is equal to or less than $d - g$; but if greater than $d - g$, this frog will fall on the curve, in which case the frog angle at M will be twice the angle, whose cosine is $\frac{2R - d}{2R - g}$.—Ed.]

(6) The frog distance SF or S_1F_1 is calculated by the formula

$$SF = \left(R + \frac{g}{2}\right)\tan\tfrac{1}{2}a + \frac{g}{\tan a}$$

(7) The length of the lead rail (TF) is calculated by the formula

$$TF = \left(R + \frac{g}{2}\right)\left(\frac{a}{180}\pi - \tan\frac{a}{2}\right) + \frac{g}{\sin a}$$

(8) The length of the follower rail (SM) is calculated by the formula

$$SM = \left(R - \frac{g}{2}\right)\left(\frac{a}{180}\pi - \tan\frac{a}{2}\right) + \frac{d - g}{2\sin a}$$

[A number of good solutions to this problem were received from correspondents. The solution of Donald M. Liddell, New York, ranks second.—Ed.]

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*Chief engineer, Bunsen Coal Co., Danville, Ill.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—What are the different methods used in mining coal on moderate pitches and steep pitches, respectively?

Ans.—With the use of wooden rails in the rooms, cars may be taken to the face and loaded cars safely handled by hand on inclinations up to about 5 deg.; or, say 3 in. per yd., provided the cars are properly spragged and do not weigh to exceed 1 ton when loaded. By driving the rooms across the pitch, or at an angle not less than 30 deg. with the gangway, under the same conditions, it is possible to handle the cars with safety, from the face to the gangway, on any inclination up to 10 deg.

When rooms are driven on the full pitch of the seam, cars are often raised and lowered between the working face and the gangway, on inclinations varying from 5 to 10 deg. Self-acting inclines are used on inclinations varying from 5 to 15 deg.; and, by the use of a "barney," the same gravity system is used on inclinations varying from 10 to 30 deg. In the use of these systems, the weight of the loaded car should not exceed 3000 lb.

In what is called the "buggy system," which is only adapted to thick seams, the coal is transported from the face to the gangway in stages, by low cars or trucks, the coal being dumped into another car at the end of each stage until the gangway is reached, where it is loaded into the regular mine car. This system is used on pitches varying from 10 to 18 deg.

"Chute mining" is used quite generally on inclinations from 15 deg. upward. The chutes must often be lined with sheet iron, until the inclination of the chute exceeds 30 deg., when the coal slides on the natural floor of the seam. In very steep pitches, the "battery system" is used where the chute is kept full of broken coal, which is drawn only as the face of the breast progresses upward, the miner standing on the broken coal at the face while performing his work.

Ques.—Which would require the use of the largest pillars and why, hard bottom and soft top, or soft botton and hard top?

Ans.—The width of room pillars depends chiefly on the depth of cover or roof pressure, the hardness of the coal and thickness of the seam, the width of pillar then bearing a certain relation to the width of the opening.

A hard bottom and soft top require narrow openings in order to safely support the weak roof; and, as a result, the required width of pillar is reduced in proportion, for the same conditions of seam and overburden. With a soft bottom and hard top, the conditions are quite different. The rooms or openings can be driven wider, which increases the width of the pillar proportionately; but the width of the pillar is still further increased by the difficulty of breaking the top, so that the roof will fall and relieve the pressure on the pillars.

Therefore, in answer to the question, it may be said that, in general, the widest pillars are required when the bottom is soft and the top hard. The wide pillar, in this case, distributes the roof pressure over a greater area and avoids the tendency of the bottom to heave. The size of the pillar is also increased by the inclination of the seam.

Ques.—What precautions would you use in driving toward old workings of unknown location?

Ans.—When driving toward old abandoned workings, a single prospect heading, not exceeding 8 ft. in width, should be driven in advance of the other workings. A drill hole should be kept 5 or 6 yd. in advance of the face of the heading, and flank holes should be drilled at an angle of about 45 deg. with the entry, every 8 or 10 yd. of advance. Wooden plugs should be kept in readiness for use in case a drill hole taps water. A sharp lookout should be kept for any increase of water or gas at the face of the heading. Only safety lamps should be used in the work.

Ques.—How would you drive a slope on a uniform grade, without an engineer's level?

Ans.—A long straight-edge should be used to lay on the floor of the entry, or on the rails, and on the top of this should be arranged a template cut to the required angle of the slope; so that when the straight-edge lies on the floor of the slope the top of the template will be level. A common handlevel is then used on the top of the template to indicate when the slope has the proper grade or inclination.

Ques.—At what point in the mine should the "intake" air current be considered the "return"?

Ans.—In general, the air current is called the return current, the moment it enters the return airway. In some cases, it is difficult to determine with exactness this point of difference. What is the *return* current of one section of the mine may become the *intake* current of another section.

The most approved plan of circulation in a well developed mine makes the return air of each section enter the main-return airway, at once. This system, however, requires the erection of an overcast or air bridge at the mouth of each section. But, until the development of a pair of entries is sufficient to warrant the expense of the erection of an air bridge, the circulation is made continuous through that pair of entries and the main headings inby from that point.

Speaking, therefore, in reference to a single pair of entries, it is correct to speak of the "intake" and "return" currents passing through them. But, with respect to the entire mine, the current is all an "intake current" until the farthest point inby is reached, which is generally the last crosscut on the main heading. From this point outby, the current is properly termed the "return current," with respect to the entire circulation, although this same current may be made to traverse another pair of headings, in which the circulation may be referred to as "intake" and "return," for that particular section or pair of headings. The main intake and return airways are the main airways outby from the last air bridge nearest the face of the main heading.

COAL AND COKE NEWS

Washington, D. C.

Coal-mining interests are organizing for the purpose of opposing the advance in rates on railroads, which is now being urged upon the Interstate Commerce Commission. Their hostility to the scheme has been manifest for some time past but is now coming to a head in the bituminous trade.

The Pittsburgh Coal Co. is prominent in leading the opposition to the advance in rates and has already engaged expert counsel. The view apparently taken by the coal people is that they constitute an exception to the general rate situation in that rates are already too high on their product, so that they should not be advanced in any event.

In a general way they are preparing to argue that even if it should be found that the railroads are in some cases suffering for lack of higher rates, it would be of no particular use to grant them because the organizations of railroad employees which have shown their power so strongly within recent months would at once take the increased income away from them. The result would be that the roads would then be left, it is claimed, in precisely as difficult a position as they are today while the shippers and the public would be obliged to struggle along under the burden of higher rates resulting from the adoption of the advance as requested.

On the other hand it is openly suggested that if the rate advance is actually granted, coal producers who are now doing business upon an exceedingly narrow margin of profit will immediately resort to the courts for relief. It is pointed out that in so doing they would be able to urge that the advanced rates were practically confiscatory, because as has been shown in the past operations are on so close a margin of profit.

This point was elaborately brought out at hearings before the commission in 1912, when the bituminous companies in the Ohio region protested strongly against the proposed advances which the railroads were endeavoring to force upon them at that time. It is doubtful whether an effort to get an injunction from the courts, should higher rates be allowed, would prove successful, inasmuch as the present hearings before the commission are merely in the nature of an investigation and do not deal with any specific schedules of advance rates.

The commission, when the rate question came up in an acute form, had the schedules withdrawn and then announced that it intended to institute a proceeding on its own account, into the general justice of the proposed rate advance. The present investigation was the result of the promise thus given.

If it should turn out in favor of the roads, what would happen would be simply that the commission would practically express a willingness to see advance rate schedules filed. Then presumably the advance would be filed and shippers would have to go through the form of filing a complaint which the commission would presumably set aside. Appeal could be taken to the courts, and an injunction asked for, but it is doubtful whether such an injunction would be made permanent in any case, in view of the previously favorable finding of the Interstate Commerce Commission.

Prolonged litigation would then have to be carried on by the coal companies and others similarly situated if they wished to prevent the advances from being put into ultimate effect, and meanwhile the higher rates would continue to be charged as permitted by the commission. According to counsel for the coal companies, their argument will be largely directed toward inducing the commission to make, in its final opinion, a distinct exception in favor of the coal producers, should that opinion actually favor higher rates, on commodities in general.

PENNSYLVANIA

Anthracite

Shamokin—The recent discovery of two veins of coal by workmen digging a foundation for a new public-school building, suggested a novel idea to Supt. Howerth, of the public schools. He proposes to leave a large portion of the measures exposed and cement the cellar. Expert mining men will be asked to timber the seam and make miniature breasts, headings and gangways to show how coal is taken from the earth. The exhibit would be used as a practical demonstration of mining methods for students and a showplace for the public, which, owing to a recent order of coal companies, is not permitted to visit underground workings. One of the veins is 10 ft. and the other 4 ft. thick.

Tamaqua—Ernest Fink and C. A. Milloux, of New York, who, for the past year or more, have been prospecting for coal in the Owl Creek Valley, have abandoned the project and shipped their machinery away. The company recently became incorporated under the name of the Eastern Pennsylvania Coal Co., and bought the Phillips operation, near Middleport, which is now working.

Plymouth—Two strikes within a week is the record established at the Lance Colliery of the Lehigh & Wilkes-Barre Coal Co., at Plymouth. The men went out at first on account of a difference existing between the check docking boss, John Bodgen, and the company. Later they returned to work with the understanding that the grievance would be settled. When the company failed to reinstate the check docking boss, the men were again ordered to remain away from work.

Wilkes-Barre—An interesting departure from the usual custom in making up the program for mining institute meetings was that of the last meeting of the Wilkes-Barre District Mining Institute, in which Jacob Urban, a Polish miner employed by the Lehigh Valley Coal Co., gave an illustrated lecture in Polish, on the accidents common to coal mining and the ways in which they could be prevented, using the photographs made by the Lackawanna Coal Co. for the instruction of its employees. Officials of the Wilkes-Barre Institute hope in this way to reach others than the mine foremen and assistants, for whom most of the previous programs have been arranged.

Bituminous

Canonsburg—Work in a number of the coal mines in the Chartiers Valley is becoming quite slack. At Westland, the mines have been shut down since prior to Thanksgiving, while others in the vicinity are operating only a part of the time. Some miners are leaving for their former homes across the Atlantic.

Evans City—The Evans City Coal Co. is lifting the options it holds on about 6000 acres of coal lands along the Harmony trolley line, mostly in Butler County. The Evans people will shortly open their first mine. Deeds for the purchase of the tract are being prepared and a deal is under way for the taking of additional coal land in Forward Township, Allegheny County, the intention being to option and later buy several thousand acres.

Pittsburgh—On a petition presented by the Pittsburgh Provision & Packing Co., asking for the appointment of a receiver for the White Rock Supply Co., Judge J. B. McFarlane appointed F. R. Babcock, J. W. Ailes and John H. Jones. These are the same receivers recently appointed for the Pittsburgh-Buffalo Co. The White Rock Supply Co. is the general supply store connected with the coal company interests.

WEST VIRGINIA

Wheeling—A rumor has been circulated to the effect that a deal for large coal holdings has been closed, whereby the Lorain Coal & Dock Co. has purchased the West Wheeling mine holdings. The latter lie across the river in Ohio. Just what the consideration was is not known, but it is said to be large.

Huntington—It is stated here by those interested in the recent negotiations between an English syndicate and a number of coal operators for the purchase of coal land in the New River field, that this deal has fallen through, at least for the time being. It was thought when the negotiations first started with the English syndicate that one of the largest coal deals that had ever been made in West Virginia would be consummated and practically all contracts had been drawn up for that purpose. The foreign financiers, however, insisted on six months, while the local operators stood together on a 10- to 30-day limit to options, with the result that the deal was not consummated nor does it seem probable that it will be unless better terms can be secured in the spring.

TENNESSEE

La Follette—Employees at the Rex No. 1 coal mine of the

La Follette Coal, Iron & Ry. Co. have been on strike since Dec. 2, and at Rex No. 2 mine since Dec. 4, on account of the discharge of a gasoline locomotive repair man, for not following instructions. A few of the men are still at work at each place, the number increasing each day. It is expected that all the men will be back to work in a very few days.

KENTUCKY

Louisville—The complaint of the Drury Coal Co. against the Illinois Central R.R. Co., filed with the Interstate Commerce Commission, will be heard by a special examiner in Louisville on Feb. 2.

Henderson—After six months' work, the Spottsville mine of the Pittsburgh Coal Co., has been pumped out, and will shortly be in good shape for work. The mine is said to reach one of the finest beds of coal in the western part of Kentucky, and its product is in good demand.

Sturgis—The West Kentucky Coal Co. broke all records in the western Kentucky field when it got out 4980 tons in one day last week. The company is now employing 1100 men, all of whom are working regularly. This is the largest force ever employed by any company in that part of the state.

OHIO

Martins Ferry—Deeds have been filed at St. Clairsville transferring several parcels of coal land in Washington and Smith townships to the Glens Run Coal Co. for a total consideration of $15,433.15. The sale of this coal is believed to be connected with that sold by the receivers of the J. W. Gorrell Coal Co. to the Glens Run Co. some time ago at a much larger price.

INDIANA

Boonville—Efforts of organizers to unionize the coal-stripping field have been answered by the Sunlight Coal Co. by the discharge of thirty employees who had signed to join the union.

Evansville—Henry F. Allen, of Pittsburgh, representing capitalists of that city who have made arrangements to merge fifteen to twenty of the largest coal mines in western Kentucky, have leased the building now occupied by the First National Bank, to be used as offices for the new company. The capitalists believe western Kentucky will become one of the largest coal fields in the Middle West, with the completion of the Panama Canal and the building of locks and dams along the lower Ohio River.

ILLINOIS

Herrin—With about a 70% car supply, mine No. 8 of the Big Muddy Coal & Iron Co. hoisted approximately 70,000 tons of coal last month, which is a record breaker, all things considered.

Edwardsville—The De Camp Coal Mining Co., of De Camp, Ill., has gone into the hands of a receiver, C. W. Huskinson, of Alton, Ill., an old mining man, having been appointed to take charge of the property. The application was filed by the State and Trust Bank of Highland, Ill., as trustee for the bondholders. The De Camp company is one of the oldest in this field, and at one time was one of the largest wholesale and retail companies in St. Louis.

Hillsboro—The 300 miners employed in the Kortcamp mine here, who have been on strike for five weeks, reported for work a few days ago. After settling their troubles they found to their surprise that they were not regular union miners and could not go to work, inasmuch as the state officers of the Mine Workers had revoked their charter. The cause of the walk-out was that a man was given a job of unloading before his turn. The miners demanded his discharge and would not abide by the ruling of the pit committee. The state officials backed up the pit committee and a new charter will have to be taken out. In the meantime the mine continues idle.

East St. Louis—The railroads entering St. Louis are commencing to store coal in anticipation of labor troubles next spring. The Illinois Traction System is figuring on filling a large concrete reservoir at Riverton, Ill., with 30,000 tons, and storage yards are contemplated at other points. The Illinois Central is laying tracks at Marine, where it will, it is understood, store 50,000 tons. The Illinois Southern is storing at points along its line about 10,000 tons. All other roads are buying in small quantities, so as not to disturb the low market price.

Springfield—The coal-carrying roads of Illinois are suffering on account of the mild weather of the present winter. Coal ordinarily constitutes a considerable portion of their traffic, and with the decreased demand for fuel, the earnings suffer in proportion. On the Wabash R.R. the Decatur Division loaded 5469 cars in November, 1912, as against 4746 this year. All other roads are loading in similar quantities.

COLORADO

Lafayette—An explosion occurred Dec. 16 at the Vulcan mine of the Rocky Mountain Fuel Co., at Lafayette, Boulder County, Colo., about 18 miles in a direct line approximately north-northwest of Denver. It is said that 38 men were killed, all of whom were married, and all but eight Americans. The mine was only a year old and according to reports, it was well equipped. It is located on the Colorado & Southern R.R.

The coal is sub-bituminous. An analysis of a nearby coal showed moisture 19.15 per cent, volatile matter 30.82, fixed carbon 44.27, sulphur 0.25 and ash 5.51. On air drying the loss is 13.4 per cent.

It appears that the mine caught fire after the explosion, making recovery difficult.

FOREIGN NEWS

Rydnik, Prussia—Sixteen miners were recently killed here by smoke from a fire which started suddenly in a mine. The fire was extinguished, but not until this number of men had been overcome.

Montreal, Canada—It is understood that arrangements for financing the Canadian Coal & Coke Co. have made satisfactory progress. Interim certificates of two-year 6 per cent. notes are now being sent out and will be replaced shortly by the definite certificates. The arrangements are said to concern the sale of an issue of $2,000,000 to $3,000,000 first-mortgage bonds, which will ultimately retire the short-time notes and bank loans and provide additional funds for the use of the company.

PERSONALS

M. T. Davis, president of the Cabin Creek Consolidated Coal Co., has disposed of his interest in that firm and has retired from the presidency. William Puckett, one of the largest stockholders, has been elected president. The company has an authorized capital of $1,500,000, of which $1,200,000 has been paid.

G. P. Troutman, of West Pittston, assistant division superintendent and division engineer of the Lackawanna Division of the Lehigh Valley Coal Co., has tendered his resignation, to take effect on Dec. 24, to accept the position of Assistant General Manager for Markle & Co., at Jeddo, the largest individual operators in the anthracite region.

J. C. Davies, state mine inspector of Ohio, has appointed the following district deputies. Dennis H. Sullivan, Coshocton, secretary of the State Board of Arbitration, deputy in the sixth district; Morris Albaugh, Murray City, deputy in the second district; Andrew Ginan, of Jacksonville, deputy in the third district, and Evan Lewis, of Harmon, deputy in the seventh district.

E. S. Rolapp, G. W. Cushing, J. A. Reeves, Henry Conlan, Jr., J. F. Emmert, D. D. MacLean, F. J. O'Brien and William Gorton, coal-mine operators of Utah and Wyoming, were in Portland recently and discussed with Traffic Manager R. B. Miller, of the O.-W. R. & N. company, the possibility of getting reduced rates on coal freights from their mines into the Pacific Northwest. The mining men contend that the rates now charged prevent them from entering this territory in competition with mines on other roads having more favorable rates.

RECENT COAL AND COKE PATENTS

Grate Bar. E. L. Thomas, Valdosta, Ga. 1,075,874. Oct. 14, 1913. Filed Apr. 25, 1911. Serial No. 623,229.

Superheater. J. Primrose, New York, N. Y. 1,076,315. Oct. 21, 1913. Filed July 10, 1912. Serial No. 708,602.

Miner's Pick. J. P. Craven, Elizabeth, N. J. 1,076,103. Oct. 21, 1913. Filed Apr. 26, 1913. Serial No. 763,901.

Mine Hoist Recorder. O. W. Ingels, Carlyle, Ill. 1,079,493, Nov. 25, 1913. Filed Jan. 16, 1913. Serial No. 742,447.

Gas Producer. Louis Friedman, New York, N. Y. 1,076,823. ct. 28, 1913. Filed Feb. 13, 1912. Serial No. 677,381.

Coal Washer—J. B. Keenan, Birmingham, Ala., 1,073,992, ept. 23, 1913. Filed Nov. 23, 1912, Serial No. 733,151.

Mining Machine. H. A. Kuhn, Pittsburgh, Penn. 1,079,-53, Nov. 25, 1913. Filed Oct. 12, 1907. Serial No. 397,126.

Rotary Coal Screen. F. S. Concerse, Binghamton, N. Y. 1,-79,543, Nov. 25, 1913. Filed May 4, 1911. Serial No. 625,634.

Steam Superheater—A. Bolton, Manchester, Eng., 1,073,-44, Sept. 23, 1913. Filed March 19, 1913. Serial No. 755,-40.

Apparatus for Pulverizing Coal—C. A. Bettington, London, Eng., 107,040, Sept. 23, 1913. Filed Nov. 15, 1909. Serial No. 28,150.

Fuel Economizing Apparatus—E. F. Clarke, Birmingham, Eng., 1,073,795, Sept. 23, 1913. Filed Feb. 24, 1913, Serial No. 50,306.

Gas Producer—C. H. T. Alston and P. T. Houston, London, Eng., 1,074,032, Sept. 23, 1913. Filed June 28, 1913, Serial No. 76,415.

Furnace for Steam Generators. J. Ramacher, Cologne, Germany. 1,077,203. Oct. 28, 1913. Filed Apr. 29, 1912. Serial No. 693,852.

Improvements in Apparatus for Washing Coal and the Like. Clifton & Kersley Coal Co., Ltd., Clifton, Manchester, England. 12,913 of 1913.

Improvements in and Connected with Coal and Other Mine Conveying Machinery. E. Douglas, Bispham Hall, near Wigan, England. 24,256 of 1912.

Gas Producer. J. K. Lyons, Pittsburgh, Penn., and J. B. Hardee, Crafton, Penn. 1,075,716. Oct. 14, 1913. Filed Jan. 2, 1909. Serial No. 470,486.

Improvements in or Relating to Apparatus for Making Coke and Gas. H. Neilson, 117 Julienstrasse, Essen-Ruttenscheid, Germany, 14,376 of 1912.

Method of Removing Impurities form Coal Gas—G. H. Hultman Stockholm, Sweden, 1,073,605, Sept. 23, 1913. Filed June 3, 1913, Serial No. 771,411.

Rectangular Gas Producer—R. B. Mildon assignor to Colonial Trust Co., Pittsburgh, Penn., 1,073,919, Sept. 23, 1013. Filed Apr. 9, 1910, Serial No. 554,541.

Improved Device for Preventing Accidents in Coal and Other Mines due to Overwinding. W. Wilson, Bathville Cottage, Armadale, Scotland. 1655 of 1913.

Improvements in Explosives for use in Coal Mining and the Like. G. Carew, and British Wesefalite, Ltd., all of Powder Factory, Denaly, near Rotherham, England. 8530 of 1913.

Steamship Furnace. C. A. Kuenzel, assignor to Kuenzel Gas Producer & Smelter Construction Co., a corporation of Washington. 1,076,893. Oct. 28, 1913. Filed Aug. 17, 1912. Serial No. 715,576.

Improvements in or Connected with Stamping Machinery for Compressing Various Materials, and More Especially Coal for Coke Making and the Like. J. J. H. Mackinlay, of Wroctwardine House, Salop, and Wm. Krueger, 61 Southfield Rd., Middleboro, England. 21,423 of 1912.

CONSTRUCTION NEWS

Wilkes-Barre, Penn.—The foundation walls for the breaker to be built by the Lehigh Valley Co., at the Packer No. 5 operation at Girardville, has been completed.

Kittanning, Penn.—The Wallworth Coal Co. recently took out papers to establish a town, to be known as Wallworth, on the opposite side of the Allegheny River from Kittanning. The company will open mines there.

Sandusky, Ohio—The first crib has been sunk for the construction of the $1,000,000 coal docks of the Lower Lakes Dock Co. in West Sandusky. This will support the loading machine to be installed when the dock is completed.

Ellwood City, Penn.—The National Coal Co., of this place, backed mostly by local capital, will begin the construction of one of the largest and most substantial coal elevators in this section along the tracks of the Baltimore & Ohio Railway.

Huntington, W. Va.—A railroad line, which will extend from the Kentucky coal fields to Baltimore, and which will shorten the haul of 200 miles, is being projected by a party of capitalists, among whom is John T. McGraw, of Grafton, W. Va.

Martins Ferry, Ohio—Work has commenced on the improvement of the Webb mine of the Pennsylvania R.R. Co. and will continue for several months. The company is moving the tracks and changing the channel of Wegee Creek in order to increase the output of the mine.

Fleming, Ky.—The Mineral Fuel Co. has started the building of another industrial city on Yount's Fork, two and a half miles from Fleming, where a large coal development is soon to be started. The name of the new city has not yet been agreed upon, but a number of mines will be opened there.

Jenkins, Ky.—Rush work characterizes the construction of the power line from the mammoth power plant of the Consolidation Coal Co. here to the big operations of the Elkhorn Coal Corporation on Beaver Creek, also the Elkhorn Coal & Gas Co. now doing large development work in the Beaver Creek coal fields.

Craftsville, Ky.—There are plans developing here for the early construction of a branch of the Lexington & Eastern R.R. from Craftsville to the headwaters of Millstone Creek, four miles, to reach extensive timber and coal lands of the Mineral Development Co., who are billed to begin immediate development work.

Wayland, Ky.—Eighteen miles of the 24 of the Beaver Creek Branch of the Chesapeake & Ohio R.R., from the mouth of Beaver Creek to reach the coal operations of the Elkhorn Coal Corporation and the Milwaukee Coal & Gas Co. have been completed and double time is being made on the laying of the steel on the remaining six miles.

Fleming, Ky.—S. T. Mundy, of the Mundy Construction Co., Hazard, Ky., has been awarded the contract for the construction of the two and a half-mile branch of the Yount's Fork Creek extension of the Lexington & Eastern R.R., from Neon to the new coal operation now being started by the Mineral Fuel Co. The construction of the new branch is to be started immediately.

Blackey, Ky.—Contract for the construction of the Rockhouse branch of the Lexington & Eastern R.R. from Blackey into the headwaters of Rockhouse Creek 18 miles to reach the rich coal lands of the Rockhouse Coal Co., the Slemp Coal Co. and the Litts Coal Co. has been awarded Adams & Sullivan, of Louisville. It is expected that the construction will be fully begun by Jan. 1.

Whitesburg, Ky.—Work of opening the Mineral Fuel Co.'s several mines at Haymond, on Pottersfork, is being rushed with all possible haste, while a large number of miners' homes are going up rapidly. Indications now are that the new city is going to meet a most phenominal growth. It will be reached by a three-mile branch of the Lexington & Eastern work upon which is now being rushed by Farbrick & Baxter, contractors.

Wayland, Ky.—The Ballard & Herring Co. has been awarded a contract to build two miles of railroad line up Stone Coal Creek from here to reach rich and extensive coal holdings of the Elkhorn Coal & Gas Co., who will begin at once the development of their holdings. The building of another industrial mining city is to start at once. This is two miles from Wayland. The branch railroad is from the Beaver Creek branch of the Chesapeake & Ohio R.R.

Birmingham, Ala.—The Republic Iron & Steel Co. announces the following improvements which will be started at once: The complete dismantling of No. 1 furnace at Thomas, Ala., and its reconstruction, at a cost of approximately $75,000, the almost total reconstruction of the properties at Palos including the construction of a modern tipple, washer, etc. In all probability, also, a battery of byproduct coke ovens will be built at the Thomas plant, but while this has not definitely been decided, the other improvements mentioned have been authorized.

NEW INCORPORATIONS

Covington, Ky.—The Carlisle Coal & Land Co. has been incorporated by Richard P. Ernst, George Stugard and John E. Shepherd, with a capital stock of $5000.

Clinton, Ind.—The Essanbee Mines Co., of this city, has increased the number of its directors from four to five, and has changed its place of business to Terre Haute.

Columbus, Ohio—The Hamilton-Parker Fuel Co., of Columbus, Ohio, has filed papers with the secretary of state increasing its capital stock from $30,300 to $50,300.

Pittsburgh, Penn.—The Youghiogheny-Pittsburgh Coal Co. has filed notice of an increase from $695,000 to $700,000 in its capital stock, and the creation of a debt of $900,000.

Louisville, Ky.—The East Kentucky Mining Co. has been organized in Louisville by Ben Leahy, Allen McNally, J. H. Bickel, Jr., J. W. Barker and W. H. Soper. The capital stock of the company is $20,000, and its debt limit $30,000.

Louisville, Ky.—The Virginia Coal Co., with a capital stock of $10,000, was recently organized by C. N. Boone, F. A. Hildebrand and L. J. Bergenroth. The company proposes to acquire coal lands in the eastern Kentucky field and will probably open an operation.

Charleston, W. Va.—An application has been filed with the Secretary of State for changing the charter of the Cabin Creek Consolidated Coal Co. This application, which affects a company with a paid-in capital of $1,200,000, has been granted, and the charter modified.

Indianapolis, Ind.—The Chicago-Carlisle Coal Co., of Carlisle, has been organized with a capital stock of $100,000. The purpose of the new incorporation is to own and operate coal mines. The directors are George A. Van Dyke, Webster A. Patterson, and Robert J. Frank, all of Chicago.

INDUSTRIAL NEWS

Wilkes-Barre, Penn.—The Lehigh & Wilkes-Barre Coal Co. will add to the equipment of its mines soon three 8-ton and two 10-ton General Electric mining locomotives.

Connellsville, Penn.—The Indiana County Coal Co., of Indiana, Penn., has sold to the Tide Coal Co., 327 acres of coal in Center Township, Indiana County, for a consideration of $18,320.

Birmingham, Ala.—The Gold Creek Coal Co. recently filed a petition in voluntary bankruptcy. The assets of the company are named at $35,000, while the liabilities are said to amount to $22,500.

Pottsville, Penn.—The Philadelphia & Reading Coal & Iron Co. will shortly install another 4-ton electric storage battery mining locomotive recently ordered from the General Electric Co., in its Glendower colliery.

Piedmont, W. Va.—The Abrams Creek Coal & Coke Co. will shortly place in operation in its mines the 3.5-ton 42-in. gage General Electric Co. storage battery mining locomotive and charging panel recetly ordered.

Whitesburg, Ky.—The Litts Coal Co., with headquarters at Coeburn, Va., is making arrangements for the development of a 5000-acre coal tract on Carr's Fork. Several million dollars will be expended in the development work.

Duluth, Minn.—The Berwind Fuel Co. will soon add to the electric equipment of its plant at Duluth Dock four 750-kv.-a. water-cooled transformers, switchboard and accessories. This apparatus will be furnished by the General Electric Co.

New Orleans, La.—Much of the coal lost in the wreck at Island No. 30 will be saved. Steam shovels are being used to take the coal out of the shallow water, where the barges went on the sand bar. The barges themselves will be a total loss.

Connellsville, Penn.—John D. McBride and wife have deeded to W. McK. Reed, of Pittsburgh, 157 acres of coal in the River seam of Pittsburgh coal, lying in North Strabane Township, Washington County, Penn., for a consideration of $64,646.

Ironton, Ohio—The operating offices of the Hess Dustless Mining Machine Co. have been removed from Amstead, W. Va., to Ironton. The machines have been made by the Ironton Engine Co. for the past 8 months. They are electrically driven and are said to be dustless.

Cleveland, Ohio—Captain Richardson, a Cleveland ship owner, has placed an order with the American Ship Building Co. for a 9000-ton steel freighter to replace the steamer "Howard M. Hanna, Jr.," wrecked in the recent storm. The boat is to be completed by the spring of 1914.

Washington, D. C.—The United States Government will prosecute labor leaders connected with the Western Federation of Miners accused of violating the Sherman anti-trust act in their activities. The stand has been taken that there is nothing in the sundry civil bill which prohibits such prosecution.

Philadelphia, Penn.—The Nelson Valve Co., of Chestnut Hill, Philadelphia, announces that it has recently taken over the manufacture and sale of the Erwood swing gate valve, formerly made by Messrs. Walch & Wyeth, of Chicago. In the future these valves will be known as the Nelson-Erwood swing gate valves.

Washington, Penn.—Daniel M. Thompson, of Deer Lick, Green County, has sold his undivided interest in a tract of land near Deer Lick to J. S. Patterson, of Waynesburg, for $260 per acre. J. G. Loughman, who for several years held an interest in the same tract of land, has also disposed of his interest to Mr. Patterson at the same price.

Birmingham, Ala.—The Little River Mining Co. has been incorporated at Gadsden, Ala., and proposes to develop about 7500 acres of coal land in the northern part of the state. The capital stock is placed at $4000, and the officers are W. T. Underwood, president; C. F. Manley, vice-president and treasurer, and Hugh White, secretary, all of Birmingham.

Cleveland, Ohio—The operation of a municipal mine may be undertaken by this city in an effort to reduce fuel bills now paid for city, county and school institutions. The city council gave this proposition serious consideration when it requested the bureau of information and complaints to compile figures showing the amount expended annually for fuel.

Columbus, Ohio—Coal operators in eastern Ohio and Pomeroy Bend districts are much interested in the recommendation of the United States Army Engineers, for a $9,000,000 appropriation for the improvement of the Ohio River. In case the appropriation is included in the Rivers and Harbors Bill it will mean a continuation of the past policy to furnish a stage of 9 ft. at all times in the Ohio River.

Birmingham, Ala.—The Sloss Sheffield Steel & Iron Co. announces that the battery of bee-hive coke ovens at its City Furnace, in the heart of Birmingham would be dismantled on the first of the year. These ovens were built in 1881, and have been in continual service since then, but recently the Sloss company agreed to remove the ovens in order to abate the smoke nuisance. It will be the passing of an old land mark.

Thomas, W. Va.—The Davis Coal & Coke Co. will shortly install additional electrical equipment in its power station consisting of two 300-kw. rotary converters; three 50-kv.a., three 75-kv.-a., six 110-kv.-a. and three 400 kv.-a. transformers, and switchboard apparatus. The additions to the mining equipment include three 6-ton and two 10-ton electric mining locomotives. All this apparatus will be supplied by the General Electric Co.

Birmingham, Ala.—The Alabama Railroad Commission recently issued an order reducing the rate on coal between Birmingham and Selma, from $1 per ton to 80c. per ton. The fight for a lower rate has been a lengthy one, and the first order issued by the commission was against the city of Selma. The latter, however, secured a second hearing, and the petition was granted. It is believed that the reduction in coal rates will prove of great benefit to the Selma manufacturing interests.

Indio, Ala.—The De Soto Coal Mining & Developing Co. has been placed in bankruptcy, the petitioners claiming that the company owes over $30,000 in debts. R. A. Porter, a Birmingham wholesale grocer, and A. J. Reilly, of Inland, Ala., a coal operator, have been named as referees. It was reported several weeks ago that this property had been sold to R. C. Middleton, of Birmingham, but the bankruptcy papers were against the De Soto company, of which B. C. Stevens, of St. Louis, is president.

Mobile, Ala.—O. F. Files, manager of the Alabama & New Orleans Transportation Co., has announced that the report recently published to the effect that the barge line operating on the Warrior River, would not supply coal from the Warrior district to Mobile, was in error, and that the company would supply Mobile, as well as New Orleans. This will give Mobile the benefits of the water rate from Birmingham. Barges are now being operated on regular schedule from Tuscaloosa to Mobile and New Orleans.

Columbus, Ohio—The joint legislative committee named to investigate the feasibility of the Ohio canal system has reported to Governor Cox. The committee takes a middle course and does not recommend the operation of the canals at present, but on the other hand does not favor the selling of the lands at this time. The report recommends enlisting the aid of the Federal Government in an attempt to establish cross-state water-way systems between the Ohio River and the Great Lakes. The committee deplores the policy followed in the past of selling canal lands piece-meal.

Birmingham, Ala.—Of paramount interest to the coal operators of the Birmingham district is the contract of the New Orleans Ry. & Light Co., calling for approximately 170,000 tons of steam coal and 25,000 tons of coke yearly. While this contract is not an especially desirable one, due to the fact that it calls for penalties on moisture, ash, sulphur, and heat content, and does not provide a bonus for superior coal, yet with the market in its present quiet condition practically all of the large operators have sent their representatives to New Orleans to make their bids upon this contract.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite dull. Pressure on stove coal has swung to chestnut. Bituminous developing a strong undertone, while superficially dull. Prices moderately firm in spite of pessimistic reports at all points. Situation hinging on weather conditions.

While the recent cold snap had a stimulating effect upon the retail end of the hard-coal business, the low temperatures were not of sufficient duration to affect the wholesale market, and the trade has again relapsed into a waiting attitude. The market is dull and operators are depending entirely on business already placed. Contract renewals are attracting some interest and indications point to an increase over last year's quotations. An interesting development in the anthracite trade has been the reduced pressure for stove coal; producers apparently conserved their supplies of this grade too rigidly, when indications pointed to an acute shortage, with the result that much of this natural consumption has been covered by chestnut and this is now in the shortest supply.

While keen disappointment is being expressed on every hand at the dull situation in bituminous, close observers of conditions are inclining to the belief that the position of the market is highly favorable, considering the adverse weather and curtailment in general industrial manufacturing. Inquiries for large tonnages will usually develop a high price, indicating that the dullness is confined more particularly to the smaller concerns and is therefore of a more or less superficial character. On the other hand it is obvious that business is not nearly so active as might really be expected at this time. There is a more abundant supply of coal while some of the larger consumers are cutting down on their contracts and an occasional instance of forced selling is reported where the market has been overshipped.

A stiffening tendency is noticeable in the Pittsburgh market, due to increased domestic business, as the result of the colder weather; however, manufacturing is light and there has been considerable falling off in consumption, with the end not yet in sight. The recent cold weather checked the rapidly declining market in Ohio and temporarily prevented what promised to develope into a complete demoralization. Considerable difficulty is being experienced in the northern part of the state due to a severe congestion on the railroads. Unsteadiness is the rule, some companies showing a tendency to cut the circular in order to force business. There is still some surplus coal on hand at Hampton Roads, but prices are being firmly maintained and indications are that this excess tonnage will soon be moved. Domestic business in the South picked up sharply as a result of the freezing temperatures.

Notwithstanding the dull situation, prices in the Middle West are being held remarkably firm. Some cutting, on the part of small operators, in order to stimulate business, is noted, while prices generally are being hammered severely. Curtailment in iron and steel manufacturing plants is having an adverse effect on the steel market, while the weather is not cold enough to bring the domestic consumption up to normal.

EASTERN MARKET

BOSTON, MASS.

Bituminous market generally listless. Spot inquiry somewhat improved, and a slight increase in offshore and government requirements. Contract demand still inactive particularly for New River and Pocahontas. Anthracite softer, due chiefly to continued warm weather with a lack of stove coal still noticeable.

Bituminous—There is but little change in the market over that of last week. At Hampton Roads there is considerable coal standing, Newport News and Sewall's Point being the sufferers in this respect. At the Norfolk & Western piers movement is prompt, chiefly owing to an increase in the foreign bunker demand. The Hampton Roads f.o.b. circular price of $2.85 is still well maintained. Offshore and government requirements, although still limited, have slightly increased. Pennsylvanias continue weak, owing to the abundant supply of the Southern coals, and their prices are from $1 to $1.65, f.o.b. mines, according to grades. Contract demand is inactive and tide-water and all-rail requirements are light. Georges Creek continues to move regularly on contract with a slightly increasing demand for any surplus of this grade. Marine market remains unchanged, coastwise chartering being still weak. Rates from Hampton Roads to Boston are 70@75c. per ton.

Quotations are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.00@1.55	$1.25@1.60	$1.67@1.77	
Philadelphia*	2.25@2.75	2.50@2.85	2.92@3.02	
New York*	2.55@3.05	2.80@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.72@3.82
Providence†				3.72@3.87

*F.o.b. †On cars.

Anthracite—The market is softer, owing to the past week's warm weather and to the decrease in the Western demand. The lack of stove coal is still the most important feature here.

NEW YORK

Superficial softness in bituminous that will soon be eliminated when colder weather appears. Consumers well stocked. Hard coal dull with operators depending entirely on contracts. Stove coal relatively easy and chestnut becoming tight.

Bituminous—The weather continues adverse to a large consumption of coal, and the trade is still quiet. A great many reports of an acute softness are heard, but the tendency is to exaggerate in that direction. Close observers of market conditions are generally agreed that the softness is more of a superficial nature, and that the trade has an excellent, though possibly not generally apparent, foundation. As a rule, reports of a weak market are confined mostly to the smaller companies, not equipped with an adequate selling organization; the larger operators are doing a big business, and the tonnage movement is steady.

Stocks on the hands of the consumers are generally conceded to be large, but this fact loses its significance in view of the fact that they are taking pains to prevent their supplies from being reduced. This is due to the anticipation of possible severe weather, which, in view of the present condition of the market, would probably result in an acute situation.

No important tonnages are reported on demurrage, and there seems to be only the normal amount of consignment coal at tide. The docks at South Amboy were reported choked up with coal, but this proved to be due to inadequate handling facilities. Production in the mining district is reported generally at full rated capacity, some companies even establishing new high records. We quote the New York market unchanged from last week as follows:

West Virginia steam, $2.60@2.75; fair grades of Pennsylvania, $2.70@2.80; good grades of Pennsylvania, $2.80@2.90; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—There is a total absence of snap to the hard-coal market. Things are abnormally quiet, and operators are depending entirely on orders they already have on hand. Line business is closing down, outlying dealers who had placed orders for a certain number of cars weekly, having reduced this number by half or requested a complete cessation of shipments for the time being. It is entirely a weather market. However, it is noted that the mines continue working at full capacity, there being plenty of cars and labor, while petty strikes in the mining regions seem to be at a minimum for the time being.

The principal development in anthracite during the week has been quite a perceptible easing up in the pressure for stove coal. Such a severe shortage of this grade was anticipated that operators conserved their supplies in every way possible; this resulted in diverting a great deal of the demand to other sizes, with the result that a surplus of stove coal has developed. Egg coal is dull, broken well taken care of, while chestnut is the strongest of any of the prepared sizes, although none of these can be described as strong at the moment. In the steam sizes, pea is easy, while all the buckwheats are more or less active.

We quote the New York market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$5.05	
Egg	5.25	$4.95@5.25	5.30	$4.75@5.20
Stove	5.25	5.25	5.30	5.20
Chestnut	5.50	5.40@5.50	5.55	5.35@5.45
Pea	3.50	3.40@3.50	3.50	3.35@3.45
Buckwheat	2.75	2.65@2.75	2.45@2.70	2.25@2.75
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

PHILADELPHIA, PENN.

Weather conditions still a controlling factor in the anthracite market. Prospect of limited mining, provided there is no immediate improvement. Bituminous conditions about on a par with anthracite, with prices weakening.

Unfortunately for the anthracite business, the weather prevailing during last week did not hold out, and there has been little need for coal. The activity manifested by the retailers, while to a certain extent passed on to the operating companies, was in the main short lived, and the trade has again resolved itself into a waiting attitude. Retailers report a fair business for stove, chestnut and pea coal, but egg is anything but popular, judging from the small number of inquiries and purchases. It is apparently impossible to dispose of egg coal at the so called circular price, and many of the individuals are forcing the market by making concessions. Even pea coal is not moving off as rapidly as it should at this season.

The renewal of contracts for the coming year is now occupying the attention of many of the operators. It is understood that some of the sizes are likely to show an advance over the figures quoted for last year. Broken coal consumption has, during the past few years, increased to a great extent, and it would not be surprising if an additional 25c. per ton, not including the state tax, is added to the figure ruling during the present year. It is understood, however, that the contract price of pea, buckwheat and rice is likely to remain the same, plus the state tax, of course. One hears of cases where strenuous objections are registered, to its imposition, but in the majority of these, sufficient arguments are brought to bear to make the purchaser see the matter in the proper light. Irrespective of the legality of the measure, which the courts have not as yet decided, the fact remains that the state will insist upon its collection until directed otherwise, and there is nothing for the producer to do but pass it on to the consumer.

Prices for line as well as tidewater remain about the same as last week, with the exception of a further tendency to weakness on the part of egg coal, by the individual operators.

One still hears unfavorable reports regarding conditions in the bituminous market. The shipments from tidewater have fallen off considerably, and the line business to local points is almost entirely confined to contracts, and unless prompt shipments are made, cancellations are quite frequently in order.

BALTIMORE, MD.

Pessimistic feeling pervades the trade. Business expected at this time is not being done. A number of contract cancellations. Export trade brisk, and the best feature in the situation.

There is keen disappointment in the local coal trade because business is so flat. Not a few of the coal men here have had a number of their best customers cut down on their contracts. This is now touching a number of lines of business, and most of the industries concerned seem doubtful as to just when they may expect a resumption of really active trade.

With an easy car supply in both West Virginia and Pennsylvania the mine interests have been prepared to ship much larger quantities of coal than are required. The result has been forced selling in many cases which has, of course, meant cheap coal. West Virginia products have been selling at anywhere from 80 to 90c., while the less desirable Pennsylvania coals have been commanding around 90c. generally, with best grades being held fairly firm for any considerable quantities at $1.35.

The export trade is quite brisk just now, however, and several important loadings were made at the Curtis Bay and Port Covington piers the past week. Prospects in this trade for some weeks to come are said to be excellent.

Dealers in anthracite have been doing a fairly brisk business in domestic sizes. These are for the most part in easy call. Steam coals are in only fair demand. Anthracite as a whole is in much better condition, at the moment, than soft coal.

CENTRAL STATES

PITTSBURGH, PENN.

Better demand on account of colder weather, resulting in less price cutting. Operations continue at about 60%. Connellsville coke quiet with price prospect somewhat uncertain. Production and shipments decreased.

Bituminous—The coal market has been considerably stronger the past week, due to the colder and more seasonable weather. There has been an excellnt run of rush ordrs, individually small, on account of weather conditions. Manufacturing demand continues relatively light, and, if anything, has decreased in the past week, though to no material extent. On the whole the trend has been toward a stiffening in prices through the elimination of most of the cutting from list figures, but it remains the case that the quotable market is not above the regular season basis, the advance of last October being entirely forgotten. Mine operations continue at the reduced rate inaugurated when the lake-shipping season closed, about 60% of full capacity. Labor and cars are in good supply. We quote, with occasional shading: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1½-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The Producers' Coke Co. has definitely stated to consumers that it will not depart from its regular asking price for furnace coke on 1914 contracts, $2. In some quarters it is intimated that this does not preclude it from selling prompt of December at lower prices, but there are no definite reports of its having done so. It represents about one-third of the total merchant capacity. Among the outsiders there are several whose output is partly taken up by long-term contracts in force, and thus there is a distinct possibility that the $2 price will eventually obtain. This deters outside operators from selling at deep cuts from $2, and while quotations have been named as low as $1.85 or $1.90, they are far from general. Prompt coke, on the other hand, is easily obtained at $1.75. The market has been quiet as to transactions and negotiations for contracts are neither numerous nor eagerly prosecuted. Production is at about 75% of capacity, in the Connellsville regions, and is thus making a better showing than pig-iron production, indicating that Connellsville is probably supplying a slightly larger proportion of the total coke consumed than was the case early in the year. We quote: Prompt furnace, $1.75; contract furnace, $1.85@2; prompt foundry, $2.50@2.75; contract foundry, $2.50@2.75, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 6 at 321,927 tons, a decrease of 22,181 tons, and shipments at 321,631 tons, a decrease of 35,154 tons.

BUFFALO, N. Y.

Still a very slack coal market. The touch of winter was too brief to affect the trade for the better. Bituminous grows weaker and anthracite is in light demand for the time of year.

Bituminous—There is no added firmness to the market. In fact it appears that the demand is lighter every succeeding week, with consequent lower prices. While it is a fact that some of the better-known shippers are still getting some orders at old prices the bulk of the business has to be done at more or less of a reduction. For this reason it is hard to give any price. Shippers try to hold to full quotations and sometimes insist on former prices as a possible help to that end, but jobbers and salesmen, being usually bears in the trade, insist on much reduced quotations. The worst of it all is that there is so little demand. As a rule the seller is unable to turn over a car in case he is left with one on hands, for consumers as a rule have already taken all that they can store. A considerable falling off in consumption is evident and the prospect is that this decrease is not yet at an end.

Quotations are therefore weak on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley coal about 25c. lower.

Coke—The long period of sagging in the coke market is not at an end. With the production of pig iron light and not increasing there can be no stiffening in coke. Members of the trade who formerly reported full prices now incline to a reduction, as though they saw no immediate hope of a recovery of the old firmness. Quotations are on a basis of $4.60 for 72-hr. Connellsville foundry, with demand light.

Anthracite—The two or three days of winter weather out Dec. 10 had some steadying influence on the market d if it had continued the demand would have been good in short time, but such was not the case and the trade is ain dull.

Anthracite shipments by lake for the week were 25,300 ns, which gives a total of 93,100 tons for December, a large nount, with one company still taking tonnage and making statement as to future proceedings. The 5,000,000-ton ark has already been passed, for the season's water trade.

TOLEDO, OHIO

Local railroad yards badly congested, the P. R.R. alone ving over 2400 cars it is unable to move. As a result empties e in short supply. Mines curtailing production and circu- r fairly well maintained, in spite of adverse conditions.

The past week has been full of developments on the cal-coal market. Heretofore the car situation has not been d but during the week a decidedly serious condition has veloped and the Toledo yards are badly congested. The nnsylvania railroad alone has more than 2400 cars of coal ady for connecting lines which are unable to accept them. ne roads have been unable to move cars so that hundreds empties lined up on switches and in yards in this vicinity e not available for use. Lack of sufficient motive power on e part of railroads has been given as a reason for the ouble by some while others claim that the replacement of ooden cars by steel cars has something to do with the situ- ion as not so many new cars are provided as were form- ly in commission. In any event the congestion is real as is so the fact that there are plenty of empties unavailable for e.

In consequence of this condition and the slump occasioned the cessation of navigation, mines are curtailing their out- t and coal is not being generally forced on the Toledo mar- t to the detriment of prices. Quotations are holding fairly ose to the list although there is some cutting, confined rgely to track coal and such coal as has been left on the cks after the close of navigation. There is more fuel on e local docks than was at first supposed would be the case, e to the fact that boats were greatly delayed, owing to e recent storm and also to the expiration of all insurance nce all the harbor lights are out.

Domestic coal is slow, owing to the warm weather for the st month, a condition wholly unexpected and unusual in is section. The slump in steam coal has not been as arked as had been feared and the operators have shown e good judgment to curtail production. A little cold eather will put the Toledo market in good shape and the ly threatening situation lies in the congestion of the ilroads.

COLUMBUS, OHIO

Declining market checked by a few days of colder weather hich stimulated domestic trade. Prices still weak, however, d there is no immediate hope of an advance. Decrease in eam tonnage reported.

The few cold days of last week was a boon to the coal ade although the effects were only temporary. The rapidly clining market was arrested for a time and prices have t yet reached the stage of demoralization. The levels hich prevail, however, are considerably lower than those the past month. Unsteadiness characterizes the trade and e smaller operators are cutting quotations in order to force siness.

The greatest improvement was seen in domestic lines. A w dealers which had rather low stocks placed orders for ocking lump and the fancy grades. But orders have been w and far between because retailers stocks are unusually ge for the time of the year. Dealers are not disposed to der more at this time and take their chances on pay- g demurrage.

Every mining district in the state is well supplied with rs. In the Hocking Valley the output for the week is esti- ated at 90% of normal and the same is true of the Pomeroy nd field. In the domestic fields the output has been large d in Eastern Ohio the production has been about 85% of e average. There is some slowness shown in steam busi- ss in every part of the country. Few if any of the larger eam users are disposed to stock up for emergencies but me railroads are stocking although their daily requirements e not as large as formerly.

Retail trade is rather slow as might be expected under isting weather conditions. Dealers are unable to keep their ams busy and trade is the dullest in years for the time of e season.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
mestic lump.....	$2.00 @ 1.85	....	$2.25 @ 2.15	$1.75 @ 1.65
inch............	1.80 @ 1.70	$1.30 @ 1.20	2.00 @ 1.90	1.50 @ 1.44
t...............	1.30 @ 1.20	....	1.55 @ 1.50	1.30 @ 1.25
ne-run..........	1.35 @ 1.30	1.15 @ 1.10	1.30 @ 1.25	1.35 @ 1.25
t, pea and slack..	0.85 @ 0.80	....	0.95 @ 0.90	0.80 @ 0.75
arse slack........	0.75 @ 0.70	0.95 @ 0.85	0.85 @ 0.80	0.70 @ 0.65

DETROIT, MICH.

Cancellations of orders becoming the rule. Market entirely a weather proposition. Indications point to a possible serious collapse.

Bituminous—The summer-like weather has improved transportation facilities, and there are now large numbers of cars standing on track on demurrage. Domestic trade is demoralized, and heavy cancellations on the part of the dealers has been the rule. Salesmen have again been put on the road in hopes of picking some stray orders that are still hanging fire. The market is entirely at the mercy of the weather. Stocks in all the adjoining territory are adequate, and cancellations are becoming the rule, rather than the exception.

Hocking, lump, egg and nut, have sold as low as 75c. per ton in some cases, and there are rumors that it has even been offered free for the accrued freight and demurrage charges. Steam business has showed a tendency to act in sympathy with domestic, and there has also been a curtailment in this grade. With a full car supply permitting maximum shipments and conditions continuing as adverse as they are, the coal trade is in serious danger of experiencing a total collapse.

The market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.25	....	$1.25	....	....	$2.00	$1.75
Egg...........	1.25	....	1.25	....	....	2.00	1.75
Nut...........	1.20	....	1.10	....	....	....	....
Steam lump....	1.15	....		....	....	....	....
¾-in. lump......	1.05	$1.10	1.00	$1.10	$1.10	....	....
Mine-run.......	.90	1.00	1.00	1.10	1.10	....	....
Slack..........	0.75	0.80	0.65	0.60	0.60	....	....

Anthracite—Stove and egg coal continue scarce, but the demand is light and not a large quantity is needed. A premium of 50c. per ton is being asked on stove coal, and 25c. per ton on pea.

Coke—Connellsville is in absolutely no demand, foundry grades being quoted at $1.65, Solvay, $2.90, and gashouse $2.75 f.o.b. oven.

HAMPTON ROADS

Fair accumulation of coal at tidewater. Demand not so heavy. Some movement of high volatile to the New England market.

Tidewater tonnage for the week has been good although not as heavy as was expected. Even with the large amount of coal dumped there is still a fair accumulation in the various railroad yards. The greater part of the surplus fuel is being held for large government colliers although there is some free coal but suppliers having such are not cutting prices and it is probable that within a few days all surplus coal will be disposed of as considerable inquiries are being received from the New England market for large cargoes.

In addition to heavy shipments of New River and Pocahontas to New England during the week there have been several small cargoes of high volatile moving to the same market.

Continued cold weather for the last ten days has caused a somewhat better demand for anthracite coal and some of the dealers have advanced the price to $8 per ton.

LOUISVILLE, KY.

Colder weather and outlook more encouraging. Quotations improved but not yet fully recovered from slump. Production somewhat restricted.

With a week of something resembling winter weather, coal operators and dealers are somewhat encouraged, although the imminent danger of a return of mild weather has caused some nervousness. The demand has been much improved, although not as greatly as was expected. If it continues, however, as there seems no reason to doubt it will, business should improve to a marked degree. This probability of an increased demand has helped the steam market.

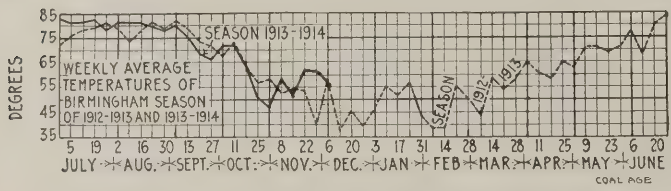
The miners are beginning to lay off for the holidays, and with something of a car shortage, there are few operations going at more than half capacity. Even without cold weather, this would naturally have the effect of strengthening the market, but if seasonable December weather is had during the next two weeks, there will very probably be a heavy demand, and an inadequate supply. Prices have not yet fully recovered from the slump caused by the prolonged period of warm weather. Sales of high-grade Eastern Kentucky block to Northern jobbers have been made at as low as $1.85 f.o.b. mines, although $2@2.15 is the more general range of prices, and even these will not continue long. Nut and slack are selling at 75@80c. Western Kentucky block is in fair demand at $1.25@1.35, while nut and slack is worth 65 to 75c., and pea and slack, which was recently a drug on the market at such prices as 10 and 15c., is stronger at 25 cents.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

Coal and coke quiet. Blacksmith coal fair. Pig iron in small demand. Car shortage still prevails.

Absolute stagnation seems to be the condition of the coal business this past week, both on steam and domestic grades, and while prices are holding up well, there is only a small tonnage moving, outside of the regular contract business. Some operators are considering reducing their tonnage, preferring to do this rather than lower the price. Furnace coke is rather quiet, after a slight flurry about ten days ago, when several of the Western smelters placed orders for several thousand tons of furnace coke for shipment prior to Jan. 1, the rate to a number of the western states advancing to $2 a ton on that date. Foundry coke is being shipped only in small tonnage lots. Blacksmith coal seems to be fareing better than any other commodity, the demand being about normal.



Sales of pig iron for the past ten days have been in small lots from 40 to 200 tons, but the Birmingham manufacturers are still holding for $11 to $11.50 f.o.b. Birmingham. The heavy buying for next year has not yet started. Even with the small shipments of coal, the car supply is inadequate on several of the roads, though some of the lines are in fairly good shape.

NEW ORLEANS

Freezing temperatures bring avalanche of coal orders. Motor truck delivery found profitable and becoming general. Harbor facilities for coaling improved.

A sudden change from almost summer weather to freezing temperatures brought an avalanche of orders and city delivery systems have been taxed to the utmost during the week. As a consequence, several hundred thousand tons of coal were sold.

In order to facilitate coaling in the harbor, several new barges and derricks have been ordered. The lack of sufficient equipment of this kind oftentimes has resulted in delay when a number of boats called for coal at the same time. Cargo business is still at a standstill and in all probability forwardings of coal from Gulf ports will be lighter this winter than has been the case in many years.

Some improvement was noted last week in the Texas demand as well as in the number of orders from points in Louisiana and Mississippi. Keen competition is resulting in the efforts to land the yearly contract of the New Orleans Railway & Light Co.

INDIANAPOLIS

Some severe weather stimulated the retail trade but the mines received little benefit and are still working only about four days a week. Notwithstanding the dullness at the mines, prices hold firm. The teamsters' strike practically over.

Two or three days of what was thought to be the real start of winter weather helped the retail trade but before the increased demand could be reflected back to the mines, mild weather returned. December so far has not been much more favorable to the coal trade than November was. Operators and retailers are standing firm on prices, notwithstanding the fact that they would like to have business stimulated.

It is noticed there is considerable advertising of Indiana domestic grades in the metropolitan papers and operators say more of it is being used yearly, displacing Eastern bituminous coals. Operators are doing their best to impress the consumer that the best of the Indiana domestic grades compare favorably with the imported product.

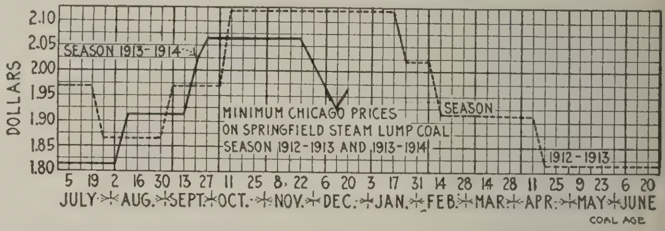
The teamsters' strike in this city, which for a time threatened to paralyze the coal trade, has been partly settled. The union has backed down on its demand for recognition and the teamsters are ready to go back, if the union schedule of wages is paid. About half the strikers are at work again but the larger employers are holding out firmly against the union button.

CHICAGO

Some recovery in the market, but continued warm weather makes the general situation soft. Smokeless lump and egg quotations remain the same, while prices for mine-run are being hammered badly. Anthracite and coke markets dull. Greater strength noted in prices for Franklin County coal.

While there has been some recovery from the depressed conditions of a week ago, the present situation is far from satisfactory. Continuation of spring-like weather is the chief cause. Practically all retailers have their yards filled to capacity and there is comparatively little demand. Many of them are taking advantage of the condition of the market, to seek lower prices.

A few dealers and small shippers have been cutting quotations on smokeless mine-run to the extent of 15c. a ton. Smokeless lump and egg prices remain about the same, the selling price, on a mine basis, ranging between $2 and $2.25. Operators in the Carterville district are pursuing the policy adopted some time ago of shutting down their mines whenever there is lack of business. As a result, prices have not weakened; domestic sizes vary between $1.60 and $1.85.



Softness prevails in the anthracite market. Distributing agents with coal on track and up to car service are cutting prices as much as 25c. a ton. Dock interests are maintaining the circular . Shipments of Hocking coal to Chicago are small in volume and prices remain steady. Franklin County coal have recovered from its previous weakness, the quotation of $1.50, the mines, named a short time ago for lump and egg having been boosted to between $1.60 and $2. Springfield steam lump and mine-run are somewhat soft; domestic lump is selling at $1.50, the mines. Indiana operators are confining their shipments to the Chicago market to contract business. A comparatively few lots of domestic lump have been sold at from $1.50 to $1.65, the mines.

Lack of activity in the iron and steel market has resulted in a depression in the coke business. Prices remain about the same.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump............	$2.32	$2.65@3.05	$2.27	
Steam lump..............	1.96		1.97	
Egg......................		2.65@3.05		$4.20
Mine-run................	1.87	2.40	1.87	3.45
Screenings..............	1.16	1.70	1.27	

Quotations on Harrisburg coal are: Domestic lump and egg, $2.65@3.90; steam lump, $2.35; mine-run, $2.35; screenings, $1.55; No. 1 nut, $2.65@3.90; No. 2 nut, $2.55.

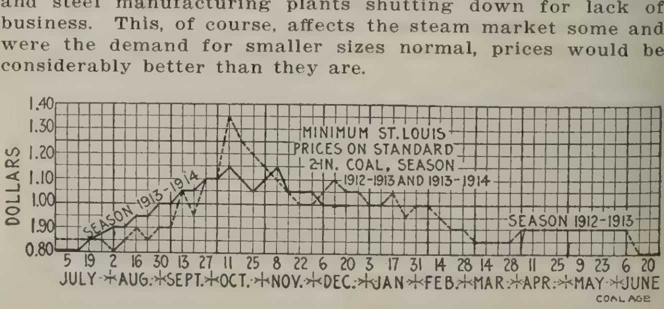
Carterville prices are: Lump, egg and No. 1 washed, $2.65 @3.90; No. 2 washed, $2.55.

Coke—Connellsville, $5.25@5.50; Wise County, $5@5.25; by-product, egg, stove and nut, $4.90@5; gas house, $4.75@4.95.

ST. LOUIS, MO.

Domestic market slow with no demand. Steam sizes showing an improving tendency. General business poor and outlook not encouraging.

There is no change in local conditions, with the exception that screenings are in better demand and seem to be bringing a fair price; if warm weather continues this condition will do likewise. Domestic demand has fallen off considerably, as the weather is not cold enough to bring about a normal consumption and the steam demand has slackened in the last week or ten days, due principally to the large iron and steel manufacturing plants shutting down for lack of business. This, of course, affects the steam market some and were the demand for smaller sizes normal, prices would be considerably better than they are.



For the first time in several weeks there is no anthracite under demurrage on the east side; 18 cars that were under demurrage for a matter of two weeks were sold to a big retail company a few days ago for $6.65 at St. Louis, or $2.65 at the mines, for egg size. This is 60c. below the St. Louis circular.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	....	....	....	**$1.00***
3-in. lump	....	....	$1.40*	....
6-in. lump	$1.30 @ 1.50	$2.25	1.50*	**1.20***
Lump and egg	1.85 @ 2.15	....	....	....
No. 1 nut	1.40 @ 1.60	....	....	....
Screenings	0.40 @ 0.50	....	....	....
Mine-run	1.10 @ 1.20	....	....	....
No. 1 washed nut	1.75	$2.25	1.40	....
No. 2 washed nut	1.35	....	1.60	....
No. 3 washed nut	1.15	....	....	....
No. 4 washed nut	1.05	....	....	....
No. 5 washed nut	0.50	....	....	....

* Asking price.

KANSAS CITY, MO.

Market dull with little or no business being negotiated. Quotations holding remarkably firm in view of the adverse conditions.

Though the weather is more satisfactory in Kansas City, it has failed to improve the situation greatly. However, there is a snap in the atmosphere which augurs well and operators are more optimistic over conditions. More coal is being burned in all quarters, and dealers' stocks are being reduced quickly enough to promise well for the future. The wholesalers have not yet been affected, however, and will not be for some time, unless a real cold wave makes its appearance.

The market is steady, operators realizing that the lethargy afflicting the business is due merely to the unseasonable weather. It is believed that a lowering of prices would have no material effect on the movement, and prospects are for a stationary market until colder weather appears.

OGDEN, UTAH

Lower temperature in some localities helps to move coal. Mines working hard to keep from accumulating nut. Storm on eastern slope of mountains will stimulate Kansas and Nebraska market. Quotations remain unchanged.

A few localities in the Rocky Mountain district were recently visited by a storm which will have a tendency to create a greater demand for coal. However, conditions as a whole have not improved greatly and while all mines are working at capacity, they are in doubt as to whether or not they can continue unless there is a decided change in the near future.

Nut coal still continues to be a source of much trouble and while the mines are moving this grade, there are times when it seems there will be a surplus. This condition has effected the price somewhat and quotations are weak. Lump and slack coal are moving through to destination rapidly and all districts are being well supplied.

Quotations have not changed and are as follows:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.25	$2.75
Nut	2.50@3.00	2.50	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

FOREIGN MARKETS

GREAT BRITAIN

Dec. 5—Owing to a strike of railwaymen on the Great Western system, many collieries are idle; the ports principally affected are Swansea and Port Talbot. The general feeling is that a settlement will be come to in the course of a day or two.

Cardiff coals are practically fully booked for December. There are many inquiries for the first quarter of next year, buyers' ideas being about $4.32 for seconds.

Quotations ae approximately:

Best Welsh steam	$5.04@5 16	Best Monmouthshires	$4.38@4.50
Best seconds	4.74@4.92	Seconds	4.08@4.20
Seconds	4.62@4.74	Best Cardiff smalls	2.64@2.76
Best dry coals	4.56@4.80	Seconds	2.40@2.52

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

PRODUCTION AND TRANSPORTATION STATISTICS

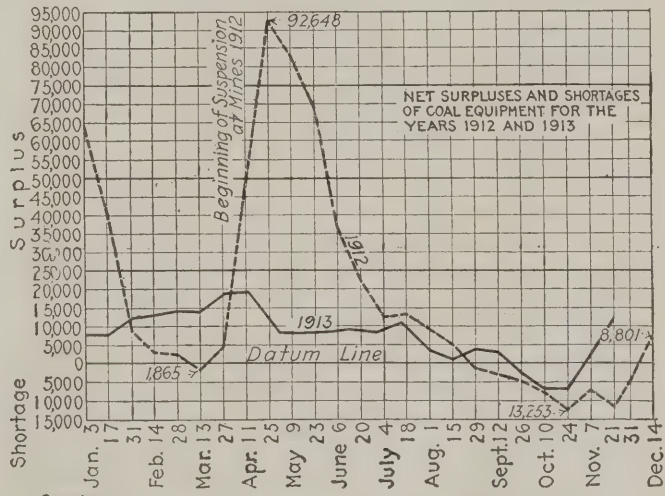
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Dec. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	40	34	**6**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	2,903	150	**2,753**
Ohio; Indiana; Michigan; Western Pennsylvania	1,884	994	**890**
West Virginia, Virginia, North & South Carolina	862	3,283	2,421
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	2,123	576	**1,547**
Iowa, Illinois, Wis., Minn.; North & South Dakota	3,450	2	**3,448**
Montana, Wyoming, Nebraska	998	16	**982**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,920	42	**1,878**
Texas, Louisiana, New Mexico	696	8	**688**
Oregon, Idaho, California, Arizona	2,745	16	**2,729**
Canadian Lines	0	0	0
Total	17,621	5,095	**12,526**

	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1	Oct. 15	Nov. 1	Nov. 15
Surplus	8,810	8,293	8,689	8,714	7,953	6,014	6,720	10,520
Shortage	4,029	7,038	5,209	7,731	10,393	12,502	12,595	8,477
Net*	**4,781**	**1,255**	**3,480**	**983**	2,440	6,488	5,875	**2,043**

***Bold face** type indicates a surplus.



COAL AGE

NORFOLK & WESTERN R.R.

The following is a statement of tonnages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of November, in short tons:

Field	Shipped	Tipple	Total	Commercial	Company
Pocahontas	1,174,885	16,769	1,191,654	1,141,615	94,187
Tug River	203,213	4,763	207,976	157,704	50,272
Thacker	250,701	10,204	260,905	169,453	91,452
Kenova	80,733	10,714	91,447	75,229	16,218
Clinch Valley	....	....	....	146,582	12,018
Other N. & W.	....	....	....	5,336	....
Total N. & W. Fields				1,695,886	264,147
Williamson and Pond Crk. RR.	....	....	....	55,002	11,763
All Othe Railroadsr	....	....	....	157,540	....
Grand Total	1,709,532	42,450	1,751,982	1,908,428	275,910

Total shipments of coke, entirely from the Pocahontas field amounted to 93,038 tons.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for October and the four months ending Oct. 31, 1913, in short tons:

	October		4 Months			
Destination	1913	**1912**	1913	%	1912	%
Tidewater	[illegible]38,780	287,078	1,058,046	**17**	1,214,311	22
East	229,018	197,350	781,628	**13**	751,702	13
West	993,183	872,485	3,939,842	**63**	3,491,474	63
Total	1,460,981	1,311,913	5,779,516		5,457,487	
Coke	33,035	25,060	119,383		87,176	
From connections						
Bituminous	109,091	50,767	427,821	**7**	106,457	2
Anthracite	1,645	1,440	6,464		4,232	
Total (except coke)	1,571,717	1,364,120	6,213,801	100	5,568,176	100

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during September and the first nine months of this year in comparison to last year, in short tons:

	September		Nine Months	
Anthracite	1912	1913	1912	1913
Baltimore & Ohio[1]	131,977	126,919	1,082,970	1,060,724
Chesapeake & Ohio[1]	1,195	1,006	19,271	12,994
Erie[3]	693,569	749,687	5,441,365	6,489,298
Pennsylvania[1] [3]	935,550	813,394	7,387,837	7,665,020
Virginia[2] [1]	....	50	20	859
Total 5 roads	1,762,291	1,691,056	13,931,463	15,228,895
Bituminous				
Baltimore & Ohio[1]	2,928,645	3,148,994	25,393,524	27,250,529
Buffalo, Roch. & P.[1] [2]	688,595	851,501	6,014,853	7,052,765
Buffalo & Susq.[1] [2]	132,796	132,667	1,088,929	1,339,193
Chesapeake & Ohio[1]	1,247,505	1,581,037	13,118,215	12,618,033
Erie[3]	21,126	12,726	205,461	306,466
Hunt. & Br'd T. Mt[1] [2]	123,382	112,483	882,626	1,007,396
New York Central	773,608	815,989	5,853,759	6,769,567
Norfolk & Western[1] [2]	1,928,537	2,109,476	17,109,092	17,939,257
Pennsylvania[1] [3]	3,906,164	4,378,037	34,114,059	37,774,323
Pitts. & Lake Erie[1] [2]	1,057,489	1,082,360	8,369,773	9,668,295
Pitts. Shaw. & North[1] [2]	170,682	238,849	1,400,884	2,037,169
Virginia[1] [2]	276,851	393,199	2,611,582	3,291,941
Western Maryland	232,204	237,663	2,114,791	2,210,556
Total 13 roads	13,487,584	15,094,981	118,277,548	129,265,490
Coke				
Baltimore & Ohio[1]	386,335	387,704	3,498,977	3,279,518
Buffalo, Roch. & P[1] [2]	49,588	36,996	384,547	413,103
Buffalo & Susq.[1] [2]	24,765	24,506	198,480	224,538
Chesapeake & Ohio[1]	20,058	29,680	188,027	266,886
New York Central	7,133		65,125	36,207
Norfolk & Western[1] [2]	113,035	121,451	1,066,936	1,176,602
Pennsylvania[1] [3]	1,073,613	1,127,951	9,671,343	10,859,413
Pitts. & Lake Erie[1] [2]	501,936	525,931	4,584,097	5,182,891
Pitts. Shaw & North[1] [2]			5,155	9,383
Western Maryland	6,020	5,991	51,638	59,223
Total 10 roads	2,182,483	2,260,210	19,714,325	21,507,764
Coal and Coke, 13 Roads				
January			16,421,839	18,936,646
February			17,787,331	17,546,496
March			19,483,025	17,631,345
April			13,429,367	16,850,690
May			15,635,568	18,986,796
June			16,702,153	18,580,363
July			16,635,448	18,704,710
August			18,396,247	19,718,856
September			17,432,358	19,046,247
October			18,712,657	....
November			17,815,767	....
December			17,929,632	....
Total, 12 months			206,381,392	

[1] Includes coal from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note.—Southern Railway handled 366,464 short tons of coal during August and 2,776,062 short tons during the 9 months ending August.

ANTHRACITE SHIPMENTS

The November shipments of anthracite amounted to 5,786,931 tons, which is the lowest record for that month since the panic year of 1907, when shipments touched 5,743,522 tons. A decrease in shipments was naturally to be expected in view of the unseasonable weather and consequent lack of demand from the consuming interests. The movement for the year to Dec. 1 shows an increase of 5,740,934 tons over that for the same period last year, and with a heavy shipment this month it is possible for the hard coalers to break their previous high record for the year, 69,954,299 tons made in 1911.

The following is comparative statement of the anthracite shipments for November and the first eleven months, of the years 1912-13, in long tons:

	November		11 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading	1,119,247	1,243,111	11,856,164	18.70	11,628,506	20.16
Lehigh Valley	1,114,014	1,177,732	11,948,792	18.84	10,682,836	18.53
Cent. R.R. N. J.	727,107	812,870	8,429,038	13.29	7,581,998	13.15
Del. Lack. & West.	810,921	889,560	9,064,157	14.30	8,214,645	14.24
Del. & Hudson	575,976	635,575	6,504,100	10.26	5,762,269	9.99
Pennsylvania	600,648	509,752	5,804,780	9.16	5,004,832	8.68
Erie	654,219	708,611	7,482,921	11.80	6,768,147	11.74
Ont. & Western	184,799	188,325	2,317,058	3.65	2,022,843	3.51
Total	5,786,931	6,165,536	63,407,010		57,666,076	

COAL FREIGHT DECISIONS

I. C. C. No. 5734—Huerfano Coal Co. vs. Colorado & Southeastern R.R.

1—Each carrier subject to the act is charged with the duty of furnishing cars for the transportation conducted over its line.

2—A carrier's obligation to furnish cars for shipments to points upon the lines of its connections is joint with the latter, and contracts with them can not relieve it of its portion of such joint liability.

3—Trackage contract between Colorado & Southeastern R.R. and Colorado & Southern Ry. found to cause an undue discrimination against petitioners in the matter of car supply.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Dec. 13.

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products			80	87	80
American Coal Products Pref.	..	..	105	109¼	102
Colorado Fuel & Iron	27⅝	26¾	26¾	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102¼
Lehigh Valley Coal Sales	190	175	175	....	....
Island Creek Coal Com	47	46	47	53½	47
Island Creek Coal Pref.	83	81⅝	83	85	80
Pittsburgh Coal	20	19	19	24⅜	14½
Pittsburgh Coal Pref.	89	87	87	95	73
Pond Creek	18⅛	17	17¼	23¾	16½
Reading	164½	161¼	162¼	171	151⅜
Reading 1st Pref.	85	85	85	92½	82½
Reading 2nd Pref.	87	86¾	86¾	95	84
Virginia Iron, Coal & Coke	40	40	40	54	37

	Closing		Week's Range or Last Sale		Year's Range	
Bonds	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	90	93½	91½	Dec. '13	90	99⅛
Colo. F. & I. gen. 6s	102½	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	75	78	76	76	76	85
Cons. Ind. Coal Me. 1st 5s	76	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92	87	87	87	87
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅝	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	86⅜	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	75	77¾	76	Dec. '13	73	80½
Tenn. Coal gen. 5s	97	Sale	97	97⅛	97	103
Birm. Div. 1st consol. 6s	100⅞	101½	101	Nov. '13	100⅝	103
Tenn. Div. 1st g 6s	101⅞	101½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	..	84	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	92½	92	98

DIVIDENDS

Beech Creek R.R.—Regular guaranteed quarterly dividend of 1% payable Jan. 2 to holders of record Dec. 23.

Little Schuylkill Navigation R.R. & Coal Co.—Dividend of $1.25 payable Jan. 15, to holders of record Dec. 11 to Jan. 14.

St. Louis, Rocky Mountain & Pacific Co.—Regular quarterly No. 6 on the preferred stock of 1¼% payable Dec. 31 to holders of record Dec. 21 to Dec. 30.

Coal & Iron National Bank—Quarterly dividend of 1½% payable Jan. 2 to holders of record Dec. 10.

American Coal Products Co.—Regular quarterly on the common stock of 1¾% payable Jan. 2 to holders of record Dec. 25 to Jan. 2, and 1¾% on the preferred stock, payable Jan. 15 to holders of record Jan. 11.

* * *

The Consolidation Coal Co.—The capital stock of this concern is $31,190,500, which includes $6,190,500 additional stock authorized in February of the current year, for the purpose of taking up some outstanding bonds. The company has now paid dividends for 26 years and since 1905 has maintained an annual disbursement of 6%.

Pittsburgh Coal Co.—Earnings of this company last year, which was the best since 1907, amounted to only $2,025,500, or less than 7½% on the preferred stock. In view of this showing it looks very doubtful if the $10,800,000 accrued back dividends on the 7% cumulative preferred stock will ever be paid.

The Lehigh Valley Coal Sales Co.—Together with the announcement of the 25% dividend by this company, it is stated that 25% additional stock will also be issued to which stockholders are permitted to subscribe in proportion to their holdings. The dividend, therefore, is really a stock dividend. The new stock will amount to $1,515,200, bringing the total outstanding capital stock up to $7,576,000.

Bond County Coal Co. (Illinois)—This company incorporated in Illinois with an issued capital stock of $200,000, does not propose operating on its Bond County properties, but will merely hold them in reserve for the future. The property has been well proved by diamond drilling; it is underlaid with the No. 6 Illinois seam which is clean and has a strong rock and slate roof and hard fire clay bottom. The thickness of the vein ranges from 6½ to 9 feet.

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

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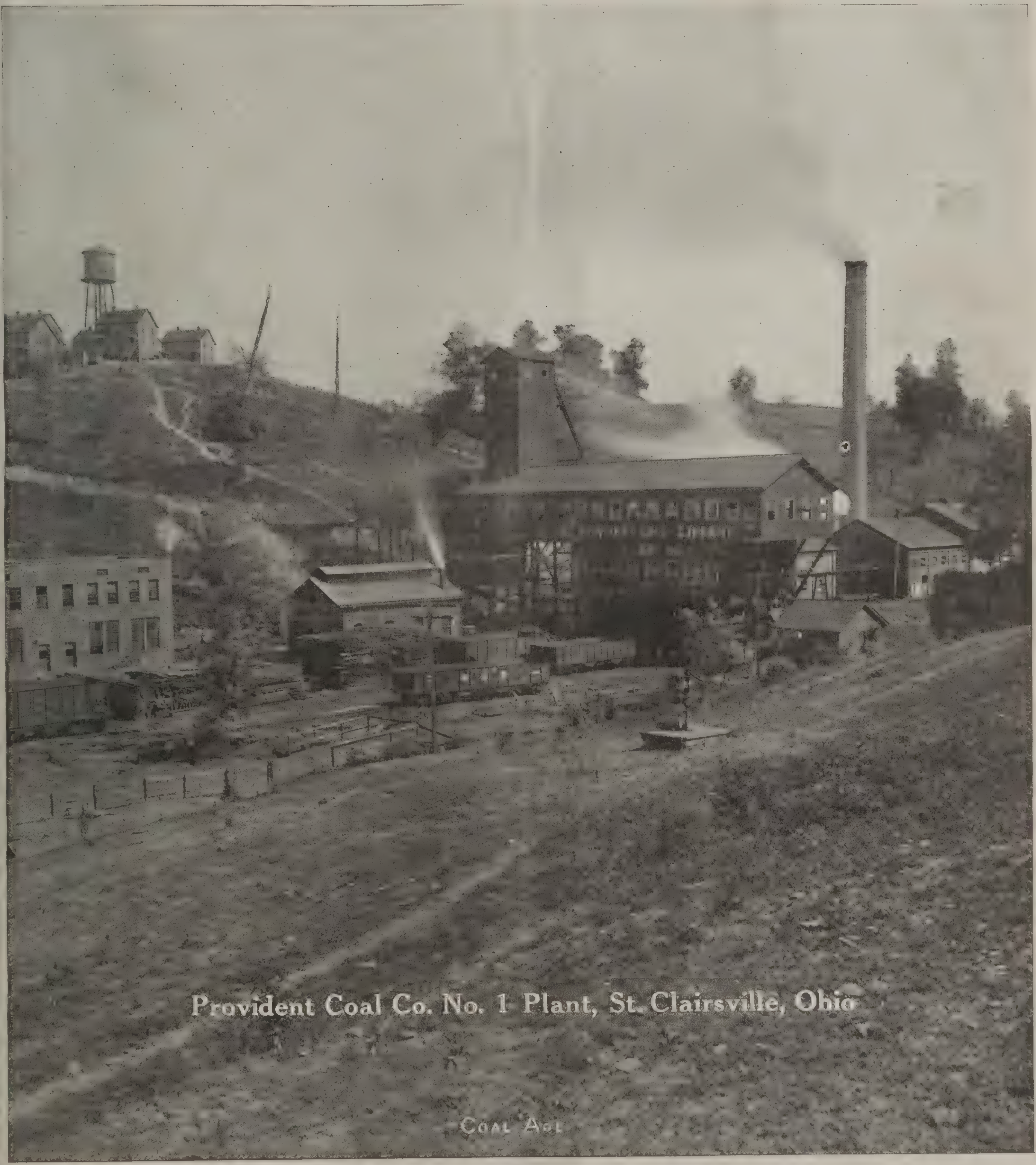
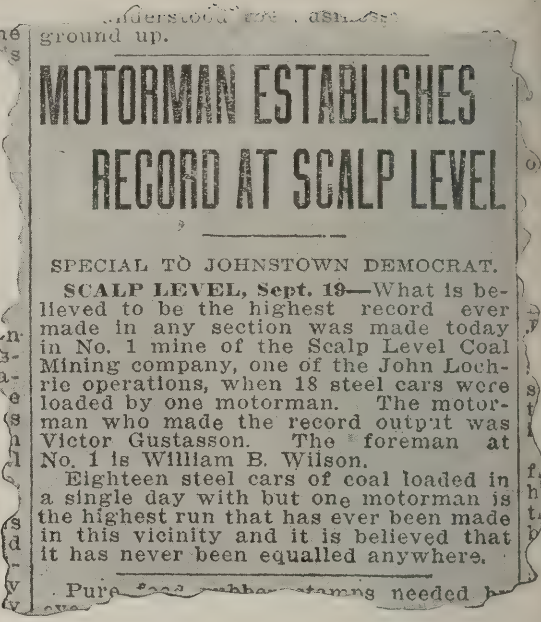


Provident Coal Co. No. 1 Plant, St. Clairsville, Ohio

18 Fifty-Ton Railroad Cars Loaded In a Day With One Baldwin-Westinghouse BARSTEEL Electric Mine Locomotive



ground up.

MOTORMAN ESTABLISHES RECORD AT SCALP LEVEL

SPECIAL TO JOHNSTOWN DEMOCRAT.

SCALP LEVEL, Sept. 19—What is believed to be the highest record ever made in any section was made today in No. 1 mine of the Scalp Level Coal Mining company, one of the John Lochrie operations, when 18 steel cars were loaded by one motorman. The motorman who made the record output was Victor Gustasson. The foreman at No. 1 is William B. Wilson.

Eighteen steel cars of coal loaded in a single day with but one motorman is the highest run that has ever been made in this vicinity and it is believed that it has never been equalled anywhere.

On this particular day they worked exactly nine hours and forty-five minutes. The only haulage equipment used was an eight-ton Baldwin-Westinghouse **Barsteel** Electric Locomotive, equipped with commutating-pole motors.

This locomotive, except for a few mine cars hauled from a dip from a point in the heading by a mule, did all the work, gathering the coal cars and hauling the same to the tipple.

When they stopped work in the evening the locomotive was inspected and found to be in first-class condition, in spite of the heavy work it performed. The motors were nearly as cool as when started in the morning.

Twelve mine cars, each loaded with two tons of coal, were hauled on each trip. The longest haul was made about 2500 feet from the face of first left to tipple and about the same distance from face of main heading to tipple. At two points in the mine for a distance of 400 feet the grades are 1½% against the loads.

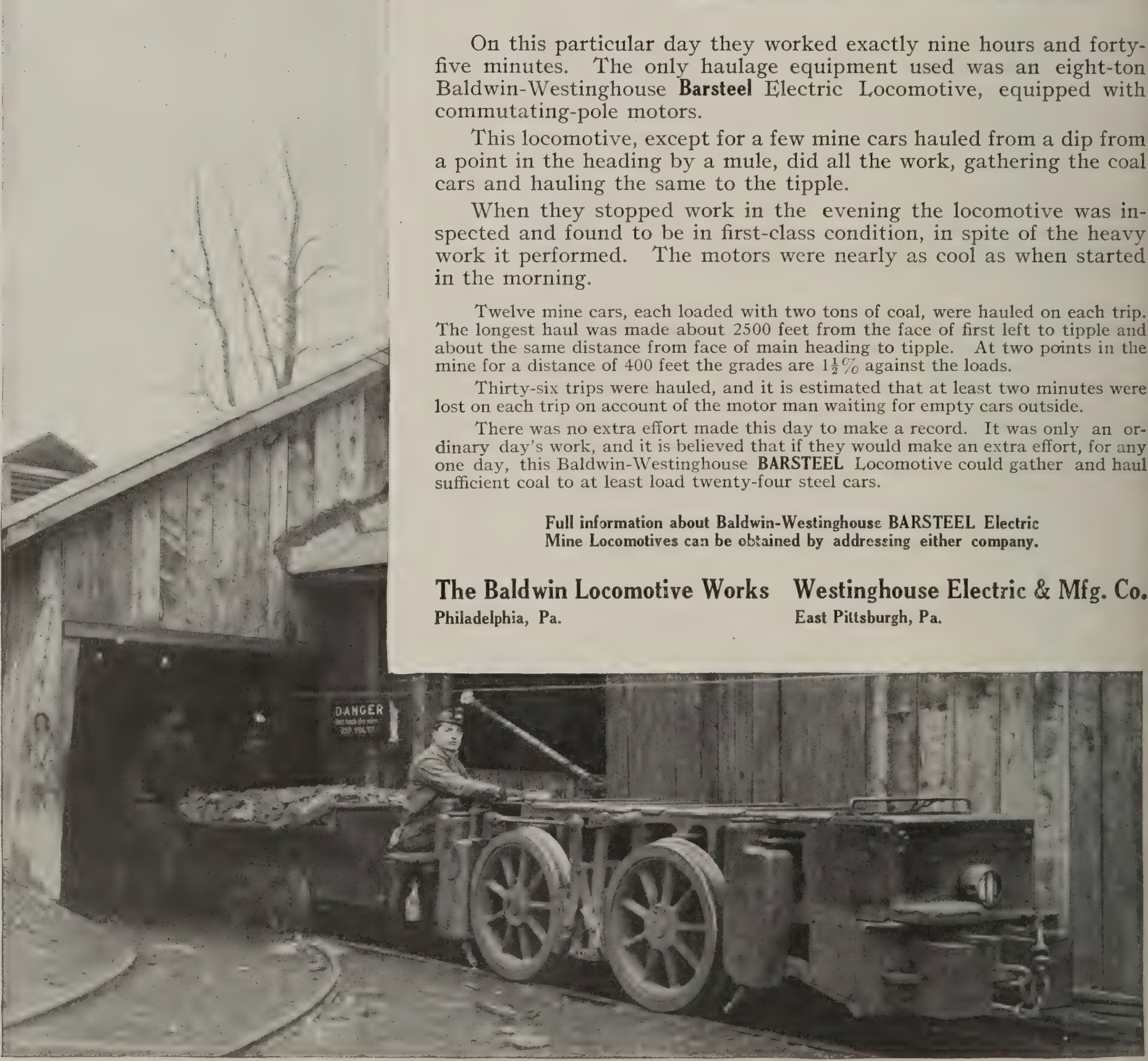
Thirty-six trips were hauled, and it is estimated that at least two minutes were lost on each trip on account of the motor man waiting for empty cars outside.

There was no extra effort made this day to make a record. It was only an ordinary day's work, and it is believed that if they would make an extra effort, for any one day, this Baldwin-Westinghouse **BARSTEEL** Locomotive could gather and haul sufficient coal to at least load twenty-four steel cars.

Full information about Baldwin-Westinghouse BARSTEEL Electric Mine Locomotives can be obtained by addressing either company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



A view of the Mines, the Motorman, and the Baldwin-Westinghouse BARSTEEL Locomotive which made this record.

COAL AGE

FLOYD W. PARSONS, *Editor.*

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CIRCULATION OF THIS ISSUE 11,250

None sent free regularly, no returns from news companies, no back numbers

HAPPY NEW YEAR

The old year's winging to its close
We're almost ready for the New,
The old year had its joys and woes
But when we pass them in review
We find the skies were often blue
In spite of clouds that we recall,
And now the year is almost through,
Here's Happy New Year to you all!

We've preached to you in plodding prose
Of Advertising, false and true,
We've marshalled facts in rows and rows
And written sermons not a few,
Perhaps you've muttered, "That'll do,"
Or softly murmured, "Hire a hall!"
—Ah well, the year is almost through,
Here's Happy New Year to you all!

We've done our durndest, heaven knows,
To help ourselves by helping you,
And if we've trod on people's toes
Or thrown some tempers all askew
We're sorry—and that's honest, too!
We would be friends with great and small,
And now the year is almost through,
Here's Happy New Year to you all!

COAL AGE

Vol. 4 NEW YORK, DECEMBER 27, 1913 No. 26

For The New Year

By Berton Braley

Written expressly for Coal Age

Now we have come to the first of the year,
Time to start in on a record that's clear,
Time to begin on a page that is clean,
How shall we fill it in nineteen fourteen?
What shall we make it—a year full of self,
Greed and Unkindness, and struggle for pelf?
Or plan out our lives on a better design,
Up in the office or down in the mine?

How shall we play in the game that is life,
Make it a battle, a war to the knife?
Or fill it with tenderness, honor and truth,
With succor to age and with welcome to youth?
Let us be true to the best that we know,
Owner or Miner—on top or below—
Let us be brothers, whatever our line,
Up in the office or down in the mine.

Now we have come to the first of the year,
Let us start in for a season of cheer,
Let us be true to the faith and the job,
Workmen who serve—and not bandits who rob!
Whether we handle a pick or a pen
Let us be servants and comrades of men,
Making life nearer the Master's design,
Up in the office or down in the mine!

Start the New Year with New Determination

Every normal man is ambitious to a certain degree. In some people this feeling is narrowed down to a definite aim; there is not a diversity of desires—only a single aspiration, and all effort of the individual is directed with the idea of attaining this one goal. Such men are specialists in the true sense of the word.

There are others, however, who are ambitious in a general way. Success to them is a broad term and covers a mighty field of action. They want to excel, but are not particular as to the line of work in which they engage, so long as the material results are satisfactory. They are honest men, and often efficient, but they lack concentration—singleness of purpose—which is a most essential quality in this age of specialization.

Start the New Year with a settled aim and a definite ambition. You are in the coal-mining business, and it's one of the nation's greatest basic industries. There are approximately a million men engaged in the work, and they need thousands of leaders. This insures those who are deserving, an opportunity to advance, if they are made of the right stuff.

And the lower down you are in the scale of employment, the more jobs that beckon you on. There are twice as many foremen as superintendents, and three times as many of the latter as there are managers. But none of these positions is to be obtained, or afterward held, unless the individual is willing to pay the price in earnest labor seriously and intelligently rendered.

Right now is the time of the year when you should balance your accounts. Have you anything to show for the work of the last twelve months? If you haven't, then you have done worse than stand still, for you are a year older, and just that much nearer the time when you can't be so sure of the punch left in your fighting arm.

Have you devoted a few hours each week to study and to keeping informed on the progress of your industry? Or, have you spent all your evenings trying to banish care and drive worry from your mind? Too many men think that "worry and care" can be expelled by a song and a bottle; but they seem to forget that such expulsion is only temporary, for the old lady will always be back with them "the morning after." You may drive the old hag away time and again while money and health last, but finally she will come back and stay to the finish.

The only way you can forever banish care is to meet her squarely, study her methods and discover her motives. Then you may get rid of her permanently by first understanding her. Freedom from worry and consequent "peace of mind" must be earned. Relief through alcohol and dissipation will prove as transitory as the opium fiend's dream of wealth and power.

If you haven't strengthened your position during the year that is dying, resolve that the coming twelve months will be devoted to preparing for the future, and be occupied in making your position in life safer. A little sensible worry now will mean peace later, for nothing is more terrible than to plod along under the crack of the whip when old age has come on. If you don't believe this is true, look about at the shuffling feet and nerveless hands of those who were careless in youth.

Don't you think it is time you stopped looking for luck to bless you, or Providence to hand you something, and come to the conclusion that hard work alone will solve your problems and net you a real return? Isn't it time you determined to live within your income and save something, no matter how little it may be? Now is the time to labor, to sacrifice and endure hardship, for when the years have piled upon you, it will be found that old age itself is sufficient punishment for one person to bear.

It's all very fine to be known as a good fellow, but it's still better to be spoken of as a respected citizen of much ability and serious intent. You have made many resolutions before, no doubt, and some of them you have broken; however, as the New Year commences, determine to do better and begin by first discovering just where you are deficient. The chances are that you yourself have been your own worst enemy, and that the greatest obstacles in your path have been of your own making.

Remember that, although everyone cannot become famous, anyone with health can avoid being an utter failure. Some of those now working with you, and having no better chance than you have, will be talked of as a success in years to come. There is no downhill in the road you must travel, it is one continuous climb; all dips in the grade lead backward. It's because so many people forget this fact that the majority fail. *Start the New Year with New Resolutions and New Courage.*

Safety of Portable Electric Mine Lamps

By H. H. Clark*

SYNOPSIS—Describes the tests applied by the Bureau of Mines to the Ceag, Hirsch and Wico lamps to determine whether they would be extinguished on the breaking of the lamp bulbs, whether the filaments were liable to cease to glow when the lamps were exposed to violence which did not destroy the bulbs and whether a reasonable degree of rough usage would impair the batteries.

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Portable electric mine lamps are a comparatively new development in this country, although they have been used in European mines for some time. William Maurice, in a lecture before the University College of Nottingham, England, stated that as early as 1887, 600 portable electric lamps were installed in a colliery in South Wales. He adds that the use of these lamps was eventually discontinued, but that 10 years later portable electric lamps were used regularly in England as a substitute for flame lamps, over 1000 lamps being in daily use by the latter part of 1899.

E. N. Zern stated in the *Coal and Coke Operator* of Mar. 14, 1912, that in 1904 several thousand portable electric lamps were in use in the mines of England and Belgium. Portable electric lamps are now used extensively in European coal mines, and in a competition held recently in England, 195 different lamps of this type were entered. For at least five years and probably for a longer time, portable electric lamps have been used here and there in the mines of this country in the attempt to develop a satisfactory substitute for the safety lamp.

Electric Lamps Safer than Flame Lamps

The Bureau of Mines advocates the adoption of the electric lamp because fire and explosion hazards will be decreased thereby. It is therefore manifest that the electric lamp itself must not be a source of danger. The bureau has proved by actual test that the glowing filaments of portable electric lamps are capable of igniting mine gas, but that sparks from such equipments of not more than six volts cannot ignite the gas unless the equipments are unusually large.

When, therefore, the bureau decided to make tests to establish the permissibility of lamps for use in gaseous mines, sparks were ignored as not being an element of danger while safeguards were required for the glowing filaments. Schedule 5, which was issued to announce the bureau's tests, contained the following paragraph:

> Permissible portable electric lamps shall be so designed and constructed that under no circumstances can the bulb of a completely assembled lamp be broken while the lamp filament is glowing[†] at a temperature sufficient to ignite explosive mixtures of mine gas and air.

Bureau's Approval of Lamps Limited to Safety Qualities

The schedule gives in detail the requirements of design, the character of the tests to which the lamp is to be submitted, and the conditions under which the tests will be made. Beyond requiring that the mechanical construction of the lamps should be rugged, no attempt was made to insure the capacity, efficiency or practicability of the lamps tested, although those that were manifestly incomplete or inadequate for mine service were not accepted for test. Therefore, it is clear that the bureau's approval of a lamp as permissible means that it vouches for the safety of the lamp but not for its capacity, time of burning, or expense and labor of maintenance.

In response to the invitation contained in Schedule 5, six lamps were submitted to the bureau for test. Three of these were rejected on account of their inadequate construction or lack of safety devices. The other three lamps were tested and after changes were made in some of them, they were approved as permissible for use in gaseous mines.

When the lamps were first received they were carefully examined in order to determine what kind of a blow would be most likely to cause the safety devices to fail in the performance of their function. The most dangerous conditions being assumed, tests were made under these conditions to determine whether or not the safety devices would really prevent the filament from igniting gas when the bulb was broken. Other tests were made to determine whether or not the safety devices were so constructed that they would give trouble by extinguishing the lamp when there was no need for such action and finally experiments were made to test the mechanical strength of the battery and its casing.

The Ceag Lamp

The Ceag lamp is constructed for hand service, and is the first lamp which was approved by the Bureau as permissible for use in gaseous mines. The lamp bulb is suspended between two spiral springs in such manner that whenever either the bulb or the glass dome which surrounds it is broken, the electric current of the lamp will cease to flow.

A preliminary examination seemed to indicate that there were only three possible ways in which the lamp could ignite gas.

1. It was conceivable that both the outer glass and the bulb might be so broken that the electric circuit would not be interrupted and the filament would therefore continue to glow.

2. The blow breaking the dome and the bulb might be of such a nature as to pin the bulb in place so that it could not release from the circuit even though the top spring were thrown out of position. The possibility that the safety devices might fail as a result of either of the above occurrences was investigated by 33 tests.

3. Even though the automatic devices operated perfectly when the lamp was broken, it was conceivable that they would not operate fast enough to interrupt the circuit before the gas became ignited. The possibility of failure under such circumstances was investigated by 13 tests.

The Filament Is Frequently Intact but Light Is Extinguished

These were made by placing the lamp inside a sheet-iron box 18x18x24 in., filled with the most explosive mixture of Pittsburgh natural gas and air, and provided with observation windows through which the phenomena occurring within the box could be plainly seen. The lamps were lighted and smashed by means of a tool shaped like a pick point, which was driven against the glass dome of the lamp with sufficient force to wreck both the dome and the bulb.

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*Engineer-in-charge of electrical investigations, Bureau of Mines, Pittsburgh, Penn.

Note—First part of paper read, Dec. 5, 1913, at the winter meeting of the Coal Mining Institute of America.

[†] We submit that "while the lamp filament is glowing" should read "in such manner as to permit the filament to glow."—Ed.

In the tests that were made to ascertain how quickly the safety devices acted, the bulb was not surrounded by the glass dome, but was held in place by the top spring, which was held in its usual position by a wooden block provided specially for the purpose. Despite the fact that the blows administered to the lamp were sufficient to shatter both the outer dome and the lamp bulb, the filament was not injured in nearly 40 per cent. of the tests made, and was prevented from igniting the gas only by the operation of the safety devices, which did not fail to perform their proper functions in any of the tests.

One of these Ceag lamps was dropped 6 ft., 15 times upon a concrete floor. Despite the severity of this test the lamp was extinguished only three times and in each case by the safety device. The lamp was dropped 5 times before the battery was injured in any way, and 12 times before a permanent leak was made in the battery jar. After the lamp had been dropped 15 times, it continued to burn for 16 hr. before going out entirely.

The Hirsch Lamp Is Protected by Short-Circuiting and Circuit-Breaking Devices

The Hirsch lamp is designed for cap service, and was the second type approved by the bureau as permissible for use in gaseous mines. The safety devices with which this lamp is equipped are mounted in the headpiece and consist of an open-circuiting device which protects the lamp against blows from the front, and a short-circuiting provision, which defends the lamp against blows from the side.

The open-circuiting device is operated by the breaking of a slip of window glass which is mounted directly across the inner surface of the bulls-eye with which the lamp is provided. The breakage of this slip of glass releases a spring which opens the circuit. The short-circuiting of the lamp is accomplished as follows: The headpiece is made up of three concentric shells separated but a short distance. The outer and the inner shell are connected to the positive pole of the battery and the intermediate shell to the negative pole. These shells, of course, completely surround the lamp bulb, and the theory of the safety device is that the bulb cannot be broken without so jamming these shells together that they will short-circuit the battery and thus extinguish the filament before it can ignite gas.

Whenever the Bulb Breaks, the Current Fails

Forty-five tests were made upon this headpiece by striking it with the following tools: A hammer, a wooden mallet, a tool shaped like a miner's pick, a piece of iron pipe, and a wooden club. Some of these tests were made while the headpiece was rigidly supported in various ways and others were made while the headpiece was swinging from the end of its cord.

The blows were struck with sufficient force to crush the headpieces, to shatter the glass in almost every case, and to punch holes completely through the shells, but every time that the lamp bulb was broken the safety devices extinguished the filament. In some of the tests the lamp was protected by its circuit-breaker and in others by the short-circuiting device.

In order to find out whether or not the safety devices would extinguish the lamp when it was not necessary they should do so, the headpiece and its cord were dropped 6 ft., 10 times upon a concrete floor. The safety devices acted in only one test and the action was considered to be necessary as the blow that tripped the circuit-breaker also shattered the outer glass of the headpiece. These tests therefore seemed to prove that the safety devices were so designed that they would only extinguish the lamp when necessary. This lamp was designed to be interchangeable for cap and hand service, but its construction was considered to be insufficiently strong for the latter purpose and so it was approved for use on the cap only. The nature of cap service being less severe upon the battery than hand service, the battery was tested by dropping it on a wooden floor a distance of 3 ft. The battery jar was cracked on the second fall, but the lamp still gave its full amount of light after the battery had been dropped 10 times.

The Wico Lamp

This lamp is designed for cap service, and was the third lamp approved by the bureau as permissible for use in gaseous mines. The bulb is so mounted that it is held in its socket by a wire stirrup against the pressure of springs that act to eject the bulb should the stirrup be removed or the bulb broken.

The tests made on this lamp were similar to those made on the Ceag lamp because the principle of the protective devices was the same. Ten tests were made by mounting the headpiece in the gas-testing gallery and smashing the bulb with a pick-pointed testing tool. In these tests the outer glass was removed and the blow directed against the naked bulb in order to determine whether or not the ejecting spring acted with sufficient speed to break the circuit before the gas could become ignited. The device acted perfectly in the 10 tests made.

Ten similar tests were then made with the outer glass in position, and as many more were tried with the blow directed against the socket tube. Finally 10 tests were made outside the gas-testing gallery by striking the headpiece with a mallet, a club and a piece of iron pipe. These latter tests were made largely to determine the mechanical strength of the various parts of the headpiece. In none of the tests did the safety devices fail to exercise their safeguarding function.

Proof against Unnecessary Extinction

Ten tests were made by dropping the headpiece and its cord upon a concrete floor from a point 6 ft. above it. The safety device did not act in any of these tests and consequently it was proven that a casual jar would not extinguish the light. The lamp being designed for cap service only, the dropping tests on the battery were made by dropping it 3 ft. upon a wooden floor. Ten tests were made altogether. The battery jar did not develop a crack until it had been dropped 8 times. After the completion of the dropping tests, the battery operated the lamp for 16 hr. at practically full brilliancy.

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The coal supply of Oklahoma is estimated to be 10,000,000,000 tons. The state contains more than 6,000,000 acres of coal-bearing land. Some of the land is estimated to be capable of yielding 7000 tons per acre.

A Premier Operation in Ohio

By Sim G. Reynolds*

SYNOPSIS—A description of a new operation which is termed "premier" instead of "model" merely because mines rejoicing in the latter appellation are notoriously dangerous.

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One and one-half miles from St. Clairsville, and about 12 miles West of the Ohio River in Belmont County, Ohio, is located colliery No. 1 of the Provident Coal Co. If the management would allow it, this mine might be designated as being a "model." There seems, however, to be something sinister in the way in which Fate has dealt with our so called model mines in recent years. This serves to give the management of a mine which is really deserving of such a cognomen a species of spinal shivers every time they hear it mentioned.

Superintendents and managers of well planned mines, fully equipped with every modern appliance for economy and safety, are not superstitious, but we all know what has happened to most of the operations which have been proudly designated as "models" in the last decade.

So in order to break the "hoodoo," if any exists, we are compelled to substitute a term synonymous with all that is good and modern in mine methods and equipment as relates to its installation at a given operation, and at the moment at least nothing more nearly designative of what we want to describe occurs to us than the word "premier." The reason for selecting this appellation will perhaps be more apparent when the equipment and methods of operations are more fully comprehended.

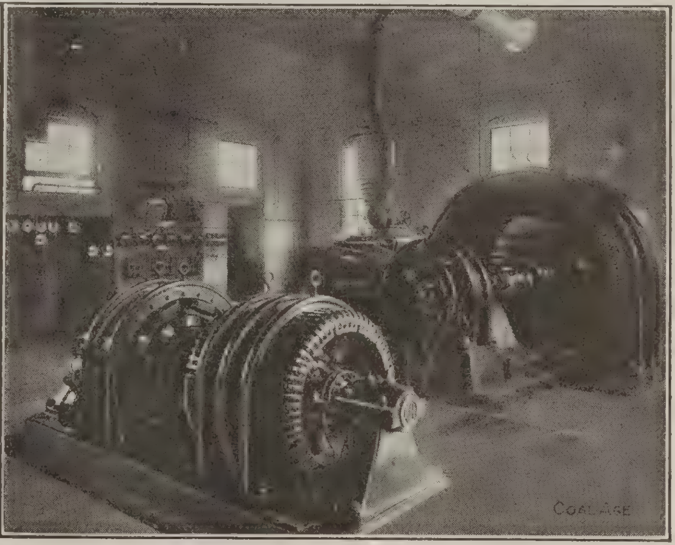
An Extensive Field Is Reached

The shaft is sunk to the Pittsburgh No. 8 seam, and into a block of this splendid coking and gas-producing coal comprising almost 8000 acres in one field. This is to be eventually worked out from the mine in question, or No. 1, and also from colliery No. 2, which is, in many respects, a counterpart of the first. It will be readily admitted therefore that this is a man-sized proposition, particularly since it is the intention of the owners to extract the utmost possible percentage of the coal measures before abandoning the mines.

The entire plant, inside and out, has been arranged with this purpose definitely in view. No. 1 colliery was opened about nine years ago, and the output of the mine is shipped over the Adena branch of the Wheeling & Lake Erie R.R. At the point where the shaft was sunk, the coal lies about 86 ft. below the surface, and while at many points the hills rise above the level of the shaft mouth to such an extent that the survey shows 300 or more feet of overlying strata, yet the mine is nongaseous. The natural dip of the seam at this locality is about 17 ft. to the mile, east.

This colliery is laid out and equipment installed to handle 2500 tons per day. The system of mining is the ordinary room-and-pillar method generally in vogue in this seam, butt entries being turned off at about 450-ft. intervals, with rooms turned off the butts on 33-ft. centers, with 9-ft. ribs between rooms.

The Tipple and Power Plant



A Corner of the Engine Room

Both Mules and Motors Are Used

Haulage of coal from working places to shafts is at present accomplished part by mule and part by motor. One 12-ton, three 6-ton and one 5-ton electric locomotives are used to haul the coal from the partings to the shaft bottom, with 15 mules transporting it from the working places to the partings. Haulage is in no sense difficult in this locality, owing to the even grade of the coal measure.

Undercutting is done by 19 electric chain machines, 17 of them being of the 19-A Jeffrey type. Transportation is accomplished by four hundred and fifty 2¼-ton capacity wood cars. Hoisting from mine to surface is accomplished by a Wellman-Seaver-Morgan hoist with a capacity of four cars per minute. The engines are fitted with a Nicholson overwinding device.

The mine is splendidly ventilated, in keeping with other uptodate measures, by an 8½x16-ft. Cappel fan,

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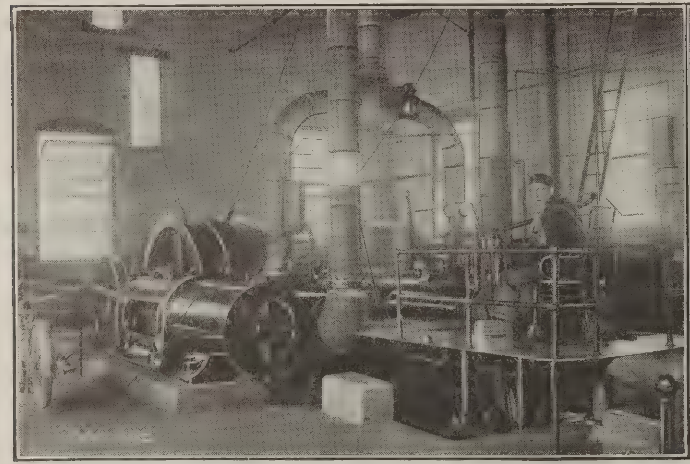
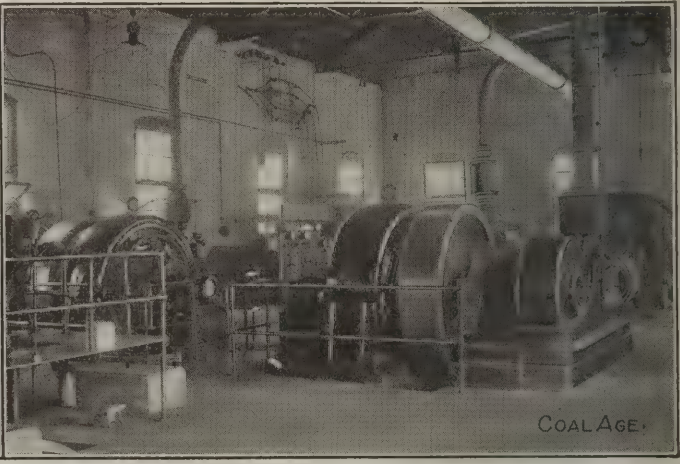
*Aetna Insurance Co., Hartford, Conn.

98,000 cu.ft. of air per minute being produced at a speed of 100 r.p.m. against a 2½-in. water gage. At the shaft bottom and along much of the main roadway and traveling-way is installed a most modern system of lighting and timbering. The comparatively great strength of steel I-beams is here being taken advantage of to protect the roadways and shaft bottoms from falls that would otherwise inevitably cause loss of time and money in a roof as brittle as this. In addition, this gives the space essential to a free movement of men, motors, and animals impossible where wooden supports are employed.

The electric lighting used throughout nearly all the main roads, as well as in the shaft bottom, is an innovation which is fortunately becoming more common. It is still rare, however, in comparison with what it would be if managers and owners of nongaseous mines only realized the wonderful possibilities for economy and safety that lie in a well lighted shaft bottom and main haulage and traveling-ways. We venture the assertion that if this single feature of a modern mine like that under discussion were but properly investigated and understood the stygian blackness of most of our soft-coal mines would in a short time be a thing of the past, insofar as the shaft and slope bottoms, the drifts and the various traveling-ways and the main haulage roads are concerned.



Hoisting Engine at Colliery No. 1



Generators at Colliery No. 1

Likewise, the constantly decaying, death-dealing, fall-producing wood cross-piece as generally used to uphold the more or less brittle strata forming the roof of the Pittsburgh No. 8 seam, would give way far more rapidly than it is doing at present to the stauch steel I-beam in wide entries, particularly if the ultimate economy and the present merits of the steel supports were better understood.

Many investigations of the comparative benefits to be derived from the use of the I-beam for this purpose have convinced the writer that its installation is far more generally justified in the interest of ultimate economy, present efficiency and the welfare of the employees than many mine owners will allow themselves to believe.

The Tipple Is of Steel

The tipple at colliery No. 1 was designed by George S. Baton, of Pittsburgh, Penn., and erected by the Pittsburgh Construction Co. of the same place. It is built entirely of steel, and is equipped with two Phillips automatic cross-over dumps. Screening apparatus is also provided to produce the following grades: One, and one-quarter inch lump, nut and slack coal, run-of-mine and ¾-in. lump.

Slate and other refuse is dumped at the tipple and conveyed to the refuse heaps by means of an aërial tramway system, which is an improvement over the method of slate handling generally in use. This slate-disposal system is not considered as being the least of many features installed at this plant with the single aim in view of ultimate economy of operation and present efficiency both combined with speed and safety.

In the matter of power the plant is equally uptodate. Steam is generated by two batteries of 150-hp. Erie boilers, and two batteries of 125-hp. Stirling boilers, the draft being furnished by a brick stack 150 ft. high, and 4 ft. in inside diameter at the top.

Electric current is generated by two 200-kw. Westinghouse, and one 500-kw. Ridgway generators, both being direct-connected to Erie-Ball engines. These machines also supply electric current for the operation of all machinery at Colliery No. 2.

The mining town in which live most of the employees of No. 1 colliery, is composed of 88 houses of four rooms each, built double, and six 6-room houses for the use of mine officials. All these are of frame construction and neatly painted in gray with white trimmings. Each house is provided with a good sized garden divided from its neighbor by a well-built, neatly painted fence.

The Water Supply Is Adequate

The welfare of the employees and their families is equally well cared for in other respects, the water supply being remarkable for a mining community. This water supply is modern and sufficient for all purposes, a reservoir holding 13,000,000 gallons, having been built under contract by William N. Miller, of St. Clairsville, Ohio. The water from this reservoir first passes through a filtering system erected by W. B. Scaife & Son, of Pittsburgh, and reaches the houses and other buildings under pressure.

The office buildings, engine and generator rooms, boiler and fan houses, and in fact all the mine buildings except the tipple, are built of a buff-colored brick, presenting an appearance quite in keeping with the rest of the plant. The work at this colliery since its beginning has been un-

under the close supervision of Superintendent David Thomas, and general manager, F. Armstrong. Mr. Thomas will be remembered by most mining men of the Pittsburgh field as having been active in the operation of some of the most extensive bituminous mines in that region, including the large Ellsworth colliery. He is evidently a manager who has the happy faculty of combining the conservative qualities of the old-school manager with the enthusiasm and optimism necessary to grasp and utilize all that scientific theory offers an uptodate mine manager. The underground workings are in charge of foreman Peter Dlesk, assisted by Henry Whitlock, and Martin Jalensz.

A complete equipment of mine-rescue apparatus is kept on hand at No. 1 mine, including oxygen helmets and other necessary first-aid supplies. A noticeable arrangement for the prevention of accidents is an automatic safety gate which opens only when the cage is at rest at the ground landing. This is the product of A. J. Allsop, of Jerome, Penn. It is but one of many efforts made by the Provident Coal Co. to conserve the life and limb of every person in its employ.

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Experiments with Animals in Carbon Monoxide

By George A. Burrell and Frank M. Seibert

SYNOPSIS—Results of careful experiments indicate that canaries are best adapted for exploration work. Both animals and men may be affected differently by the same proportion of carbon monoxide, and because some animals have an abnormally high resistance to the gas, more than one animal should be used at a time.

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The usefulness of small animals in detecting vitiated air in mines is well established. The Bureau of Mines and others have much information on this subject, but in order to make this paper brief, accounts of their practical use or of accidents which occurred because they were not used will not be given here.

The Bureau has experimented with most of the more common small animals, such as canaries, guinea pigs, rabbits, chickens, dogs, mice and pigeons, and finds that canaries or mice are the most suitable for the work. Of the two the Bureau finds canaries to be the more sensitive. They were used in England before their acceptance in this country; presumably in places on the Continent also. Their usefulness in husbanding the resources of breathing apparatus is of great importance.

An additional reason for the use of canaries lies in the fact that they are generally easily obtainable, and become pets of the men who have them. If handled intelligently in rescue operations, they seldom die as a result of their exposure to carbon monoxide.

In rather a brief manner, one of the objects of this paper is to give the results of experiments by the Bureau which have shown that canaries may be used repeatedly in rescue operations without danger of their being more susceptible to carbon-monoxide poisoning after many exposures. This fact had not been determined experimentally hitherto, as far as I am aware. A second important investigation is into the relative effect of carbon monoxide on men and small animals. Carbon monoxide was the gas experimented with because it is that constituent of afterdamp, which is most insidious in its action, most difficult to detect, and responsible for many of the deaths caused by mine explosions. Moreover, small animals feel distress sooner than men in atmospheres vitiated by other gases than carbon monoxide, and so their action in all irrespirable gases will serve as a valuable indication of the presence of those gases when in quantities dangerous to human life.

Effect of Repeated Exposure to Carbon Monoxide

Details of these experiments will be given later in a publication of the Bureau. They will only be outlined here. Canaries, mice and guinea pigs were repeatedly exposed to carbon monoxide under different conditions. In some experiments they were exposed to atmospheres that distress them in about 2 minutes. In the case of canaries, 0.25 per cent. was used in some experiments and the animals were exposed 7 to 10 successive times.

For instance, the animal was exposed to collapse, and then when it had apparently recovered (7 to 12 minutes), it was exposed again and again, the object being to see if, after many exposures to a certain percentage of the gas, they would upon subsequent exposures show distress in a greater length of time, i.e., become more or less acclimatized to the gas. No acclimatization effect was noticed.

The same experiment was performed with mice and guinea pigs with the same result. Other percentages beside 0.25 per cent. were also used in the case of both canaries and mice. The experiments were also carried further to the extent that the same animals that had been exposed several or many times on one day were exposed many times the next day and on successive days.

Animals were also exposed to percentages that quickly distress them, and after removal from the atmosphere and recovery, were placed in atmospheres that ordinarily do not apparently affect fresh animals. This experiment was also reversed, the animals being first placed in atmospheres which do not affect them (for a long time, at least), say 0.10 per cent. in the case of canaries, and then they were exposed to atmospheres that ordinarily affect them quickly, to see if results different from the ordinary could be obtained.

In performing this work, the results of which can be briefly told, but which required considerable time for its performance, the conditions of recovery work with the aid of small animals were kept in view. In such work parties would usually advance until the animals showed distress. The animals would then in all probability be carried back to fresh air, and further advance, if such were made, would be accomplished with breathing apparatus. A general reconnoissance might be made with the animals to define the danger zone of the mine. In the latter event they might be exposed to proportions of carbon monoxide that would in each case cause collapse.

Note—Paper presented before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4-5, 1913. Published with the permission of the Director of the Bureau of Mines.

SEVERAL OTHER POSSIBLE CONTINGENCIES

It may happen, in other cases, that the animals may be first used in a part of the mine where very small percentages of carbon monoxide exist, say 0.10 per cent., a proportion that does not usually seem to affect canaries or mice within one or two hour's time (as far as can be observed) and then they may be used in a place where a larger percentage may be present. It is possible, too, that an animal which collapses at a certain place because of the proportion of carbon monoxide there, might upon recovery be used in an atmosphere containing a proportion that does not usually affect a fresh animal. Finally, the same animal might be exposed over several successive days while a mine was being explored.

It is believed that the experiments performed show that animals will not become acclimatized to carbon monoxide under the conditions surrounding recovery work in mines, and hence become less useful and even a source of danger. It might be mentioned that this question has been raised several times in discussing the use of small animals for detecting afterdamp in mines.

It should be mentioned that two Canadian investigators, G. G. Nasmith[1] and D. A. S. Graham, found that animals finally become acclimatized by continued exposure, i.e., if a guinea pig is exposed for days or weeks to small percentages, it can finally stand exposures that would otherwise kill it, but our tests have shown that in the case of small animals which are quickly removed to fresh air (after distress is shown) and then exposed again for a reasonable number of times, this acclimatization effect is not apparent. The two methods of experimentation are not parallel. It is pertinent to add that the effect Nasmith and Graham observed in guinea pigs—an increase in the red-blood cells—has been observed in men working around blast furnaces, the gas from which contains a high percentage of carbon monoxide.

EFFECTS ON DIFFERENT ANIMALS OF THE SAME PROPORTIONS OF CARBON MONOXIDE

The Bureau has performed many experiments in order to draw some conclusions regarding the effect on different animals of the same species of a given proportion of carbon monoxide. It was found that in general a given percentage of that gas affected different animals of the same species in about the same length of time. The results were, at least, closely enough in agreement to justify reliance on the use of animals in mine-rescue work, but once in a while an animal behaved markedly differently from what was expected. This is more true of mice than of canaries, yet even in the case of the latter several of them should be taken with an exploration party.

THE RELATIVE EFFECT OF SMALL AMOUNTS OF CARBON MONOXIDE ON MEN AND SMALL ANIMALS

In reading over accounts of rescue and recovery work in mines, one is impressed with the fact that some users of small animals have not been entirely satisfied with the behavior of mice and birds (especially mice), because men have apparently felt distress before the animals became affected. The Bureau as the result of many experiments made to determine the resistance of small animals to carbon-monoxide poisoning believes it has the data at hand which explains this dissatisfaction.

It was found, for instance, that almost all of the animals tried, do not show sufficient distress in one hour's time, with 0.10 per cent. of carbon monoxide, to make them valuable for detecting this percentage of the gas. In some cases the length of exposure was extended to three hours without any effects being observed. In one case only was a canary affected in so short a time as 12 min. by 0.10 per cent. of carbon monoxide.

With another bird and the same percentage of carbon monoxide, distress was scarcely observable in three hours. Only a disposition to remain quiet was observed. Eight different canaries were used and six different mice. Only one mouse out of many was slightly affected in so short a time as 30 min. with 0.10 per cent., and even it was not overcome in 4 hours. Neither chickens nor pigeons were visibly distressed.

In an atmosphere containing 0.15 per cent. of carbon monoxide, canaries showed distress in from 5 to 30 min. A mouse showed slight distress at the end of an hour. With 0.20 per cent. canaries responded in from two to five minutes except in one case (35 min.). Three mice responded in 12 min., and a fourth in 46 min. No blood tests were made, the object being to determine the usefulness of the animals for mining work, where their behavior as apparent to the eye is the only guide. Haldane states that 0.06 per cent. carbon monoxide is sufficient to produce distinct symptoms in mice.[2] We do not hesitate to say that because of his greater experience in experimenting with small animals, Dr. Haldane might detect outward symptoms in a mouse that would escape our attention. On the other hand, we have had greater experience than many of those who might use small animals in mines. Further, in the laboratory, observations are better made than in the mine where the light may be poor.

Dr. Haldane made many experiments with himself as the subject in determining the effect of carbon monoxide on men.[3] He found that 0.12 per cent. causes a mouse to sprawl in 11 min. Haldane felt a slight tendency to palpitation in 33 min. In 90 min., he had distinct dimness of vision and hearing and a slight tendency to stagger, besides abnormal panting when he stopped the experiment long enough to run up and down stairs. In two hours' time vision and hearing became markedly impaired and there was some confusion of mind. When the mouse was finally removed from the cage it could not move about. After 18 min. from the time of stopping, Haldane had a distinct throbbing headache which did not last long.

THE MINIMUM HARMFUL PERCENTAGE OF CARBON MONOXIDE

With 0.045 per cent. of carbon monoxide, Haldane did not notice any symptoms in the four hours that the experiment was carried on, but on running upstairs there was unusual panting, slight palpitation, etc. A mouse was not distinctly affected. In defining the minimum harmful or poisonous percentage of carbon monoxide, Haldane states that 0.05 per cent. in pure air is just sufficient to produce in time very slight symptoms in man, and the same percentage produces very slight symptoms in mice. He states that 0.20 per cent. is very dangerous to man. With 0.05 per cent. and thereabouts, Haldane finds that the gas finally begins to affect man and the outward signs appear in mice.

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[1] The hematology of carbon-monoxide poisoning. "Journ. Physiology," 1906, Vol. 25, Nos. 1 and 2, pp. 32-52.

[2] The relation of the action of carbonic oxide to oxygen tension. J. S. Haldane, "Journ. Physiology," Vol. 18, 1895, pp. 201-217.

[3] The action of carbon monoxide on man. Jno. Haldane, "Journ. Physiology," Vol. 18, 1895, pp. 430-462.

Haldane's observations on mice are not entirely in accord with our own researches. The reasons are probably, as already stated, differences in observation. We are convinced from our experiments that in a mine with poor light, and perhaps only hurried examination of the animal, and by persons more or less inexperienced in the actions of such animals, mice and canaries will not usually show distress pronounced enough to give good warning with 0.10 per cent. or less of carbon monoxide. Haldane's work shows that this percentage may finally affect men—a headache in 40 or 50 min. perhaps, or slight tendency to palpitations in less time. This condition will be a considerable time removed from actual distress or unsteadiness of movement. At the end of 20 min., one of the authors had only a slight headache when he exposed himself to 0.25 per cent. carbon monoxide (in air). Later, however, he became very ill. Canaries collapsed in just a few minutes.

In connection with the above laboratory experiments, we have made observations regarding the use of small animals in mines. One instance is noteworthy, as follows:

A mine fire recently occurred and a sample of mine gas was obtained that contained the following constituents:

SAMPLE OF MINE GAS

CO_2	1.10 per cent.
O_2	18.61 per cent.
CO	0.12 per cent.
CH_4	0.42 per cent.
N_2	79.75 per cent.
Total	100.00 per cent.

This sample was obtained in a place where exploration work was being conducted. Canaries carried with the party were not affected, but two of the men finally complained of a bad headache. Later when they went to the surface they became ill. One was indisposed all evening. The birds were with the men continually.

These facts, although they appear damaging against the use of small animals for the purpose proposed, only militate in part against their usefulness. They still remain, in our opinion, the best indicators of carbon monoxide for exploring parties in mines that we have. Canaries will give ample warning of percentages of carbon monoxide immediately dangerous to men. When the proportion of carbon monoxide is 0.15 per cent., canaries will show distress usually in from 5 to 12 min. With 0.20 per cent. the distress is apparent usually in from 2 to 6 min. For distress to appear in men with those percentages requires much longer time, although in the case of some individuals the effects may, when they do appear, last for hours. We have also determined this point experimentally, as have others. Men cannot stand the exposure to collapse from carbon monoxide as animals can. Canaries and mice after distress and collapse recover quickly if exposed to fresh air—only a matter of minutes usually. In the case of men exposed to collapse, recovery is often a matter of days.

Reasons for Variable Effects of Carbon Monoxide on Men

In assigning reasons for the variable effects produced on men and small animals by small quantities (say 0.10 per cent. and under) of carbon monoxide, we would say that it is largely a question of observation. The blood of the animal is, of course, taking up the carbon monoxide, but only slowly and to the extent that even after a long time, one hour or more, the only effect in the animal may be a slight sluggishness or disinclination to move about. Men, on the other hand, especially when moving about or doing hard work, absorb much more oxygen and hence more carbon monoxide than when at rest, and may finally feel a slight or even a severe headache in the same gas mixture that is only slightly or not affecting the animals (as far as can be observed).

The men may even finally become very sick. It is not believed that any pronounced acclimatization effect is produced in an animal on a short exposure which would account for the apparent resistance. It must be remembered that a man is in an excellent position to determine effects upon himself long before distress occurs, in the case of small percentages of carbon monoxide.

When the carbon-monoxide content of an atmosphere is raised from 0.10 per cent. to say 0.15 or 0.20 per cent., the susceptibility of a canary or mouse to the gas is markedly increased, as judged by the action of the animal—so much more than in the case of men that a canary especially may show distress in 5 min., while a man may require 30 or more min. A man, if he exposes himself so long, however, may finally become quite sick, and if he remains in the poisonous atmosphere for longer periods, may become dangerously affected.

The Gas May Affect Different Persons in a Different Manner

The Bureau has compiled data from different sources to show the effects produced on different persons by carbon monoxide. The fact is clearly brought out that the gas may affect different persons in a different manner. Long-standing after-effects produced in people by severe poisoning, although apparently rare, are by no means unknown. It appears to be the evidence usually that recovery from exposure is complete, but that in the case of some individuals long-standing after-effects may follow.

These after-effects on different people cannot be connected absolutely with any degree of exposure, i.e., one short exposure to large percentages, repeated exposures to large percentages as usually happens in the case of blast-furnace gas, or slow exposure to collapse with small percentages of the gas, as in the case of miners exposed to the smaller percentages that are found in mines following explosions.

In the case of the same individual the final blood saturation is what counts. The point is that different people may withstand different degrees of blood saturation. In the case of blast-furnace men, the same men may be exposed to collapse or severe temporary sickness time and again. Usually, as far as can be observed from their behavior, they retain their normal condition, although, as has been pointed out by Thomas Oliver,[4] severe after-effects may linger for two years.

This appears to be exceptional. An Illinois commission appointed to inquire into conditions around steel plants, found it hard to separate effects on steel workers produced by bad living conditions and those produced on some of the men by carbon monoxide, although they were inclined to the view that carbon-monoxide poisoning had much to do with the generally poor condition of some of the employees. The exact action of the gas in producing severe nervous disorders still remains somewhat obscure. Some do not believe the action so simple as to merely temporarily deprive the system of oxygen, as in the case of suffocation, although most of the good experimental evidence points to this view.

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[4] Thomas Oliver, "Diseases of Occupation," p. 67.

An analogy is found in men who work at high altitudes or suddenly ascend to extreme heights in balloons, where the oxygen tension is very low. Different individuals also may be affected differently at high altitudes. One must believe that in cases both of carbon-monoxide poisoning and oxygen deprivation by other causes, the idiosyncrasy of the individual plays an important part. Others have laid much stress on this point.

Guinea Pigs May Become Immune

As regards acclimatization to the gas, it has been strikingly shown that guinea pigs may become immune. The compensation found in pigs has also been in part observed in men. The red-blood cells increase to compensate for those put out of action by the carbon monoxide. How long this may continue without markedly distressing men is important.

Repeated exposure to carbon monoxide may occur in the case of miners, in those who do the shot-firing. Blasting explosives always produce some carbon monoxide in coal mines. Men may return too quickly to the working face (before gases have disappeared), to examine their shot, and thus expose themselves to percentages, usually small, of the gas. Where large shots are fired, where the ventilation is poor, and where the working faces are too far ahead of the last breakthrough, contact by men with harmful percentages of carbon monoxide and other poisonous gases may follow. Miners at some mines frequently go home sick from powder smoke. The general effect of such exposure on them cannot be anything but bad.

Afterdamp Will Differ in Composition

In the conduct of exploration work one sometimes hears it said that certain individuals of a party were able to withstand atmospheres that caused distress in other members of the same party. This may be true because some men are more affected than others by the same proportions of the gas, but one or two other causes must be kept in mind. Afterdamp in different parts of a mine (in some places quite close together) will differ much in composition, to the extent that at one place a very small and insignificant amount of carbon monoxide might be present, while at another place, close by, a harmful proportion might exist. One person in a party unknowingly might encounter the latter atmosphere while his comrades do not.

Another reason usually less apparent to an exploring party has to do with the fact that the amount of carbon monoxide absorbed depends, of course, upon the air breathed. A man at rest may breathe 7 or 8 liters of air per minute. By even moderate exertion this can be increased to 3 or 4 times that quantity. It follows that if one or more members of an exploring party work harder than others they will become poisoned more quickly than their fellows.

Summary

1. Small animals may be used repeatedly in exploration work without becoming less useful as indicators of carbon monoxide.
2. Of the more common small animals, canaries are best adapted for exploration work.
3. Men may feel distress, especially if they work hard, in the presence of small proportions of carbon monoxide (0.10 per cent, or under) when animals at rest in their cages do not show it distinctly.
4. It is found occasionally that different animals of the same species may be affected differently by the same proportion of carbon monoxide; hence more than one animal should be used at a time.

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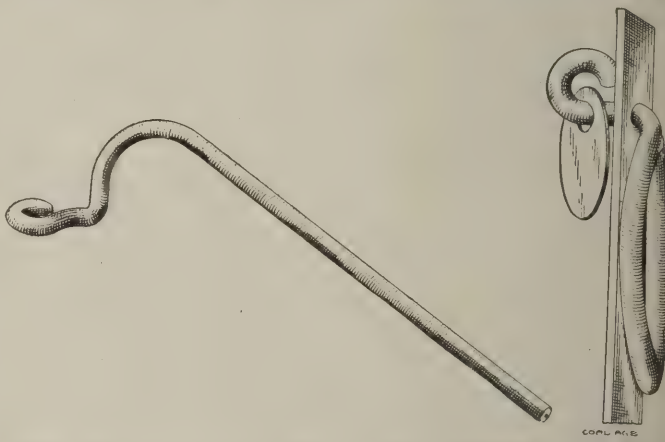
Safety Hook for Miner's Check

In the Langenbrahm mine at Essen, Germany, and in a number of Upper Silesian operations, a clever device for attaching the miner's check to the car has been used with satisfaction. It is described in *Glückauf,* and consists of an iron rod hooked at one end and originally straight at the other. The straight end is thrust through a hole in the side of the car and then bent into a ring which hangs down.



The Check Hook before and after Insertion in Side of Car

The check can be hung on the hook only when the ring inside the car is free to be lifted. When the car is full the coal holds the ring flat against the side so that no one can tamper with the check. This device is manufactured by the Rheinischen Handelsgesellschaft m. b. H., of Mörs, Germany.

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John Lind—Coal Miner

There are probably few people in the country who are aware of the fact that John Lind, President Wilson's personal representative in Mexico, was at one time identified with the Western coal industry. About 20 years ago, Mr. Lind and others, of Salt Lake City, Utah, developed what has later proved to be one of the most enduring and successful of the Western coal operations. The company was organized under the name of the Diamond Coal & Coke Co., the operation being located at Diamondville, in what was then Uintah County, Wyo. Their original opening, No. 1 mine, is still in operation. Some time later, practically the entire capital stock of the company was taken over by the Amalgamated Copper Co., and it has since proved to be the most important and valuable of that company's large coal properties.

Notes on the Clinkering of Mixed Coals

By R. D. Quickel[*]

SYNOPSIS—Some interesting data on the clinkering of fuel mixtures of different coals at high temperatures, with particular reference to railroad work. The author comments on the well known inconsistencies in clinkering and gives detailed results of some interesting problems he has met with.

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The object of this paper is to call attention to some facts, relative to the combustion of mixed coal, the unsatisfactory results sometimes experienced when burning them and the reasons for same. I have also endeavored to evolve some rules whereby it may be determined whether or not clinkering will result when certain coal or coals are burned in a locomotive firebox. The locomotive firebox has been used in the practical and theoretical work connected with this paper, because a locomotive under maximum working conditions generates temperatures higher than are probably generated in any other common combustion chamber.

Some Peculiarities of the Clinkering Problem

As to the clinkering of coals the latest textbooks mention that such a thing occurs, but give no reasons as to the actual cause, although some of them do mention that the ash of the coals have something to do with it.[†] Every user of steam coal has discovered fuels which would not give him satisfactory results, and large consumers have also discovered that they could not use a mixture of certain coals. In all cases the results were only found after an immense amount of trouble. These errors in purchasing fuel are most expensive.

The fuel-purchasing department of the Queen & Crescent Route discovered years ago that it was impracticable to mix certain coals together and get satisfactory results, and that it was necessary to run actual locomotive tests with the mixed fuel to find out if it would give maximum steam pressure. For instance, we draw our present fuel supply for the Cincinnati, New Orleans & Texas Pacific Ry. from four separate and distinct districts. From three of these districts we can, and do, mix the coal indiscriminately on our coal chutes, while that from the fourth district will not burn without clinkering, if mixed with any of the other coals from the three districts mentioned; in other words, if we were to come to a coaling station with about half a tank of fuel from the fourth district, and were to fill the tender with coal from any of the other three districts, we would, in a short time, have clinker trouble on our locomotives, which would result eventually in an engine failure.

With our present equipment we have found that sometimes either one of the two coals would be absolutely satisfactory when used by itself, but when mixed, these same two coals proved entirely unsatisfactory. We have also found that sometimes certain mixed coals will give perfect satisfaction in our stationary boiler plants, but when used on a locomotive they proved as complete a failure.

As previously stated, actual experience on locomotives has shown that certain coals or certain mixtures of coal will clinker. If we can find any simple method of determining by calculation from a true analysis, involving both proximate analysis of the coal and the ash analysis, whether a coal will or will not clinker, we have discovered something which should be of help, both to the coal dealer himself and the man who buys coal. It has been my experience that a great many coal salesmen fool themselves in regard to their own product.

Today, when a steam coal must stand on its merits with regard to contract based on B.t.u.'s, and ash and sulphur content, a coal salesman cannot know too much about the fuel he is trying to sell. A contract let through misrepresentation, or ignorance, works a greater hardship on the seller, eventually, than on the buyer, on account of the bad reputation given the coal, and those who sell it. Different coals are not all suited for the same purpose, a great deal depending on the drafting, grates and temperatures reached in the various combustion chambers.

Kinds of Clinker

There are two separate and distinct kinds of clinkers formed in locomotive operation. The hard clinker is formed largely by improper firing and the other, known as the molasses clinker, is formed by the fusing together, or slagging, of the coal ash. Improper firing can never be directly responsible for the formation of a molasses clinker, but will undoubtedly hasten its formation. The hard and the molasses clinker differ widely in chemical composition, as is shown by the following analyses:

	Hard Clinker	Molasses Clinker
Silica	56.50	35.04
Alumina	35.20	17.32
Ferric oxide	4.96	37.12
Lime	0.66	7.42
Magnesia	0.83	1.12
Potash	1.14	0.87
Soda	0.43	0.63
Sulphur	1.00	trace
Titanium dioxide	trace	0.50
Total	100.72	100.52

These clinkers differ more widely in their formation and action in the firebox than they do in chemical composition. The hard clinker gives the firebed, in the spot where it is formed, a dead appearance, which stays approximately the same size as when first formed. This clinker can be easily removed by simply pulling it out of the fire, or by turning it upside down or on its side when it is simply disintegrated by the action of the fire. The hard clinker has a tendency to stick together, and will not break when an attempt is made to remove it.

The molasses clinker is altogether a different proposition. When first formed its appearance in the firebox is similar to that of the hard variety, but instead of staying approximately the same size as when first noted, it will continue to grow larger in area. When it covers an area of approximately 4 sq.ft., small blue flames about 3 in. in length will be noticed coming up through it and also at the edges if examined when the engine is working or with the blower on. This clinker will continue to grow until the entire surface of the firebox is covered. Upon attempting to remove it, we find that it will be soft, as compared to the hard clinker, and as fast as the upper part or crust is taken off it will be noted that the semi-ash underneath has run together like thick molasses.

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[*] Fuel agent, Queen & Crescent Route, Lexington, Ky.

Note—Paper read at the mid-winter meeting of the Kentucky Mining Institute, Lexington, Ky., Dec. 8, 1913.

[†] Probably one of the latest discussions on this subject is that by F. R. Wadleigh, which appeared in "Coal Age," Vol. 1, p. 1207, and was supplemented with a discussion by Wm. B. Phillips on page 111 of Vol. 2, and A. Bement on page 218. Another article on the same subject will be found on page 862 of the same volume.—Editor.

Examination of the ash pan and fire grates is also surprising. The clinker is found to have run down between the grate fingers and where hardened, hangs from the grate bars in long strings like icicles. Upon attempting to shake the grate, we find this impossible, as the clinker has filled the spaces between the grate bars, and has solidified to such an extent as to prevent any chance for motion in the grate fingers. The only way a clinker of this character can be removed is to clean the entire firebox and build a new fire. Of course, in a case of this character, we have experienced a disastrous engine failure.

For anyone familiar with metallurgy or the principles thereof, it is evident that in the formation of a molasses clinker a metallurgical reaction of some kind has taken place. My attention was first called to the matter of calculating the slags in coal ash by an article in the *Colliery Engineer,* by E. B. Wilson, editor. In this article and a subsequent one, read before the Coal Mining Institute of America, Mr. Wilson advocated the use of Ballenger's Factors in connection with the metallurgical calculations which would be involved in figuring slags from the percentages of silica and the various oxides, as shown in the ash analysis of a coal. I applied these factors in some calculations connected with practical engine tests and found them to give excellent results.

DEFINITION OF A MONOSILICATE SLAG

There are more than likely three different kinds of silicate slags formed in the fusing together of coal ash at high temperatures. However, as we are certain of the formation of the monosilicate variety, I will use this slag as typical in the following discussion.

A monosilicate slag is one in which the ratio of the oxygen in the base is to the oxygen in the acid as one is to one. For the benefit of those unfamiliar with metallurgical terms and chemical formulas, the following is given as an illustration of a monosilicate slag, expressed as a chemical formula. The slag formed in this case, formula for which is shown on the right-hand side of the equation, is known as a calcium monosilicate:

$$\begin{array}{ccccc} \text{Lime} & & \text{Silica} & & \text{Calcium Monosilicate} \\ 2\,CaO & + & SiO_2 & = & 2\,CaO\ .\ SiO_2 \end{array}$$

It will be noted that because the silica contains two atoms of oxygen as written on the left-hand side of the equation, to make the ratio one to one, we must use two molecules of lime. Similarly we can write the silicate slags of magnesia, alumina, and ferric oxide, as follows:

$$\begin{array}{ccccc} \text{Magnesia} & & \text{Silica} & & \text{Magnesium Silicate} \\ 2\,MgO & + & SiO_2 & = & 2\,MgO\ .\ SiO_2 \end{array}$$

$$\begin{array}{ccccc} \text{Alumina} & & \text{Silica} & & \text{Aluminum Silicate} \\ 2\,Al_2O_3 & + & 3\,SiO_2 & = & 2\,Al_2O_3\ .\ 3\,SiO_2 \end{array}$$

$$\begin{array}{ccccc} \text{Ferric Oxide} & & \text{Silica} & & \text{Iron Silicate} \\ 2\,Fe_2O_3 & + & 3\,SiO_2 & = & 2\,Fe_2O_3\ .\ 3\,SiO_2 \end{array}$$

The molecular weights and the symbols of the various atoms involved in the following calculations may be readily obtained from any international table of atomic weights. The ones given below are only those which will be used in the subsequent calculations: Oxygen = O = 16; magnesium = Mg = 24.36; iron = Fe = 55.9; alumina = Al = 27.1; calcium = Ca = 40.1; silicon = Si = 28.4.

Referring back to the equation showing a calcium monosilicate and substituting the atomic weights, we have the following:

$$2\,CaO + SiO_2 = 2\,CaO\ .\ SiO_2$$

$$112.2 + 60.4 = 172.6$$

From this equation it is readily seen that it requires $\frac{60.4}{112.2} = 0.543$ parts of silica to combine with one part of lime to form a calcium monosilicate slag. The decimal fraction 0.543 is termed Ballenger's factor for a lime silicate. Ballenger's factor for magnesium, iron and aluminum silicates is determined as follows:

Ballenger's Factor

For a Magnesium Silicate:

$$\left\{\begin{array}{llll} 2\,MgO & + SiO_2 & = & 2\,MgO.SiO_2 \\ 80.72 & 60.4 & & 141.12 \end{array}\right. \qquad \frac{60.4}{80.72} = 0.747$$

For an Aluminum Silicate:

$$\left\{\begin{array}{llll} 2\,Al_2O_3 & + 3\,SiO_2 & = & 2\,Al_2O_3.3\,SiO_2 \\ 204.4 & 181.2 & & 385.6 \end{array}\right. \qquad \frac{181.2}{204.4} = 0.886$$

For an Iron Silicate (Ferric)

$$\left\{\begin{array}{llll} 2\,Fe_2O_3 & + 3\,SiO_2 & = & 2\,Fe_2O_3.3\,SiO_2 \\ 319.6 & 181.2 & & 500.8 \end{array}\right. \qquad \frac{181.2}{319.6} = 0.567$$

Ballenger's factors for the principal oxides found in the coal ash are then as follows:

$$MgO = 0.747$$
$$Al_2O_3 = 0.886$$
$$CaO = 0.543$$
$$Fe_2O_3 = 0.567$$

The following is a proximate analysis of the various sections of the No. 4 Blocton coal, in the Blocton field of Alabama; also analysis of the ash:

	No. 1 Bottom Coal	No. 2 Fire Clay	No. 3 Middle-man	No. 4 Top Coal	No. 5 Rash
Moisture	2.00	0.83	0.91	1.33	1.35
Volatile combustible	36.03	7.07	24.36	34.71	17.12
Fixed carbon	58.52	0.72	55.98	57.16	25.98
Ash	3.45	91.38	18.75	6.80	55.55
Total	100.00	100.00	100.00	100.00	100.00
Sulphur	0.76	None	0.23	0.40	0.27
B.t.u.'s	14,150	None	12,405	13,840	Not possible to ignite on six attempts.
Ash Analysis					
Silica	11.34	52.32	28.00	20.40	60.42
Ferric oxide	31.84	5.44	12.64	14.80	3.20
Alumina	13.40	24.20	7.82	11.26	30.24
Lime	16.54	0.50	26.90	26.66	0.72
Magnesia	6.99	1.80	6.93	4.60	0.63
Titanium Dioxide	0.36	0.80	trace	0.64	1.10
Sulphur Trioxide	17.82		2.26	7.97	trace
Potash	0.54	4.22	0.34	0.36	0.80
Soda	0.48	0.35	0.51	0.35	1.36
Ignition		8.91	15.96	13.12	1.30
Carbonate		trace	much	present	none
Moisture		0.83			
Total	99.04	99.37	101.36	100.16	99.77
Fusibility in blast lamp	Fusible	Fusible	Fusible	Fusible	Infusible

This coal was used as a locomotive fuel on the Alabama Great Southern Railroad for a period of two and one-half years, although during its successful performance the fireclay parting was not, to any extent, noticeable in the seam mined during that time. The rash practically amounted to nothing. Upon renewal of the contract with the company mining this coal, and after same had run for a period of about six months, we began to have a great deal of difficulty with clinkered fires. The trouble was traced to the coal, analyses given above, and further shipments refused. An ordinary examination of the coal on the coal chutes, and in cars, did not show any unusual percentage of incombustibles. Closer examination, however, did show some little fireclay and rash in the product. The owner decided to have this coal washed, and a car was sent to a plant and the entire contents treated. I personally supervised a test of this washed coal on one of our manifest freight trains, with the following result:

A Test of the Blocton Coal

Left Birmingham Dec. 2, 1912, as first section train 77, south, engine 216, with 1360 net tons freight, 30 loads and 1 empty; maximum grade encountered for any distance, 1 per cent.; coal washed and screened over a three-quarter inch screen. A peculiar thing was noted during this test in that no matter how the coal was fired it was impossible to make any black smoke. Of course, black smoke is not desirable at any time, but the fact remains that with the majority of coals, having from 25 to 35 per cent. volatile matter, smoke is easier made than eliminated.

After the engine had been run about 30 miles, it was noticed that there was a slight dropping back in steam pressure, although several times while the engine was in side track at meeting points, the boiler popped off. On a grade known locally as Tuscaloosa Hill, about 55 miles from Birmingham, the steam dropped back to 135 lb., and it was just possible for the engine to pull the train to the top of the hill and roll over into Tuscaloosa. We had a meeting point at Moundville, 15 miles south of Tuscaloosa, and after being in the side track at this point for about 15 min., steam pressure dropped back to 45 pounds.

The first clinker of any size was noted about 40 miles south of Birmingham; it was small and of the molasses variety. The clinker grew rapidly in area, and when the test train reached Tuscaloosa, it covered the entire area of the firebox. During the entire test the slice bar was not used once, and the engine was fired by the most uptodate methods.

At Moundville an attempt was made to clean fire. It was soon discovered that as fast as the clinker was removed, what remained in the firebox ran together again, and it was necessary to knock the fire. The crust of this clinker was approximately 12 in. in thickness. It had been impossible to shake the grates for some time and upon examination of the grates and firebox, we found both completely filled with clinker. A microscopical examination of the coal showed that some of it was impregnated with small partings of fireclay and rash; it was also found in the sample of coal that there was a small percentage of both of these present.

Determining the Trouble

Referring to the analyses of both the coal and the ash, it will be found that as far as the bases are concerned, we may eliminate practically all of them, except those for which we have already determined Ballenger's factors. The sulphur is reported as sulphur trioxide, and it is probable that some part of it will combine with part of the lime, forming calcium sulphate ($CaSO_4$). Assuming that 10 per cent. of the SO_3 combines with the lime, we would have available percentages of lime, as follows:

	No. 1 Bottom Coal	No. 2 Fire Clay	No. 3 Middle-man	No. 4 Top Coal	No. 5 Rash
Lime.....	14.89	0.45	24.21	24.40	0.65

As sulphur trioxide is an unstable compound, the chances are that a large part of it will go off in the ordinary process of combustion. As we have also present some little carbonate and potash, part of the SO_3 may combine with the carbonate and potash, forming sodium sulphate, and potassium sulphate.

Taking the factor for ferric oxide, 0.567, and multiplying it by 11.34, or the percentage of ferric oxide present in the bottom coal, we have:

Fe_2O_3 0.567 × 31.84 = 18.05% of silica needed to unite with 31.84% FeO

Similarly,

$$\begin{array}{rl} CaO\ 0.543 \times 14.89 = 8.08\% & \text{of silica needed to unite with } 14.89\%\ CaO \\ Al_2O_3\ 0.886 \times 13.40 = 11.87\% & \text{of silica needed to unite with } 13.40\%\ AlO \\ MgO\ 0.747 \times 6.99 = 5.22\% & \text{of silica needed to unite with } 6.99\%\ MgO \\ \hline 42.22 \qquad 42.22\% & \text{of silica needed to unite with bases present.} \\ 11.34\% & \text{of silica present in bottom coal.} \\ \hline 30.88\% & \text{of silica needed.} \end{array}$$

Performing similar calculations for the fireclay:

$$\begin{array}{rl} Fe_2O_3\ 0.567 \times 5.44 = 3.08\% & \\ CaO\ 0.543 \times 0.50 = 0.27\% & \\ Al_2O_3\ 0.886 \times 24.20 = 21.33\% & \\ MgO\ 0.747 \times 1.80 = 1.34\% & \\ \hline 26.02\% & \text{of silica needed to unite with bases present.} \\ 52.32\% & \text{of silica present in fire clay.} \\ \hline 26.30\% & \text{of silica in excess of bases.} \end{array}$$

For middleman:

$$\begin{array}{rl} Fe_2O_3\ 0.567 \times 12.64 = 7.16\% & \\ CaO\ 0.543 \times 24.21 = 13.15\% & \\ Al_2O_3\ 0.886 \times 3.82 = 6.92\% & \\ MgO\ 0.747 \times 6.93 = 5.18\% & \\ \hline 32.41\% & \text{of silica needed to unite with bases present.} \\ 28.00\% & \text{of silica present in middleman.} \\ \hline 4.41\% & \text{of silica needed.} \end{array}$$

For top coal:

$$\begin{array}{rl} Fe_2O_3\ 0.567 \times 14.80 = 8.39\% & \\ CaO\ 0.543 \times 24.40 = 13.24\% & \\ Al_2O_3\ 0.886 \times 11.26 = 9.97\% & \\ MgO\ 0.747 \times 4.60 = 3.43\% & \\ \hline 35.03\% & \text{of silica needed to unite with bases present.} \\ 20.40\% & \text{of silica present.} \\ \hline 14.63\% & \text{of silica needed.} \end{array}$$

For rash:

$$\begin{array}{rl} Fe_2O_3\ 0.567 \times 3.20 = 1.81\% & \\ CaO\ 0.543 \times 0.65 = 0.35\% & \\ Al_2O_3\ 0.886 \times 30.24 = 26.79\% & \\ MgO\ 0.747 \times 0.63 = 0.47\% & \\ \hline 29.72\% & \text{of silica needed to unite with bases present.} \\ 60.42\% & \text{of silica present in rash.} \\ \hline 30.70\% & \text{of silica in excess of bases.} \end{array}$$

By referring to the above calculations, it will be found there is an excessive amount of bases in all but the fireclay and rash, each of which shows silica to be largely in excess, and which would combine with the excess of bases in the bottom coal, middleman and top coal. The chemist also notes that in the analysis of the ash with a simple laboratory blast lamp, all but the rash were fusible.

A summation of the percentages of silica needed to convert all the basic oxides present in the top coal, middleman and bottom coal to a monosilicate slag gives us 49.92 per cent. Likewise we find a total of 57.18 per cent. of silica in excess of that required to convert the basic oxides in the fireclay and rash. Subtracting, we find we have 7.08 per cent. silica in excess of what is needed. This amount of silica in excess need not be considered as it would be removed in the preparation of the coal by washing.

I desire to state here that while this coal did not give satisfaction on locomotives that it did give excellent results as a power-house fuel, the reason, no doubt, being that the temperature reached in the power-house boiler, where it is now being used, is not near as high as that attained under maximum working conditions on a locomotive.

POWER DEPARTMENT

Electricity vs. Steam for Winches

By W. H. Easton

SYNOPSIS—Exact comparative data of steam and electric donkey engines or winches are difficult to secure. This article describes the results obtained by removing the piston rods and gearing a motor to the crank disk of an engine used for transferring coal from barges to a delivery bin.

⁂

One of the difficulties in proving the economy of electric power for donkey engines, winches and similar applications is due to the fact that it is seldom possible to get data on exactly parallel cases. To compare the cost of operation of a given steam hoist with that of a different, although perhaps nearly similar, electric hoist is not satisfactory, and as a matter of fact, both sides of the question have been proved from data of this kind.

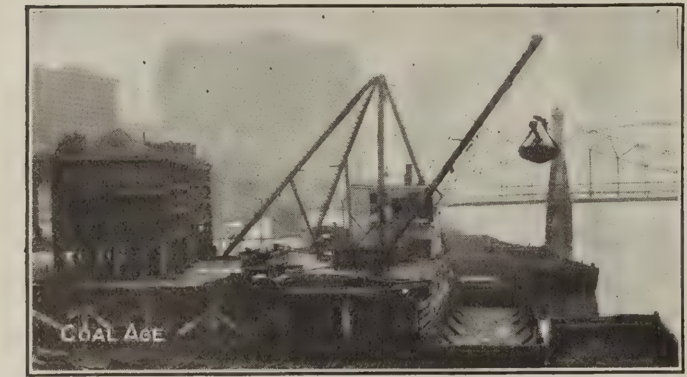


Fig. 1. General View of the Coal-Handling Plant

It is, therefore, gratifying to find a perfectly clear-cut case, where a motor has been directly substituted for a steam engine with no other change in the factors, and where the performance and the cost under both systems are easily obtainable. Such a hoist is shown in Fig. 1. As the illustration clearly shows, this device is used for taking coal from barges and loading it into a bin from which delivery wagons are supplied.

Fig. 2 shows the hoist with the old steam boiler and the new motor. The only change in the hoist was to remove the piston rods and bolt a ring gear to the crank disk, as the illustration shows. A pinion on the motor shaft meshes with this gear, so that the motor application is simple and was made without interfering with the daily operation of the hoist.

The Size and Amount of Work Done

The vertical distance from the top of the barge to the bin is 65 ft. The radius of the swing is 110 ft. and the average length of the swing is 70 ft. The weight of the bucket is 3800 lb. and its capacity is 42 bu., or 3192 lb. The average amount of coal lifted per month is 203,219 bu., or 7722 tons. The motor is a Westinghouse high-torque slip-ring induction machine of 75 hp. capacity. Central station power is used.

The cost to transfer 7722 tons with steam operation was, for coal $60, and for water $15. With electric operation, the cost for power is 1c. a ton, so that the cost for the transferring of the same tonnage would be $77.22, practically the same figure. Hence, electric power is certainly not prohibitively expensive.

Other items must, however, be considered as well as the cost. For the steam engine a licensed engineer is required, whose wages are $125 a month, but a man can be obtained to operate the electric hoist with perfect satisfaction for $75 a month.

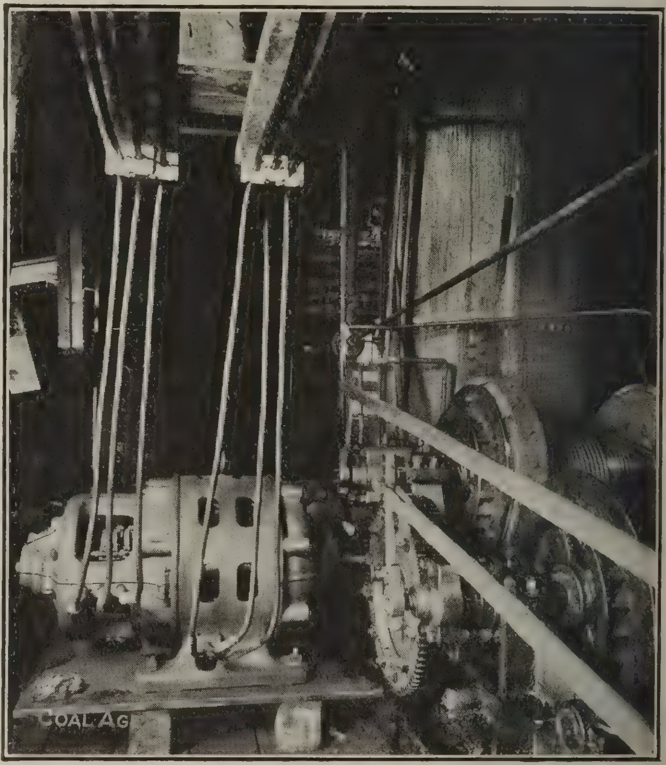


Fig. 2. The Motor Is Geared Direct to the Crank Disk

Furthermore, the steam hoist required 60 sec. to make each trip, whereas the electric hoist, because it can be accelerated more rapidly, can make a trip in 50 sec.—a 20 per cent. increase in production. Hence, for a full 10-hr. day, the electric hoist can make 120 more trips than the steam hoist and can transfer 5040 more bushels of coal.

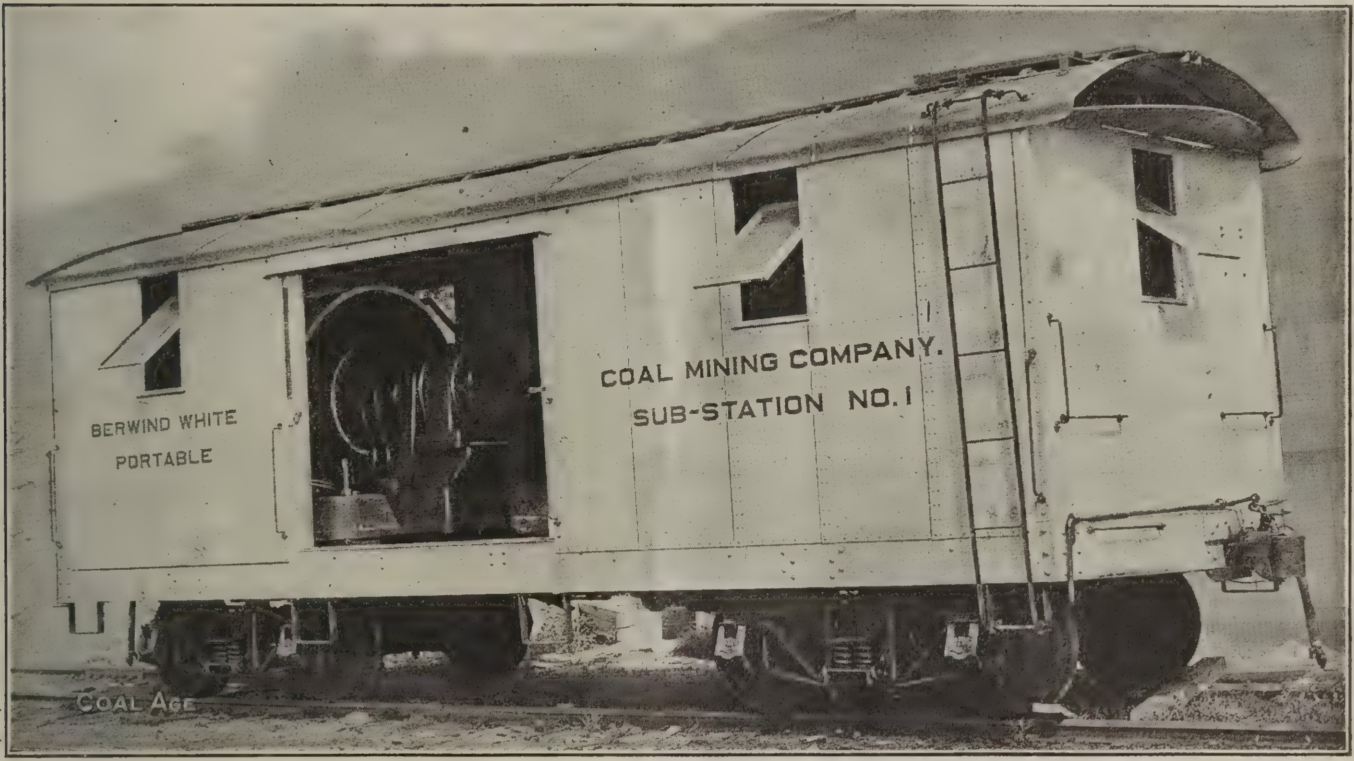
The motor is more reliable than the engine, requires little oil and no water, is always ready to operate without waiting for steam to come up to pressure, requires no attention when not in use, and has nothing to freeze up. Hence with the electric hoist the cost of repairs and maintenance will be less and there will be fewer delays and shut-downs. The relative cost of electric operation will, therefore, be less and the production greater than the figures given above.

A Portable Substation

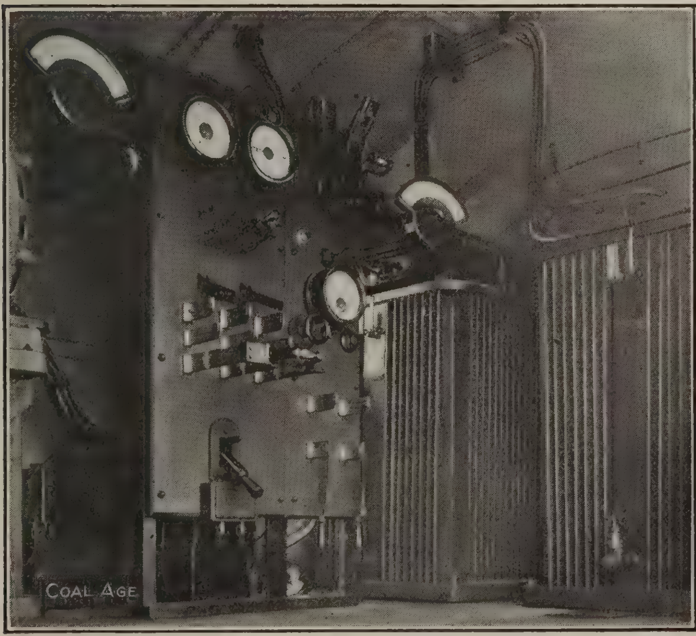
The Berwind-White Coal Mining Co., of Windber, Penn., has recently added a 400-kw. Westinghouse portable substation to its equipment, and is making an interesting use of the same.

As is well known, a substation consists of apparatus for changing alternating current into direct current and is generally necessary in mining work, because direct current must be used for haulage but cannot be transmitted economically over long distances. Hence, when the mine is located at a point remote from the power station, from which it draws its supply, the electric energy can be transmitted efficiently only as alternating current at high voltage, and then converted into direct current at the substation for use underground.

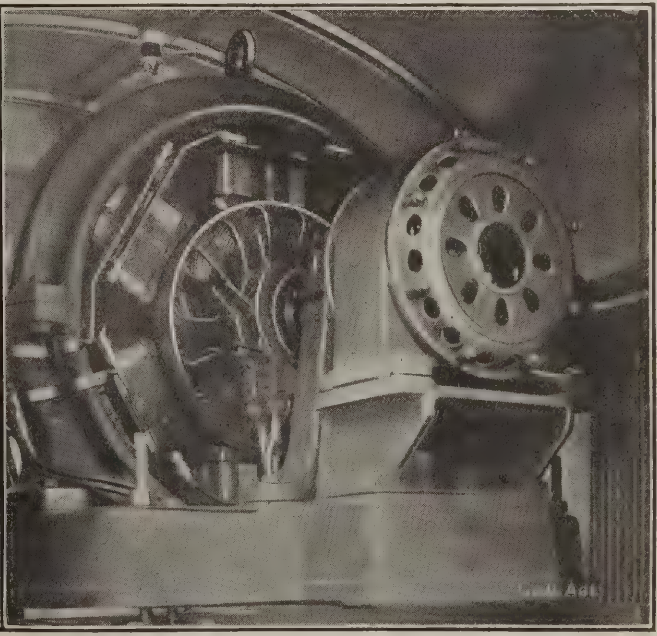
The Berwind-White Co. is developing its outlying properties at a rapid rate and needs direct current at points where permanent substations have not yet been erected. The portable substation was therefore decided upon in order to prevent delays in development. This substation has the same equipment as that of a permanent installation, namely, transformers to step down to a moderate voltage the high potential of the current received from the transmission line, a switchboard and a rotary converter, which receives alternating current and delivers



The Portable Substation on a Sidetrack



The Transformers and Switchboard



The Rotary Converter

direct current. This apparatus is all mounted in a car resembling an ordinary freight car.

The Portable Substation in Use

When work at a new development reaches the point where direct current is necessary, the portable substation is hauled to the workings, connected to the transmission line and put in operation generating the necessary direct current. When the permanent substation is completed, the portable one becomes unecessary and is taken to the next development.

A further use for this substation is to provide insurance against shutdowns. If accidents occur at any of the permanent substations, the portable one is sent to carry the load until the necessary repairs are completed. One substation of this character, therefore, is practically the equivalent of a duplicate set of apparatus at each permanent installation.

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Use of Gasoline Motors in Mines

By W. C. Whitcomb*

SYNOPSIS—An elementary article on the gasoline motor, showing how to compute the size of the locomotive, the weight of the rail and the velocity of the air current in which it should work. The author says that some expert inspection should be provided and urges that gasoline haulage is not unsafe if proper precautions are taken.

⁂

It must be some 12 or more years ago that the St. Bernard Mining Co. tried out a gasoline motor built by a man named Prouty. This machine was crude and was not a success. Other attempts to produce a workable locomotive were made in West Virginia, Pennsylvania and Illinois; none of which were permanently successful.

There is nothing mysterious or uncertain in regard to the use of gasoline motors in mines. The problems to be considered are the same as those presented by any mechanical system of haulage which depends on the tractive resistance of the rail for its hauling capacity. First: The local conditions should be thoroughly studied and profiles should be made of the haulage ways, showing grades, etc. The number of tons to be handled per day and hour should be carefully ascertained, the length of haul measured, the time required to make a return trip carefully estimated and from these data the number of cars it is necessary to handle per trip can be decided. Then we can ascertain the total weight of trip, figuring in the weight of both car and load and check the profiles to see what the grades are both in favor of and against the loads and empty trip. Then we decide on a motor with enough weight and power to handle the trip against the grades with a liberal margin of reserve.

Car Friction and Gravity Resistance

Ordinary mine cars will require from 30 to 40 lb. pull per ton to move them on a level track. The horizontal tractive resistance of modern cars in good condition may drop down as low as 20 lb. per ton, but it is not safe to figure much less than 30 to 35 lb. per ton on the level. For each 1 per cent. grade against the load, 20 lb. per ton must be added. For example, if a car will move on 30 lb. per ton pull on a level, it will require 30 + 20 or 50 lb. pull against a 1 per cent. grade, or 30 + 20 + 20 or 70 lb. pull against a 2 per cent. grade.

I mention these points, as an operator is apt to say his hauls are "practically level" when he may have places with 1 or 2 per cent. grades against the loads and cannot see why his motor is not giving the results unless he has his profile and knows what he is doing.

Again, when working against grades, the pull required to move or pull the cars not only increases, but the draw-bar pull of the locomotive is less as the motor has to pull its own weight up the grades.

Draw-Bar Pull Calculated as One-Fifth Weight of Motor

I ordinarily figure that a motor will exert a draw-bar pull equal to one-fifth its weight in pounds when working on a level and on dry rail of proper weight for the motor, but from this draw-bar pull exerted on a level we deduct 1 per cent. of the weight of the motor in pounds for each 1 per cent. grade. For example, a 5-ton motor will exert a tractive effort, or draw-bar pull, on the level of one-fifth of 10,000 lb., or 2000 lb. Against a 1 per cent. grade, we would have 2000 lb. less 1 per cent. of 10,000 lb., or 2000 less 100 lb., or 1900 lb., net; or 1800 lb., net, against a 2 per cent. grade, etc. We must not assume that the hauls are "practically level," but know what the grades are and make allowance for them.

Each Rail Should Weigh 4 Lb. per Yard for Every Ton of Weight of the Locomotive

Without the use of a formula, we roughly estimate that it requires a rail that will weigh at least 4 lb. per yard for each ton of weight in the locomotive. For example, a 4-ton motor should run on a 16-lb. rail; a 5-ton on a 20-lb. rail, etc. This rail should be well laid and connected with fishplates. Low spots should be avoided. Switches should have long, easy points; curves should be as easy as possible, for the shocks and strains on a track increase about with the square of the velocity, and with mechanical haulage you not only get greater weights but higher speeds. Therefore, what might be a good track for mules is a poor track for locomotives.

These points are common to all mechanical haulage. I raise them as there is some tendency among operators to think that because a gasoline motor is a self-contained and independent unit, it is not necessary to make as much preparation for putting it in operation as with other systems of mechanical haulage, and to a certain degree, they are right, as it is not necessary to bond the rails or to line up the trolley wires with the track, etc., but good track conditions are essential to success with any system of mechanical haulage.

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*General manager, Geo. D. Whitcomb Co., Rochelle, Ill.

Note—Article read before the Kentucky Mining Institute, Lexington, Ky., Dec. 8, 1913.

The Effect of the Gasoline Motor on the Mine Air

Much has been said about their effect on the mine ventilation and the danger of using gasoline motors. The former difficulty is easily removed. A gasoline engine will exhaust a small quantity of gas and of this discharge the most important impurity is carbon monoxide, as it is a dangerous gas, and a very small percentage in the air is injurious to the men in the mine. With an engine working properly there is little monoxide formed. The amount will vary with the quantity of gasoline consumed. There is no satisfactory or practical way of absorbing or neutralizing carbon monoxide. Carbon dioxide can be absorbed to a certain extent by lime or caustic-soda solutions and by plain water, and the objectionable odor can be taken out of the exhaust by running it through a lime solution or through water, but the only satisfactory way to make conditions safe and pleasant is to supply enough air to dilute the exhaust until it is harmless. This is not a difficult matter and in any mine with uptodate ventilation, it is already provided to a large extent by the requirements of the law, as the statutes call for a certain amount of air for each man and animal in the mine, and this volume in workings large enough to use a motor will so thoroughly dilute the gas that it will be below the danger point and so low that it cannot be detected by chemical analysis, but if more air is required, it can easily be forced through the entries.

As before stated, the percentage of exhaust gas will vary with the gasoline consumed. Therefore, you can figure on the amount of air necessary by taking the average gasoline consumption, or you can figure the maximum amount of gasoline that can be burned in the engine used on a motor. I normally figure on an engine of at least double the average horsepower used, for in starting a trip there is a heavy load and occasionally heavy grades are encountered. But where there are grades there is a heavy pull when traveling in one direction and practically none when passing over the road on the return trip; therefore, grades do not increase the average consumption to any large extent, but they do add to the quantity of fuel used for a short time.

800 to 1000 Cu.Ft. per Ton per Min.

We have found that when the consumption of gasoline is at its average, if there is from 800 to 1000 cu.ft. of air per minute per ton of weight in the motor passing through the entry where the motor is working continuously, the exhaust is not noticed and is unobjectionable. The smaller ventilating current recommended is suited for the intake and the larger for the return airway. If a motor only makes an occasional trip into an entry or working place, a small air current is sufficient, just enough to insure circulation and carry the exhaust out before the next trip of the motor, so that the exhaust will not accumulate. If you figure on the maximum gasoline consumption possible in the engine it would require about double these amounts, but as before stated, it is almost impossible to use the maximum under ordinary conditions.

For example, on our 7-ton motor, we have an engine capable of developing 50 hp. when running 500 r.p.m. On a brake test, this engine would probably burn about a pint of gasoline per horsepower per hour, that is, 50 pints or 6¼ gal. per hour. At this rate, this engine would burn 50 gal. of gasoline in an 8-hr. day, while the facts of the case are that the average gasoline consumption of this motor will run from 15 to 18 gal., showing that the average horsepower developed is from 15 to 18 hp.

The large engines, however, are more economical than smaller engines as they permit the work to be done on high gear and at slow engine speeds. You have all seen, no doubt, the same results in your automobiles. If you are running on direct drive, your gasoline consumption is low but if you get in mud and have to shift into second or third gear, your engine is running fast and the gasoline consumption increases.

Why Estimates Should Not Be Based on Full Power

I mention this point of gasoline consumption as there is a tendency to figure on what gas might be thrown off if the full power of the engine was used all the time rather than on the actual amount. It would hardly be possible to use the full power of the engine all the time, for if grades, etc., required it in one direction, there would be little or no power required in the opposite direction. For example, take a 4000-ft. haul with a heavy grade against the load all the way. To come up this inclination under normal speed would require say, 10 to 12 min. under three-fourths full power. To switch, hook onto empties, etc., would take 1 to 2 min.; to come back with the empties, 10 min.; to switch and couple to loads, 1 to 2 min. Therefore, we would have, say a total of 22 to 26 min., with 12 min. under, say ¾ full load, 3 to 4 min. under little or no load and 10 min. on return trip under ¼ load, so that even under such conditions the average would be less than ½ load.

Experience Needed for Locomotive Operation

There has been a tendency to consider gasoline motors unreliable. This has been to a certain extent true in the past, but with the present development, there is little excuse for not getting as good and consistent results with gasoline motors as with any other system. However, a gasoline motor will not run itself nor can it be put into the hands of an inexperienced man and be run indefinitely without care or attention.

Gasoline-driven machines have received a great deal of unjust criticism and blame due to the fact that they can be placed in the hands of an inexperienced man after a few hours' instruction and he can operate them. We see automobiles, auto-trucks, etc., not to mention gasoline mine motors, operated by men who know but little about the mechanical construction of these machines or their requirements. They know how to charge them with gasoline, how to oil them and how to turn the crank to start them, but nothing further. This is all right if there is someone back of them to examine the locomotives occasionally and to see that they are kept in order. But very often, especially with mine motors, because they are self-contained and independent, such a man is left to run and care for the machine and while often he is willing and anxious enough to give satisfaction, yet due to his lack of experience he is unable to do himself or the machine justice.

If an electric plant is installed, it requires an engineer, an electrician and a wireman, all in addition to the motorman. A compressed-air plant needs an engineer and a pipeman, as well as a compressed-air locomotive engineer. Hence why should not provision be made for the inspection and care of gasoline motors by someone other than the motorman? Inspection is not required every day but the old adage, "a stitch in time saves nine," applies to gasoline motors. They will probably run for months demanding little or no attention other than to put in gasoline, oil and water and tighten up a bolt or nut occasionally, but they will sooner or later require attention. The same is true of a boiler, engine, generator, compressor or any other machine performing a large amount of work, such as a gasoline locomotive does, but the conditions under which the latter works are more adverse. Where systematic care and attention are given, gasoline haulage is just as reliable as any other system.

Safety from Explosion

Many operators fear to use gasoline in mines. This fear is well founded unless proper precautions are taken. We have so designed our motors that the tanks cannot be filled when on the locomotive, yet can be sealed or closed when off the motor. Handles are provided for carrying the tanks and the weight of a tank, is such that one man can carry it. Four tanks are furnished, two to be carried on the machine and two to be sent outside the mine.

Either tank can be used separately for running the engine, so that the operator can use up one tank, switch over to the other, send the empty tank up and have a full one come down, which he could pick up on the next trip, and always have a reserve tank on the machine and two reserve tanks on the surface. These tanks should be filled at an oil station away from the shaft or tipple, so that the gasoline is handled around the tipple and below ground in sealed tanks exclusively.

They are so placed on the motor that they are protected on all sides by heavy iron covers. By this system, danger is eliminated. Between each tank and the engine are two shut-off valves so that in case of an accident, the gasoline can be shut off at two different points for each tank. This system has worked out very satisfactorily, and although there are over three hundred of our motors in use, we have not had any trouble from this source.

Ignition of Gas or Coal Dust

So far as igniting gas or coal dust, I think there is no question but what gasoline motors are much safer than electric motors as the exhaust from a gasoline motor passes through a large muffler or cooling box and is finally discharged near the ground while the electric motor is apt to give off sparks or electric flames either at the track or at the trolley wire near the roof where gas would accumulate.

Gasoline motors have only been used in mines in a practical way during the last four years. Great improvements have been made and more will naturally follow, but today, with equal conditions and care, the gasoline motor will undoubtedly give as cheap, if not cheaper results with less cost of installation than any other system and is the most flexible haulage which can be installed, as all that is required in making extensions is to put the track in shape. When not in use the gasoline motor can be put on one side in a dry motor stall and will not require care or feed and when ready to start it is not necessary to see that boiler, engine, trolley wires, rail bonds, pipe lines, etc., are also ready. The gasoline motor has taken its place in mine haulage and as it is better understood it will be more appreciated.

The Storage of Anthracite Coal

The storage of anthracite coal is a subject of which the public knows little and indeed on which accurate information is not easily obtainable. The fact that storage is a source of considerable expense to the operating companies is also a matter of which most persons are entirely ignorant. An authority on the subject estimates the amount that may be in storage at one time at about 10 per cent. of a year's marketable production, or say 7,000,000 tons, at tidewater and interior points. At the present time coal in storage is about at the maximum.

One coal company has storage facilities with a capacity of 2,000,000 tons. At one of its plants provision is made for 480,000 tons, at another for 383,000 tons. More than 125,000 tons can be stored at a covered plant in South Chicago. The Schuylkill Haven yard of the Philadelphia & Reading Coal & Iron Co., has a capacity of 1,000,000 tons, and that at Abrams a capacity of 600,000 tons. This stored coal must be hoisted, when needed, out of the Mahanoy Valley over Broad Mountain. The pair of hoisting engines installed for this purpose could hoist three "battleships" and will develop 5000 hp. while doing it.

The expense in storage involves not only the cost of handling the coal several times, but the loss that results from breakage, which is the chief care of the employees in charge of this branch of the anthracite-coal business. There is also a considerable investment in hoisting machinery. In addition, the huge conical piles of coal are subject to freezing, and when they get in that condition the only way the coal can be handled is to break it up by pick and shovel gangs, which is not only expensive work, but damages a good deal of coal.—*Philadelphia News Bureau.*

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Copying Old Blueprints

A writer in the *American Machinist* has the following to say regarding a method for rehabilitating old blueprints:

> There is often trouble, in drawing offices, in having some old blueprint record creased and hardly decipherable. To work from it is not advisable for it might become torn and made even more indistinct than it is at present. The draftsman cannot trace it because the lines are too indistinct to look at through the tracing cloth and redrawing it would be a rather costly item.
>
> I had an instance of this recently where an individual brought me an ancient blueprint, the only record, and desired me to duplicate it. After a little experimenting with another blueprint, I found that if the white lines on the print were inked over, a very presentable blueprint could be obtained from exposing this as one would a tracing. So I went ahead and inked over the white lines on the old blueprint with india ink. This, as you can imagine, was very much easier than tracing it. When this was finished, I placed the print in the printing frame and obtained several blueprints from it as if from a tracing.

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Erratum

In Fig. 5, on p. 851, of our Dec. 6 issue, to the left of the figure, the words occur: "A grounded armature is found, lamps out." This should read: "A grounded armature is found, lamps light."

⁂

A fireboss who was going up over a roll, and who had tested the face of a crosscut with his safety lamp, called down to the workmen waiting below with naked lights: "There's a bit of gas here, so don't youse all come up; only one of youse come up here with a light."

EDITORIALS

The Source of Public Scientific Conceptions

In the earlier days of the rescue apparatus, the question was often raised whether breathing pure oxygen was not dangerous to life. The prevalence of this idea in official and other quarters led Prof. Gustav Gärtner, as he tells us in the "Dräeger Hefte," to investigate its authority.

Extensive search in scientific textbooks failed to elicit such an opinion, barring the fact that oxygen was shown to be dangerous if it exceeded the pressure of two atmospheres. At least Prof. Gärtner heard the same opinion advanced by his young nephew and demanded the source of his information. "I have read it in a romance of Jules Verne," answered the boy. "Twenty Thousand Leagues under the Sea" was the lad's authority, and also, as investigation showed, this same book had created in him many other notions.

Verne represents that oxygen breathing intensifies, but shortens life like the burning of a candle. It is the same scientific treatise which, if distant recollections may be trusted, represents that a submarine boat can be run on current generated in Bunsen batteries. Few, doubtless, of the many who have read this and other works by the same writer have ever doubted the accuracy of the information contained therein. Many popular ideas have originated in just such an unreliable manner.

A Discrepancy in Coke Statistics

For a great many years the statistics of Connellsville coke, compiled weekly by the *Connellsville Courier*, have been accepted in the coke and iron trades as worthy of serious consideration. Reflecting on Disraeli's remarks regarding the three kinds of inveracity, of which statistics is one, we are disposed to apply such checks as may appear likely to disclose possible irregularities.

The *Courier* presents weekly two sets of figures, one of coke production in the Connellsville and lower Connellsville regions, and the other of shipments from those regions. Normally the divergences between the two are slight, as certainly they should be, for it is quite unusual to stock coke at the ovens. The extra handling is expensive and damages the coke to such an extent that buyers usually object to receiving stock coke except in emergencies. As a rule, too, it is unecessary, for the production of an oven can be regulated to a certain extent by varying the number of charges in the week.

Observing a tendency in the past few months for the reported shipments to outrun the production, we took pains to add up the respective figures as reported since July 1 to date, in the 24 weekly reports, and find that the shipments exceed the production by more than 65 thousand tons. Assuming that the statistics are precisely accurate, and that the region is entirely bare of stocks now, it is apparent that there must have been some 65,000 tons in stock on July 1. At that very time, however, it was claimed that the operators were being careful not to accumulate stocks, but rather to restrict production to the absolute limit of demand.

"What It Is—What It Does

The words above are quoted from a caption in the reply of the United Mine Workers of America to the statement of the coal operators of Colorado. We shall not copy here all the good works accredited to union activity but note only two of those presented. The circular states that: "The union has made life safer in the mines so that the death rate in unorganized workings is three times greater than in those where the union is recognized. It has been the greatest power in the country in preventing strikes in the coal mines. Wyoming, for instance, has had no strike since it became organized. The coal miners and operators deal with each other in peace and harmony."

We have always been advocates of the right of the miner to form a union and have never been blind to the advantages which might accrue to operators, miners and the public from such an organization, and we are glad to see that the union is boasting that such results have been already accomplished. The statement quoted shows that the leaders in that movement believe that the union *should* secure safety and promote industrial peace.

Of course, the organization should do even more, it should guarantee excellence of work and efficiency and it should lead in promoting domestic comfort and high ideals of citizenship among its members. But after reading the quotation above, we cannot refrain from congratulating the union on having a clear comprehension of a part, if only a part, of its duty to the men, the operators and the nation.

But we can only write these words of commendation by being utterly blind to the wilfulness with which the United Mine Workers of America have misrepresented the real facts while they rightly define their proper mission which they have left unfulfilled.

There are so many states in which the union is weak in some parts and strong in others that a comparison based on an estimate of states as a whole would give unreliable results and it would besides overlook the inherent dangers of mining in various localities, thus defeating any attempt to draw a correct inference from statistics.

But we are certainly safe when we make the declaration that the United Mine Workers of America have opposed themselves to the safe conduct of mines. The organization has, it is true, aided in passing laws involving expense and trouble to the operator, but on the other hand it has repeatedly sought legislation which permitted the shooting of coal from the solid and only in nonunion states are convictions obtained against miners for violation of the laws of safety. Its strong opposition to all attempts to discharge violators of safety rules has led to repeated accidents. In fact, the union, like other *ex-parte* bodies, works for the reform of the other fellow and labors equally hard to maintain such evils as make it popular with its supporters. It has been equally active in the seeking and the nullifying of legislation; so perhaps its virtues and failings on the whole counter-balance.

As for promoting industrial peace, it has never done this. Its existence involves a strike or a suspension every year or so when the schedules are rearranged. We consider it, therefore, rather a guarantee of industrial war than as a pledge of peace. But if it would only keep its agreements in between these periods of rearrangement, it might claim to prevent some minor labor troubles but unfortunately its contracts are not kept. The Anthracite Conciliation Board, after noting some two or three hundred strikes in the anthracite region made by union men to obtain privileges which their contract did not give them, instructed one operator to discharge three of his labor leaders. The operators of central Pennsylvania in a meeting called at Philadelphia for that special purpose, have served notice on the miners that they will withdraw their recognition from the union, if that body does not cease its unwarranted strikes to obtain ends other than those provided by the contract, which both parties have signed. These two facts will show how little is to be gained by agreements with the union as now constituted.

It is said that a standing army insures peace, but most of the warriors of the United Mine Workers of America are only paid by that organization in times of war or disagreement and when everybody is working peacefully the occupation of the pit committee is gone. So this body seeks an occasion for a quarrel and sedulously endeavors to make a *new* contract as the operator obstinately refuses to give them an excuse for trouble by breaking the one he has signed.

But these are not essential parts of union activity. If the organization were in other hands we believe it would not necessarily be useless to its members, the operators and the public. Some changes could be made which would insure a greater degree of peace. The meddlesome pit committee which is an unutterable nuisance should be abolished. It is paid only when it gives trouble and, if at all venal, it can arrange to annoy the operator all the time. Under stricter supervision by the paid officers, the local committee could be made at least cognizant of its duty even if the policy of the union did not permit of its entire suppression. There should be no countenance given by the union to strikes other than those which are declared for the purpose of enforcing agreements, and suspension from the union should follow all unauthorized striking. As the operators but rarely seek to evade their contracts, there would be almost no occasion for strikes or suspensions.

The union should show itself as much interested in aiding all good movements as that local union at Gillespie, the good deeds of which will be found set forth in our sociological department of this week. A few years ago the business man did not regard safety provisions as incumbent on him. He thought that his duty was done when he avoided using dangerous devices and kept his machinery in condition. Today he lays his plans for safety with consummate care. The union, however, is just as callous today as the operator was in years gone by. A few years ago the propaganda of safety was regarded as none of the business of the industry. It is now thought to be none of the business of the union, but we venture to think it will eventually be regarded as a leading obligation. Even the organization cannot safely oppose itself permanently to the spirit of the age and to the needs of its members. The fact that it loudly proclaims that it is moving in that direction gives us hope that we shall in time be able to see evidence of its progress.

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The Mine Foreman Certificate

Complaints reach us, from time to time to the effect that many mine foremen holding positions of responsibility with certain coal companies have failed to comply with the requirements of the state mining law, in regard to the certification of mine foremen. In some cases, it is claimed that the man holding such a position does not even possess the certificate required by law; but, more frequently, the claim is made that the certificate was secured through improper means. Occasionally it is stated that the man holding the certificate has not taken out his naturalization papers and is not, therefore, a citizen of this country or eligible to the position of mine foreman.

There is nothing more discouraging to the man who is the honest possessor of a certificate entitling him to hold a position as mine foreman, than to know that present incumbents of the office he desires have no certificates, or have obtained their certificates through dishonest means and are not legally entitled to the same.

We know that, in many cases, state mining boards have attempted a more or less thorough investigation to ascertain, if possible, what certificates are wrongfully held. We have known of cases, in the past, where the mine inspector has notified the coal company that a mine foreman in their employ must secure his certificate by a certain date or give up his place. In some few cases, a mine foreman of long experience and acquaintance with the mine of which he has charge has been permitted to continue to serve in that capacity for a stated time, which would enable him to prepare himself to pass an examination and secure a certificate as required by law.

In some states, the mining law provides for what is termed a "service certificate," which makes it legal for a man to continue to serve the same company, in the same capacity, as long as his service is satisfactory. The service certificate was provided to avoid the possibility of a law requiring certification, proving a hardship and an unjust burden on the man who had served successfully for a number of years in his present position. The time has largely passed now, in most states requiring the certification of mine foreman, when such a law will work a burden on men holding that position. The fact is generally recognized that it is not only desirable, but absolutely essential that all mine foremen should be men possessing not only practical experience, but theoretical knowledge of the principles of mining.

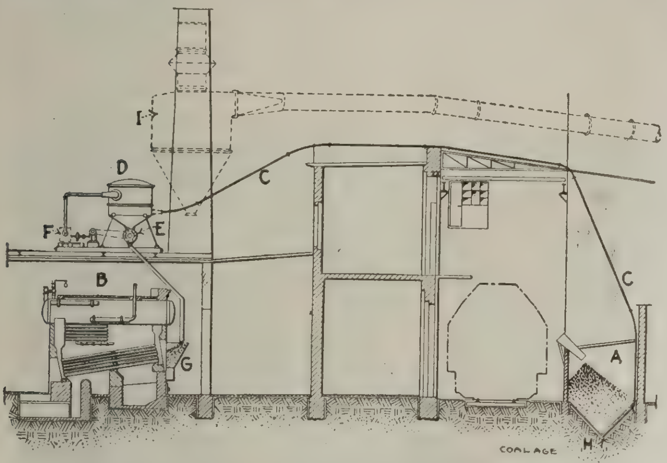
Coal Age would not assume to impugn the honesty of any member of an examining board; but there is unquestionably grave doubt as to the thoroughness of many examinations to determine the competency of candidates for the position of mine foreman. Mine examining boards are strongly urged to consider the growing need of a fuller knowledge of theory and principles in mining, on the part of candidates, for all positions of trust and responsibility. Let everything possible be done to raise the standard and increase the efficiency in this department of the work. In this way only will the certificate of competency continue to be of value.

Pneumatic Plant for Transporting Coal

The pneumatic transportation system employs directly exhausted power or compressed air (or both successively) to convey the material in tightly closed tubes; it has been used for about 15 years,* for moving valuable raw materials, such as grain, malt and chemicals. In spite of its three- or four-fold power consumption, it had the advantage of saving losses in dust of the product.

The pneumatic transportation of low-grade materials, such as sand, coal slag, ash and refuse, has recently begun to assume economic importance. The process has been considerably improved and coal up to nut size is now handled; and especially the dangerous coal dust may be conveyed safely and without economic disadvantage.

The plant here described transports nut coal to the boiler house with entire satisfaction. It was built by Simon, Buhler & Baumann, Frankfort on the Main, for their own use.



Sketch Showing General Arrangement

As shown by the illustration, the coal shed *A* is at some distance from the boiler house *B*. The transportation of the nut coal in hand trucks or barrows across the shipping track was inconvenient, owing chiefly to blockage of the way by freight cars. The pneumatic system avoids this difficulty. A pipe *C* was run from the coal shed over the railroad track, and storage building directly to the place of use. Above the boiler house is the vacuum receiver *D* with discharging device *E* and an electrically driven air pump *F*, so that the coal is brought directly into the hopper *G* in front of the automatic stoker. By means of the motor starter, the fireman in the boiler house can start or stop the transportation.

Since the coal is bulky, the suction mouthpiece *H* in the shed cannot automatically suck it up as in the case of grain and other granular material, but a special arrangement must be employed which enables a completely automatic service. In the transportation tube the coal moves with considerable velocity, and when passing curves, rubs on the tube walls. Curves are, therefore, to be avoided so far as possible, and where indispensable they should be gentle ones. At the entry into the vacuum receiver care should be taken that coal drops upon coal, since otherwise it breaks up into dust and becomes unsuitable for grate firing. Discharge tube and chute must be as short as possible.

The coal collecting in the vacuum receiver *D* sinks through a steep funnel bottom to the discharging device *E*, which cuts it off from the vacuum. It consists of a cell wheel turning at about 10 r.p.m., and emptying the coal in small quantities. The coal dust forming in the receiver is caught on screens and by shaking with a hand lever the coal is resized.

For large plants a wet filter is recommended, that is, a reservoir filled with water to a certain height. The air containing coal dust is sucked through and thus cleaned. The slime thus produced is drawn off into certain chambers, dried and briquetted.

The furnace can also be fed automatically by a chip or sawdust-conveying plant *I* of about the same power. The movement of the air is produced in the plant described by a rotary blower *F*, belted to a 6-hp. electric motor. The quantity of coal conveyed is about 6½ cu.yd. per hour. The force of the air current, even at a speed of 65 to 100 ft. per sec., is so great that chains and electric-lighting fixtures from grain ships are sucked up. Velocities up to 150 and 200 ft. per sec. have been reached in pneumatic transportation plants.

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*Much longer in the United States.

Note—Translated from an article in "Gluckauf," by Prof. M. Buhle, of Dresden, Germany.

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Recent Legal Decisions

By A. L. H. STREET*

Miner's Lunch Place as Place of Employment—A coal miner while eating lunch in the mine within 4 ft. of his place of work was acting within the scope of his employment, so as to charge his employer with liability for injuries resulting from a fall of rock from the roof. (Indiana Appellate Court, Domestic Block Coal Co. vs. Holden, 103 Northeastern Reporter, 73.)

Nondelegable Character of Employer's Duty—An employer cannot avoid responsibility for injury to a worker, arising from failure to provide a reasonably safe place of work, by delegating performance of such duty to some particular employee. (Oklahoma Supreme Court, Great Western Coal & Coke Co. vs. Malone, 136 Pacific Reporter, 403.)

Scope of Coal Mining Co.'s Powers—Charter power given a corporation to engage in mining, coking and selling coke and coal impliedly includes authority to own and hold such real estate as is reasonably necessary in conducting its general business. The company is, therefore, empowered to own and hold the surface of land in order to mine coal underneath, and may utilize the surface for agricultural purposes, as an incident of ownership, subject to the right of the state to compel the corporation to dispose of any land not held or used for corporate purposes. One who has wrongfully injured the land by overflowing it cannot assert that ownership of the property was beyond the power of the company, for the purpose of avoiding liability for the damage done. (Illinois Supreme Court, La Salle County Carbon Coal Co. vs. Sanitary District of Chicago, 103 Northeastern Reporter, 175.)

Operation of Illinois Mines Act.—The Illinois mines and miners act requires coal operators to maintain competent shaftsmen at the bottom of each shaft to preserve order and to enforce regulations governing the carriage of men on cages and to keep the shaft lighted. Held, that in a suit by a miner for personal injury, based on his employer's violation of this statute, it is no defense that the miner was guilty of negligence contributing to the accident, or that negligence of a third person concurred to produce the injury, but it must appear that the employer's violation of the law was a direct cause of the accident. A miner does not become a trespasser, so as to lose the benefit of the statute, by entering a shaft before he is required to do so in the performance of his duties, if he enters at a time when a shaftsman should be on duty. Since the purpose of the law is to protect all coal miners, the operator owes the same duty to a miner employed on a night shift, who does not go to work until after the day shift has left and the coal has been hoisted, as is owed to day workers. (Illinois Supreme Court, Brunnworth vs. Kerens-Donnewald Coal Co., 103 Northeastern Reporter, 178.)

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*Attorney-at-law, St. Paul, Minn.

SOCIOLOGICAL DEPARTMENT

An Illinois First-Aid Meet

SYNOPSIS—A rescue meet in which the labor union joins with a coal company in offering prizes and directing the events.

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The Superior Coal Co., of Gillespie, Ill., has three of the largest coal mines in the state. The No. 3 mine has a record of 4748 tons hoisted in an 8-hr. shift and the 3 mines often produce 12,000 tons in one day.

The Superior mines are officered wholly by progressive young men and are with the leaders in any work which will make coal mining safer and more efficient. From the beginning of the safety movement they have been warm advocates and supporters of the mine-rescue and first-aid development.

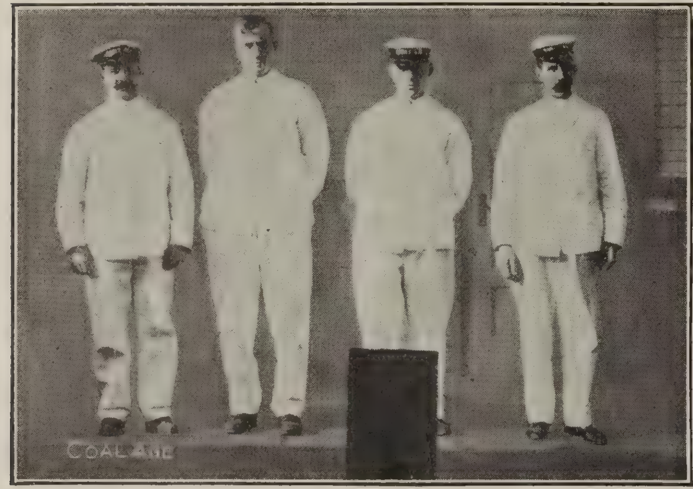
A room has been fitted at the general offices, with Draeger and Fluess rescue helmets and first-aid and mine-rescue equipment. A pulmotor with charged oxygen cylinder is always ready for use in the mines or in the town. Last fall the first of a series of annual field days was held in Gillespie and the Superior Coal Co. presented a beautiful trophy as first prize.

The company is a subsidiary of the Chicago & Northwestern Ry. Co., its mines being located on the Southern Illinois division of that road which has just been completed. On Nov. 18, 1913, President W. A. Gardner, of that railway, who is also president of the Superior Coal Co., made an inspection of the new division and, as he had always been interested in the first-aid movement, it was decided to demonstrate to him and the directors what progress had been made, and an exhibition was given despite the fact that the annual meet was approaching, being scheduled for Dec. 9.

The Mine-Rescue Exhibition

The exhibition was furnished by the first-aid team (Champion No. 1) of the Superior Coal Co., which won the trophy presented by that corporation at the State Fair, on Oct. 10, 1913. It consists of miners from mines Nos. 1 and 2. All the members hold Red Cross certificates. The captain is J. Weir, his subordinates being J. Struthers, C. Miller, J. Couden and W. Wood.

The rescue team was headed by John K. Fraser, assistant mine manager at No. 2 mine who was a captain of one of the rescue teams at the Cherry disaster. The other members were W. Lyons, assistant mine manager at No. 1 mine, J. McMillen, assistant mine manager at No. 3, D. D. Wilcox, assistant chief engineer, and A. W. Carroll, mining engineer at No. 2.



Winners of Superior Coal Co.'s Loving Cup

First-Aid Team, Saline Coal Co., Harrisburg, Ill.

The drawing shows the transformation whereby the carpenter shop at No. 3 mine was made to look like a room off an entry. It was assumed that an explosion had taken place in the mine. As soon as it occurred, the rescue squad was called to the office and was met by Assistant Superintendent Shanahan, who as mine manager told the squad what had happened. On arriving at the mine, they were told that checks 301 and 302 were still on the board and that Jones and Smith were, therefore, still below. The helmets were examined and put on immediately and the squad in charge of John Fraser, the captain, started into the mine.

The men carried Wolf and electric safety lamps and made tests for gas as they proceeded. The room was filled with smoke (sulphur and formaldehyde being used to produce the required effect) and a man, a dummy, was found at the point marked on the drawing. The dummy was carried out and on reaching the surface, the first-aid men received the body and substituting a live person performed resuscitatory work on him with the pulmotor with the help of J. Boston, safety inspector.

The rescue teams then reëntered the mine in search of Smith and found his cap and lamp near a fall of slate.

THE GILLESPIE PIPERS, COMPOSED OF MINERS WORKING IN THE SUPERIOR COAL CO.'S MINES

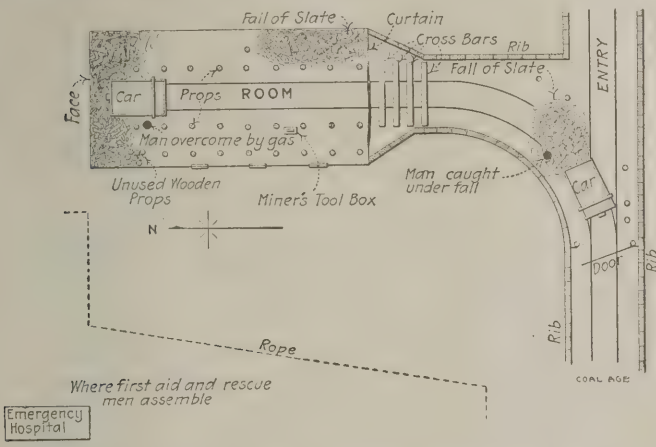
CUBA TEAM USING THE LUNGMOTOR FOR RESUSCITATION WITHOUT AN OXYGEN CYLINDER

A messenger was sent out to get the first-aid men and ventilation being reëstablished they entered the room and removed the patient on a stretcher, the rescue men meanwhile having lifted the slate fall from his prostrate body.

The victim was treated for the following injuries: a scalp wound, lacerated left shoulder, compound fracture of the right forearm, fractured right leg and shock sufficient to render him unconscious.

THE FIRST-AID CONTEST

A first-aid contest was held on Dec. 9, in the Colonial theater in Gillespie, and four towns were represented in the competition, namely, Cuba, Breeze, Harrisburg and Gillespie. The contests opened at 9 a.m. with music on the main street by the local band. D. D. Wilcox, assistant mining engineer of the Superior Coal Co., acted as chairman and called the convention to order.



RESCUE GALLERY AT NO. 3 MINE, SUPERIOR COAL CO.

John Ross, superintendent of the Superior Coal Co., addressed the meeting and expressed his regrets that General Superintendent John P. Reese could not be present as he had been obliged to go to Iowa to attend an important meeting of the operators of that state held to consider the new contract with the miners to be made Apr. 1, 1914.

ALL LOCAL AUTHORITIES REPRESENTED

The Methodist preacher, Rev. Spragg, Frank Hoehn, the superintendent of the Gillespie schools, James Taylor, the state mine inspector and Thomas Downie, president of local No. 730, were the speakers. The reader will do well to examine this list of speech-makers because only by combining all the forces mentioned can a successful campaign for safety be commenced. Mr. Downie explained that the local of which he was president appreciated the movement and had donated money to its support.

The Superior Coal Co. has always realized that success in first-aid work depends on the interest that the employees take in their efforts and the officials understand that the utmost they can do is to encourage and assist, for the real execution lies with the miner himself.

The judges in the contest were A. F. Knoefel, surgeon for the Vandalia Coal Co. and first vice-president of the American Mine Safety Association, Dr. George A. Clotfelter, of Hillsboro, and Dr. Hopkins, of Chicago, chief surgeon of the Chicago & Northwestern Ry.

THE EVENTS

The first problem in the first-aid contest was a one-man event in which 6 men competed.

> Two men are entering a mine on an electric locomotive. The trolley wire is down and knocks the trip rider from the motor. The accident happens at a dip where the water has been allowed to accumulate. The trip rider falls under the motor sustaining a fractured thigh and a cut in the groin. The wire when it fell on him gave him a severe shock.

Fullerton Fulton, of Gillespie, received first prize, Bert Peeck, of Harrisburg, second, and Thomas Trigg, of Cuba, third.

In the afternoon, the Gillespie Pipe Band gave a selection after which nine teams competed in the following two-man event:

> Two men cutting coal in a room fail to set a prop close to the face. One who is shoveling slack is caught by a fall of slate and coal. The driver comes by and the uninjured man calls on him for assistance. The nature of the injury sustained is a compound fracture of both bones of the left leg just above the ankle, calf badly lacerated, severe hemorrhage, right ear also badly lacerated and an incised wound on left temple.

James Struthers and James Weir, of Gillespie, won first prize and Charles Miller and John Cowden of same place took second.

OSCAR CARTLIDGE AND THOMAS ENGLISH

The next contest was a full-team event.

There has been an explosion in a mine and a driver has been injured in the following manner: Fracture of left arm and elbow, fracture on right side of chest, including seventh, eighth and ninth ribs, fracture of pelvis at middle line in front. Patient unconscious. Adopt the proper treatment and carry the patient 20 ft. on a stretcher.

There were five teams competing. The Cuba team took first prize, Gillespie team No. 2 second prize and Breeze No. 4 third prize.

THE AWARDS

The following prizes were awarded for the team contest:

First Prize—Superior Coal Co.'s trophy for one year with names of contestants engraved. $25 cash donated by Local Union No. 730, U. M. W. of A. An American Mine Safety medal, Red Cross medal and a book entitled "Questions and Answers" were given to each participant, the latter being presented by James Taylor, state mine inspector.

Second Prize—$15 cash. A solid gold medal was presented by the Superior Coal Co., and a book on "Questions and Answers" was donated by James Taylor to each participant.

Third Prize—$10 cash. Solid silver medal presented to each participant by Superior Coal Co.

The prizes for the one-man event were as follows:

First Prize—Trophy awarded by the Superior Coal Co. $10 cash awarded by Local Union 730, U. M. W. of A. American Red Cross medal and American Safety Association medal.

Second Prize—$5 cash and a solid gold medal presented by the Superior Coal Co.

Third Prize—$3 cash and a solid silver medal presented by the Superior Coal Co.

The prizes for the two-man event were:

First Prize—One 17-jewel Waltham gold watch presented by the Superior Coal Co.'s officials to each participant.

Second Prize—One solid gold ring to each participant, given by the officials of the Superior Coal Co.

Among the visitors were Oscar Cartlidge, manager of the state rescue stations; Dave Reese, Superintendent of No. 1 mine of the Peabody Coal Co., of Kinkead, Ill.; Harm Young, district superintendent of Peabody mines, Taylorville, Ill.; Thomas English, superintendent of rescue station, Springfield, Ill., and R. Y. Williams, engineer in rescue department, Bureau of Mines.

The meeting was under the auspices of Local 730 of the United Mine Workers' Union, the American Mine Safety Association and the Superior Coal Company.

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Electric Installations in Gaseous Mines

By Dr. Alfred Gradenwitz*

Electricity can be used in fiery mines with complete success, provided the mine owner works hand-in-hand with the electrical engineer.

Two fundamental systems have been followed in this connection; the one is based on the principle of installing the electric motor and apparatus at such points in a fiery mine as are free from firedamp, while the other consists of developing motors and apparatus of explosion-proof design, which can be safely employed where there is real danger. Mine owners generally have been in favor of the former system, and, as far as the practice in Europe is concerned, an Austrian plant can be mentioned as a striking instance, namely, the large pumping motors installed in the fiery mines of the Karwin district, where the pump chamber, and not the motor, is protected against the entrance of firedamp. Here it was believed that the explosion-proof enclosure of large motors, such as are necessary for driving central pumping plants, was practically impossible, or, at all events inadvisable at the present state of electrical engineering.

The pump chamber, in this case, was made air tight at the water hole while the connection with the crosscut is provided with three iron doors, the two outer ones opening in one direction, while the inner one opens in the opposite direction.

In addition to electrically driven pumping plants, traction by electric locomotive is also gaining considerably in importance year by year. Two types of locomotives may be used in this connection, one a type for parts free from firedamp, and the other a type for those sections where there is danger. In the first case, locomotives with bare contact wires have been used successfully, while for the second, explosion-proof accumulator locomotives have found favor.

Of the electrically driven machinery in the mines, the hoisting winches are of special importance, as they are generally situated at the highest point in the workings and therefore in greater danger from the collection of firedamp than other machinery. The hoisting engines have therefore been placed in a current of fresh air.

Experiments made in the Gelsenkirchen-Bismark Experimental Station, with a view to the development of explosion-proof motors and apparatus have shown three forms of construction to be possible: First, total inclosure; second, laminated-plate safety-protection; third, oil protection.

The totally inclosed form assumes an explosion-proof construction from the outset and calls for such a casing of motors and apparatus as to be able to withstand the pressure of explosion in the event of any firedamp igniting in its interior.

In the laminated-plate safety-protection, the familiar principle of a Davy lamp is followed, ignition being prevented by a wire gauze which causes the gases to give up their heat as they pass through. The characteristic element of such apparatus takes the form of the packing of laminated plates fixed to the end openings of electric motors or the covers of the inclosed apparatus.

Oil protection is the third form of explosion-proof construction and is employed for motors, as a rule, solely for the protection of the slip ring. Its use enables an extremely convenient form of controlling switch and other apparatus to be adopted. Here the protection against explosion is secured by allowing the opening and closing of any live contacts to take place under oil.

Experiments made by Beyling on motors and apparatus in fiery mines have shown the necessity of testing the operation of the safety devices. The plate protection must be most carefully manufactured, its effectiveness being completely destroyed by a single fault and the same is true of the totally inclosed type, as danger exists where there are any flaws in the casing.

The testing floor erected by the Allgemeine Elektrizitäts Gesellschaft, of Berlin, for testing motors and apparatus to be used in firedamp mines consists of a cement chamber sunk below the level of the ground, which can be subdivided into a number of small compartments and is closed at the top by a paper cover which is torn when the explosion passes from the motor into the chamber. The compartment can be filled with an explosive mixture containing approximately 15 per cent of illuminating gas which, being agitated by an air pump, insures an explosive mixture in apparatus and chamber.

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*Berlin, Germany.

DISCUSSION BY READERS

Education and Training of Mining Men

Letter No. 6—It has been suggested by a recent writer, in these columns, that boys should be taken into the mines at an early age in order that they may learn the practical side of mining. While I have the greatest respect for the practical man and honor the man who has risen from the bottom to a position of responsibility, I nevertheless feel that experience should not be gained at the expense of something more valuable; and, on this account, I want to point out a few objections to the course suggested by Mr. Smith, Coal Age, Nov. 15, p. 743.

First, it must be admitted by all that the moral atmosphere of the mine or that of the average industry is not conducive to the good habits and training of young men. The boy put to work at an early age in the mine is thrown into contact with men of all classes and nationalities. While learning how to put up a brattice, drive a mule and many other things of a practical nature, he picks up at the same time much perverted information on matters that should be taught him only by his parents or teachers. In addition to this, he gets first-hand information on drinking and gambling, by being forced to listen to the discussion of these subjects by devotees. While there are many men who neither drink nor gamble, and others who will refrain from discussing such subjects or repeating immoral stories when a boy is present, their influence, which is largely negative, is more than offset by the conduct of other men who are indifferent to the welfare of the boys and who take a certain delight in instilling evil into the youthful mind.

The man who is down and out presents a certain picturesqueness that appeals to the boyish mind. One such man will often exert a greater influence than a half-dozen men of correct habits. It frequently happens that the boy who has had the advantage of a good home most readily succumbs to these evil influences because of their novelty. If, then, the boy is to become morally strong and a good citizen, keep him from these influences as long as possible or, at least, until his character is formed.

Second, the boy in the mine is surrounded by bodily dangers that he does not fully appreciate. He does not realize the need of caution but learns to take chances. It is convenient for a boss to send a boy on an errand or with a message to another part of the mine, which exposes him to the dangers of moving cars, contact with live wires, falling roof in places with which he is not acquainted, etc. Also, after the first few days in the mine, the inquisitive mind of the boy leads him to investigate the nature and possibilities of live wires, explosives, etc., which may and often does lead to grave results.

Third, the early practical training of the boy means a corresponding neglect of his education or schooling. Too much cannot be said of the value in after life of a good education. I believe every boy should have the advantage of early schooling, wherever this is possible. Early schooling has at least two recognized features: The culture of the mind, and the application of knowledge to industry. Both are equally important. The miner with no early schooling, when dissatisfied with conditions, finds himself generally helpless to alter them and, under improved conditions, he is often incapable of availing himself of the advantage they afford. His untrained mind does not suggest to him the remedy to apply when he is conscious that something is wrong. The fault lies in the lack of early education, for which he or his parents are generally to blame.

The increase of interest in night schools and correspondence study at home is a silent witness to the need that is felt by the man whose early schooling has been neglected. In view of these facts, I would say: Educate the boy first and let him get his practical training later. It will make him a more intelligent and practical man and a more efficient worker.

Fourth, to start life at the practical end commits the boy to a class of work for which he may not be adapted and in which, therefore, he will never succeed. It gives him no opportunity to choose his vocation in life. He has little chance of advancement, little satisfaction in his work, and becomes easily discouraged. His early training does not make it easy for him to change to another calling. It often happens that ill health will compel a man to quit work in the mine; and, in that case, if he lacks useful knowledge that would enable him to take up other work with promise of success, he is helpless and becomes a vagrant.

I have in mind such a case where a miner, unable to work underground, took up the occupation of steel construction and rose to a position of trust. Another alternative is the field of photography. But, on the other hand, the man who went to work in the mine at an early age, though possibly having a natural adaptation for other work, has little chance later of success, owing to the lack of early schooling that is necessary in all advanced callings. Therefore, give the boy the best early schooling you can and thus afford him a chance to make his own choice of a vocation in life.

Geo. N. Lantz.

New Straitsville, Ohio.

The Certificate Law

Letter No. 7—My experience as a miner who has worked in eight different states in this country and in two shires of Scotland, and has served as mine foreman in three states during the past 15 years, leads me to declare in favor of a *universal* certificate of competency for mine foreman. The work of mining coal and transporting it to the tipple, in respect to safety and economy of operation, requires about the same skill, care and experience on the part of the mine foreman, in whatever state or district the mine may be located. The man who shows the greatest fitness and capacity for the position is generally the one who is most successful, as operators have not much use for incompetent men.

In my opinion, the ambitious mine foreman who holds a certificate in one state and who desires to make a change, should not be barred from holding a similar position in another state. I cannot see that a universal certificate entitling the holder to fill a position as mine foreman in any state will jeopardize lives or property, as this would depend on the competency of the man. On the other hand, such a law would broaden the field of competition and encourage ambitious miners to qualify and fit themselves for positions of trust and responsibility. I believe the law should, likewise, be extended to cover the certificates for fireboss and hoisting engineers so that they could operate in a wider field.

In the practical application of this plan, I would suggest that examining boards, when preparing the questions for examination and granting certificates of competency, should treat the subject in its broadest aspect, so as to cover the different conditions that are liable to occur in mining coal. The inclination or pitch of coal seams varies from zero to 90 deg., so that the seam may lie at any inclination from flat to perpendicular, requiring the adoption of different methods for the extraction of the coal. The possible presence of gas will require a knowledge of how it may be safely removed. It is true the laws are different in the several mining states; but these are in printed form, and a man must acquaint himself thoroughly with the mining laws of the state in which he desires to hold a position as mine foreman.

R. J. Pickett.

Shelburn, Ind.

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Letter No. 8—I have been much interested in the discussion of the question relating to a uniform mine-foreman certificate law. I notice that some correspondents, in discussing this question, hold that a mine foreman in one state should be considered as being qualified to hold the same position in another state; while others claim that it is better for each state to conduct its own examinations and not to consider the certificate issued by an examining board in another state.

I would like to ask: Cannot this question be compromised and a common ground be determined that would overcome the objections that have been raised? Our mines, at present, are mostly classified as "gaseous" and "nongaseous" mines. We are told the attempt is being made in West Virginia to classify mines as "nonhazardous," "hazardous" and "extra hazardous." Is it not possible to carry out this idea of classification in respect to the certificate law, and group the mines throughout the coal-producing states into two or more classes? The certificates of competency for mine foremen could then be graded to suit these different classes of mines. With suitably organized and authorized examining boards, it would not seem to be difficult to regard a mine foreman certified as competent in one state, to be qualified for holding the same position in another state.

It seems to me that this arrangement would remove the difficulty to which Mr. Wilson refers, Coal Age, Nov. 8, p. 710, where mines located along the boundary between two states were operated under the mining laws of their respective states; and a mine foreman in charge of a mine on one side of the boundary line could not hold the same position in an adjoining mine on the opposite side of that boundary, notwithstanding the conditions in these two mines were precisely identical.

Although the situation may prove, as in this case, somewhat annoying, it must be allowed that the law is a safeguard against inefficiency. I believe that if the suggestion is worth while, there should be some classification of mines determined upon and some standardization of examinations made that would enable the certified foreman in one state to stand as qualified for holding the same position in the same class of mines in another state.

Geo. N. Lantz.

New Straitsville, Ohio.

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Analyzing the Mine Cost Sheet

Letter No. 1—Reading the article on this subject by J. B. de Hart, Coal Age, Dec. 6, p. 842, calls to mind how often it has occurred in my own experience, as well as that of others, that I have tried hard to reason with a mine superintendent how the output of coal could be increased very materially and the cost per ton reduced, by making certain changes that were almost insignificant of themselves. I can endorse every statement in that article as true.

At a mine of which I had charge, some time ago, the main-haulage rope on the slope was breaking twice and sometimes three times a day. I argued with the mine superintendent to show him that the time spent in splicing the rope, together with the loss in output, greatly increased the cost per ton of coal loaded and that this would be saved by getting a new rope, which would soon pay for itself by avoiding these accidents. It was often necessary, in this mine, to stay at night and pay men extra time to hunt old rope and have it hauled out from the workings, to replace sections of the main rope where it was ready to break. It might happen, then, that things would run smoothly the following day and nothing would be said.

It is easy to see that the superintendent, in this case, was not a practical man, which is often the case where a man is taken out of a store and placed in charge of a mine to conduct its operation. Perhaps he has never worked a day inside of a mine, and it is very hard to make him understand that it is necessary to do a great many things in order to systematize the work and reduce the cost, in the mine.

Where haulage was done by an electric motor, it has frequently happened that a bad piece of road would greatly delay the work, because cars were continually getting off the track at certain points. This would tie up the road until the cars could be again put on the track. A little grading of the roads would have overcome this difficulty and reduced the cost by increasing the output. The superintendent promised, time after time, to let me grade the road, after I had explained to him that this could be done without decreasing the output. But he always seemed unwilling to have me go ahead with the grading. There were places where, owing to depressions in the road, the cars would bump together, throwing much of the coal off, which frequently caused wrecks that tore up the track. Besides this causing much delay, it was necessary to put on a night shift to clean the road, all of which could be avoided with a little expense of time and labor to put the track in good condition; but the reply was always: "We cannot stand the expense at the present time."

The suggestion is made that a mine foreman who is trying in every way possible to reduce the cost of putting the coal on the surface, should be encouraged and given full credit for what he accomplishes. But, instead of this, in most cases, a mine foreman who dares to insinuate that the conditions under which he is working are unnecessarily increasing the cost per ton will soon be given to understand that, if the place does not suit him, he can leave. I have known this to happen in more cases than one. I am happy to say that the company by which I am at present employed is making every effort to show the foreman where and how the cost per ton can be reduced. That is what counts in a coal mine. We are continually told to keep our roads well graded, so that the coal can be hauled with as little trouble and delay as possible.

Our general superintendent goes inside the mine each week himself, to see that everything is done. He is always ready to give full instructions and explanation of what is not understood; and suggestions of a foreman are not turned down, but are heard and carefully considered. The foreman is instructed to see that the bituminous-mine law is fully enforced, in every point pertaining to the welfare of the men. Such an interest on the part of a superintendent makes the work run more smoothly and goes far toward reducing the cost per ton. A lack of harmony between the superintendent and his foreman is bound to increase the cost of operation.

John J. Clark,
Assistant Mine Supt.,
B. & S. Coal & Coke Co.

Sagamore, Penn.

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Letter No. 2—It was with much interest I read the foreword, Coal Age, Nov. 15, and the article along the same line by J. B. de Hart, Dec. 6, p. 842. As I view this question, there is only one obstacle to overcome, in acting upon your suggestion in the second paragraph of the foreword, and that is, the big word "if." Do we "recognize the camp?" It has been my experience, as it has probably been that of others, to be refused the "$600 to build a bathhouse." The reason given for the refusal is that the proposition is more "a matter of sentiment than one of practical business."

In the case to which I refer, the matter was put up to the company with the argument that it would mean a larger labor force; and a larger labor force would mean an increased tonnage, with a reduction in the cost of production. The reply given, however, was to the effect that "neighboring mines did not have a bathhouse." It was argued that the expectation of an increase in labor force was "pure assumption and quite problematic." Should the argument be pressed further, the manager would usually be told that he might build a bathhouse when he had put the mine on a paying basis.

Upon the receipt of this answer, the feelings of the average mine manager are similar to those of the man who tried to purchase a sawmill on credit. On being told that he would have to put up the price before he could be given possession of the mill, he replied that he had not the price and if he had he would not want the mill. If a manager can put the mine on a paying basis without the bathhouse, there is no real need, from a business standpoint, of building one.

This applies to small companies more than to large ones. The manager of a small coal-mining company, today, has before him a herculean task. If he fails to put the mine on a paying basis, it is more often due to a shortsighted policy on the part of the company, rather than to any mismanagement on the part of the one in charge. But the manager is the one who must shoulder the burden and take the blame.

It is surprising to note the number of companies that are in just the condition described in your foreword. It requires more of a hypnotist than a manager, in most cases, to make the company see the need of a practical and reasonable proposition as it appeals to him. He studies the question daily from a practical standpoint; he is the man who must make good and produce results. He feels the need more than anyone else of a broad-gage, far-sighted business policy.

I have in mind an instance of this. Not long ago, a proposition was put up to me by a company and I was asked to suggest a way to make it pay. The president of the company wanted to know if I did not believe it would be a wise plan to do away with the power plant and haul all of the coal from the mine with mules. He suggested, also, shooting the coal from the solid and doing away with mining machines. He, further, wanted to replace the fan with a ventilating furnace. His principal argument, in favor of this plan, was that he had been connected with several operations where there was no power plant and the mine was worked at a profit. Without any further analysis of the situation and without making any attempt to ascertain the true reasons why these mines were run at a profit, while the one of which we had charge appeared to be a losing proposition, he concluded blindly that the uptodate equipment of this mine was a needless expenditure of capital, which could be put to better use.

After listening patiently to his suggestions, I attempted to show him that the real trouble, in the present case, was that some of the machinery was out of repair and must be put in good condition to do the efficient work of which it was capable. I argued that if this was done, it would not be long before the mine would be operated on a paying basis and prove a profitable investment. He failed to see the wisdom of this advice; and it seemed impossible to convince him that a comparatively slight additional outlay for needed repairs was all that was required to produce good results and put the coal on the track at a profit.

While this is but one incident among a hundred others, it illustrates the policy of a large number of companies who are mining coal, today, at a small profit and too often at a loss. Imagine, for a moment, the manager of such a company asking for $600 with which to build a washhouse. He might as well ask, at the same time, to be relieved of his duties as manager. The case is almost hopeless under these conditions, and, as I said before, the manager for such a company has on his hands a herculean task. In this connection, I thoroughly endorse the excellent article of Mr. de Hart on Analyzing the Mine Cost Sheet. The article is opportune and should appeal forcibly to every coal-mining company. I have not written this in criticism so much as to point a way to remedy the difficulty and assist the mine manager and foreman in their honest endeavors to produce results.

G. M. Shoemaker.

Pennington Gap.

Technical Education in Mining

The foreword, Coal Age, Nov. 1, after setting forth the desirability of having a technically educated man in the position of mine manager, proceeds to compare this man unfavorably with the so called practical man. This seems a little illogical, if not unfair. If it were assumed that competent engineers attack problems in mining, in the manner described, the question might justly be asked: What use are engineers in any organization? What confidence can be placed in an engineer who would consider only "first cost and relative life of mine cars," or, having a knowledge of "fan efficiencies and water-gage readings, neglected to consider the size, length and condition of the airway," in respect to improving the ventilation.

In justice to the engineer, permit me to cite one or two instances where his technical education and training are indispensable? At a certain mine not employing an engineer, a fan is needed and several manufacturers are asked to investigate and submit bids for the same. All reliable manufacturers of mine equipment have capable engineers in their employ; but, as every operator knows, these engineers cannot be expected to make full and careful investigation of the conditions inside the mine, when the chances are only one in ten of their securing the contract for the installation.

Another instance is: A practical manager wanted a tipple profanely quick, and he got it; and, as a result, a very brittle coal is dropped into cars from a height of about 8 ft., producing loss from breakage of coal and causing complaints from consumers. In some cases, tipples are built requiring the coal to be hauled up an incline, where a change of location would permit of a gravity road leading to the tipple.

On the other hand, I know of cases where engineers were called into consultation, in the matter of purchase of mine cars and interested themselves in determining the relation between wheel-base and minimum radius of curvature for the tracks; the width of car was decided in accordance with roof conditions. The center of gravity of the load in the cars was kept as near as possible to the floor of the mine.

The suggestion in the foreword, that able men of both classes are of advantage, should not mislead anyone. The man in authority without some technical training is fast passing from the mines; because, with the help of such mining papers as Coal Age and the assistance of correspondence schools and night schools, a man need not leave his work to obtain a good technical education.

COLORADO ENGINEER.

Trinidad, Colo.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Natural Ventilation In Slope Mines and Dip Workings—The same condition in respect to the natural heat of the mine producing or modifying the circulation of the air, holds in all slope mines and dip workings, the same as in shafts and drifts. Whenever the mine temperature is much below or above that of the outside atmosphere, the difference in temperature makes the return air heavier or lighter than the intake air; and the difference in weight of these two air columns destroys the equilibrium of the mine air and creates a current in the airways throughout the mine.

A considerable difference of temperature is often observed between the dip and rise air currents in particular sections of a mine. It is this difference in the temperatures of the intake and return currents that often makes dip workings harder to ventilate in summer than in winter. For the same reason, rise workings are frequently found to be more easily ventilated in the summer season.

Air Columns—The term "air column," like water column, always refers to a vertical column. The air column, in ventilation, is an imaginary vertical column of air, of unit section (commonly, 1 sq.ft.) and of such height that its weight, in pounds, is equal to the pressure it measures (lb. per sq.ft.). The density of the air (wt. per cu.ft.) is either stated or understood, so that when the height of air column is given the pressure it indicates is readily calculated.

In mining practice, it is common to express ventilating pressure in feet of air column or, as we say, "head of air." Calling the weight of 1 cu.ft. of air w (lb.) and the head of air column h (ft.), the pressure p (lb. per sq.ft.) is calculated by the formula

$$p = wh$$

Or the air column corresponding to any given pressure is found by transposing this formula; thus,

$$h = \frac{p}{w}$$

Example—What is the head of air column corresponding to a ventilating pressure of 10 lb. per sq.ft., assuming a temperature of 60 deg. F. and a barometric pressure of 30 in.?

Solution—The weight of 1 cu.ft. of air, at the given temperature and pressure is

$$w = \frac{1.3273\,B}{460 + t} = \frac{1.3273 \times 30}{460 + 60} = 0.0766 \textit{ lb., nearly}$$

The required head of air is then

$$h = \frac{p}{w} = \frac{10}{0.0766} = 130.5 \textit{ ft.}$$

Example—Find the ventilating pressure and water gage corresponding to 80 ft. of air column, at the same density.

Solution—

$$p = wh = 0.0766 \times 80 = 6.128 \textit{ lb. per sq.ft.}$$
$$w.g. = 6.128 \div 5.2 = 1.18 \textit{ in., nearly}$$

The Coal Age Pocket Book

Air Column and Water Gage—Since water is practically 815 times as heavy as air at normal temperature and pressure, 1 ft. of water column measures the same pressure as 815 ft. of ordinary air column; and 1 in. of water gage is therefore equal to 815 ÷ 12 = say 68 ft. of air column, which gives the following:

Rule—To reduce feet of air column to inches of water gage, divide by 68.

To reduce inches of water gage to feet of air column, multiply by 68.

Air Column and Unit Ventilating Pressure—Since air at a normal temperature and pressure weighs, practically, 13 cu.ft. to the pound, every 13 ft. of air column represents, approximately, a ventilating pressure of 1 lb. per sq.ft., which gives the following:

Rule—To reduce feet of air column to unit pressure, divide by 13.

To reduce unit pressure (lb. per sq.ft.) to feet of air column, multiply by 13.

Air Column and Barometric Pressure—Since 1 cu.in. of mercury weighs 0.491 lb., each inch of mercury column indicates a pressure of 0.491 lb. per sq.in.; or 0.491 × 144 = 70.7 lb. per sq.ft.; and since each pound per square foot of pressure corresponds to 13 ft. of air column, approximately,

$$1 \textit{ in. (barometer)} = 70.7 \times 13 = \textit{say } 920 \textit{ ft. (air column)}$$

Rule (Approximate)—To reduce feet of air column to inches of barometer, divide by 920.

To reduce barometric pressure (inches) to feet of air column, multiply by 920.

Barometric and Unit Ventilating Pressure—Barometric pressure is always expressed in inches of mercury column. Unit ventilating pressure is expressed in pounds per square foot, ounces per square inch, or inches of water gage.

Rule—To reduce barometric pressure (inches) to ventilating pressure (lb. per sq.ft.), multiply by 70.7; or to ventilating pressure (oz. per sq.in.), multiply by 0.491 × 16 = 7.856; or to water gage (in.), multiply by 70.7 ÷ 5.2 = 13.6, which is the specific gravity of mercury referred to water as a standard.

Since 13 ft. air column represents a pressure of 1 lb. per sq.ft., a pressure of 1 oz. per sq.in. corresponds to an air column of (13 × 144) ÷ 16 = 117 ft.

EQUIVALENTS IN PRESSURE

Air column (ft.) = 68 × water gage (in.);
= 13 × pressure (lb. per sq.ft.);
= 117 × pressure (oz. per sq.in.);
= 920 × barometric pressure (in.);
Pressure (lb. per sq.ft.) = 5.2 × water gage (in.);
= 70.7 × barometric pressure (in.);
Pressure (oz. per sq.in.) = 0.58 × water gage (in.);
= 7.86 × barometric pressure (in.);
Water gage (in.) = 13.6 × barometric pressure (in.);

INQUIRIES OF GENERAL INTEREST

Electrical Resistance of Steel Rails

We have had an argument about the difference in resistance between a copper wire and steel rails, and desire to submit the question to you, in hopes that you can give us the necessary information. The question is:

What is the difference in resistance between a 4-O round copper wire 3000 ft. long and the two 25-lb. steel rails, in a track, 2000 ft. long, followed by two 30-lb. steel rails, in 1000 ft. of track? The rails are bonded with pressed-terminal all-wire 2-O bonds.

Will you also kindly state how many kilowatt-hours will be available at the end of a 250-volt line, where a 30-hp. motor, 3000 ft. from the generator, is taking 100 amperes?

H. E. BULLOCK.

Hazard, Ky.

The resistance of 1000 ft. of a 4-O copper wire at, say 68° F. (20°C.), as taken from a table giving the resistances of copper wires for different gages and temperatures, in ohms per thousand feet, is 0.04893 ohm. The resistance for such a conductor 3000 ft. long is then, 3 × 0.04893 = 0.14679 ohm.

An approximate rule for calculating the resistance of copper wire per thousand feet, in ohms, is to divide 10,000 by the size of the wire in circular mils. Thus, for a 4-O wire (211,600 circ.mils), the resistance is, approximately,

$$R = \frac{10,000}{211,600} = 0.04726 \textit{ ohm per } 1000 \textit{ ft.}$$

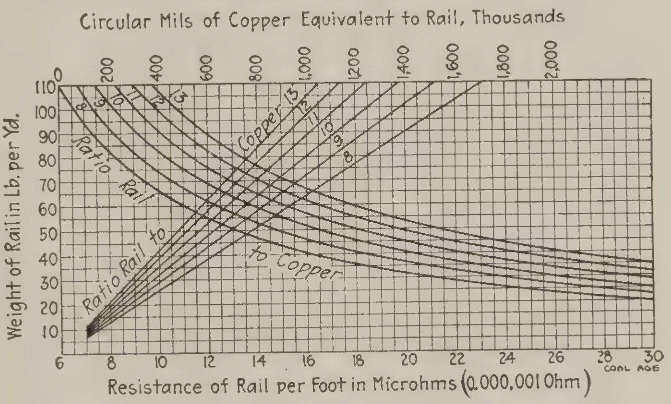
This rule should only be used in rough calculations. When accuracy is desired, the resistance for the wire should be taken from electrical tables, as above stated.

The resistance of steel rails, for the same cross-section and length, varies with the composition of the steel. The presence of sulphur and manganese, particularly the latter, greatly modifies the resistance of the steel. It has been found that this resistance will vary from about eight to thirteen times that of copper of the same sectional area and at the same temperature. This has given rise to what is termed the "ratio of rail to copper" or the "rail-to-copper ratio." The results of numerous experiments have made it possible to calculate the equivalent *circular mils of copper* corresponding to any given weight of rail in pounds per yard, for any rail-to-copper ratio. To do this, the weight of rail, in pounds per yard, is multiplied by the constant corresponding to this ratio, as determined by the composition of the steel. The value of this constant, for the several ratios, is as follows:

Rail-to-Copper Ratio	Constant	Rail-to-Copper Ratio	Constant
8	15,550	11	11,360
9	13,820	12	10,360
10	12,500	13	9,590

Applying this method to the solution of the question asked by correspondent and assuming a rail-to-copper ratio of 10, the constant for this ratio, as taken from the above table, is 12,500. Then, for a 25-lb. rail, the equivalent circular mils of copper is 25 × 12,500 = 312,500. Electrical tables are not generally extended to include as large a wire as this area indicates. The resistance in ohms per thousand feet, however, can be calculated, approximately, by the rule previously given. Thus, 10,000 ÷ 312,500 = 0.032 ohm. The resistance of the two rails, in the first 2000 ft. of this track, is the same as the resistance of a single 25-lb. rail 1000 ft. long, or 0.032 ohm.

Again, for a 30-lb. rail of the same composition, the equivalent circular mils of copper is 30 × 12,500 = 375,000. The corresponding resistance is, therefore, approximately, 10,000 ÷ 375,000 = 0.0267 ohm. The resistance of the two rails, for 1000 ft. of track, is one-half of this amount, or 0.01335 ohm. The total rail resistance in this track is, therefore, 0.032 + 0.01335 = 0.04535 ohm; and the difference, in favor of the iron rails, is 0.14679 — 0.04535 = 0.10144 ohm.



DIAGRAMS SHOWING COPPER EQUIVALENT AND ELECTRICAL RESISTANCE OF STEEL RAILS

The above combined diagrams, taken from the Ohio Brass Co.'s catalog, show graphically the circular mils of copper, of equal electrical resistance to steel rails of different weights and "rail-to-copper ratios." The curved lines show the resistance, in microhms, of steel rails of different weights and ratios.

The diameter, in inches, of a copper wire that is the electrical equivalent of a steel rail of a given weight (lb. per yd.) may be calculated by multiplying the respective constant taken from the above table, by the weight of the rail, extracting the square root of the product and dividing that result by 1000. Thus, for a rail-to-copper ratio of 10, the constant is 12,500. Then, the diameter of the copper-wire equivalent is

$$d = \frac{\sqrt{25 \times 12,500}}{1000} = 0.559 \textit{ in.}$$

In answer to the second question, a 30-hp. motor consumes 30 × 746 = 22,380 watts or 22.38 kw. If this motor is taking, as stated, 100 amp., the voltage, at the full capacity of the motor, is 22,380 ÷ 100 = 223.8 volts. The drop in voltage for this line is, therefore, 250 — 223.8 = 26.2 volts. The work performed by this motor, in each hour, when working at its rated capacity, is 22.38 kw.-hr.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—A mine airway is 8 ft. high, 8 ft. wide and 10,000 ft. long; (a) find the rubbing surface. (b) Assuming a unit of resistance, $k = 0.00000002$ and a water gage $w.g. = 2$ in.; what is the velocity of the air current? (c) What is the quantity of air in circulation? (d) What is the horsepower on the air?

Ans.—(a) This airway being square its perimeter is $4 \times 8 = 32$ ft.; the rubbing surface is then $s = 32 \times 10{,}000 = 320{,}000$ *sq.ft.*

(b) The unit pressure corresponding to 2 in. of water gage is $2 \times 5.2 = 10.4$ lb. per sq.ft. The sectional area of this airway is $8 \times 8 = 64$ sq.ft. The velocity of the air current, in this case, is therefore

$$v = \sqrt{\frac{pa}{ks}} = \sqrt{\frac{0.00000002 \times 320{,}000}{10.4 \times 64}}$$
$$= 322.5 \textit{ ft. per min.}$$

(c) The quantity of air in circulation is

$$q = a\,v = 64 \times 322.5 = 20{,}640 \textit{ cu.ft. per min.}$$

(d) The horsepower on the air is

$$H = \frac{qp}{33{,}000} = \frac{20{,}640 \times 10.4}{33{,}000} = 6.5 \textit{ hp.}$$

Ques.—(a) A certain power is producing 20,640 cu.ft. of air per min. in an airway 8x8 ft., at a velocity of 322.5 ft. per min.; what quantity and velocity will the same power produce in an airway 6x6 ft. of the same length?

(b) What horsepower would be required to produce the same quantity of air in this airway as in the previous one and what would be the water gage, in that case?

Ans.—(a) For the same power on the air, the quantity of air in circulation varies directly as the sectional area and inversely as the cube root of the perimeter, the airways being of the same length. Therefore, the quantity ratio is equal to the area ratio times the cube root of the inverse perimeter ratio. The sectional areas and perimeters of the two airways are as follows:

Airway 8x8 ft.,

$a = 8 \times 8 = 64$ *sq.ft.*, $o = 4 \times 8 = 32$ *ft.*

Airway 6x6 ft.,

$a = 6 \times 6 = 36$ *sq.ft.*, $o = 4 \times 6 = 24$ *ft.*

Equating these values as ratios, as stated above,

$$\frac{q_2}{q_1} = \frac{a_2}{a_1}\sqrt[3]{\frac{o_1}{o_2}} = \frac{36}{64}\sqrt[3]{\frac{32}{24}} = \frac{9}{16}\sqrt[3]{\frac{4}{3}} = \frac{9}{16}\sqrt[3]{1.333} = 0.619$$

But. $q_1 = 20{,}640$ cu.ft. per min. and calling the required quantity $q_2 = x$,

$$\frac{x}{20{,}640} = 0.619$$

$$x = 20{,}640 \times 0.619 = 12{,}776, \text{ say } 12{,}800 \textit{ cu.ft. per min.}$$

The velocity in the 6x6-ft. airway may be found in two ways. For the same power on the air and the same length of airway, the velocity varies inversely as the cube root of the perimeter of the airway, or the velocity ratio is equal to the cube root of the inverse perimeter ratio; thus,

$$\frac{v_2}{v_1} = \sqrt[8]{\frac{o_1}{o_2}} = \sqrt[3]{\frac{32}{24}} = \sqrt[3]{\frac{4}{3}} = \sqrt[3]{1.333} = 1.1006$$

But $v_1 = 322.5$ ft. and calling the required velocity of air x,

$$\frac{x}{322.5} = 1.1006$$

$$x = 322.5 \times 1.1006 = 355 \textit{ ft. per min.}$$

The velocity of the air current can also be found as follows, when the sectional area is known:

$$v = \frac{q}{a} = \frac{12{,}800}{36} = 355 \textit{ cu.ft. per min.}$$

(b) To increase the quantity of air in circulation in the 6x6-ft. airway, to that produced in the 8x8-ft. airway, it will be necessary to increase the power. Then, considering the 6x6-ft. airway only, since the power varies as the cube of the quantity of air in circulation, the power ratio is equal to the cube of the quantity ratio. Thus, calling the required power x, the original being 6.5 hp.

$$\frac{x}{6.5} = \left(\frac{20{,}640}{12{,}800}\right)^3 = \left(\frac{129}{80}\right)^3 = (1.6125)^3 = 4.19$$

$$x = 6.5 \times 4.19 = 27.235 \textit{ hp.}$$

Since the original water gage was not given for the 6x6-ft. airway, it is necessary to calculate the water gage, in this last case, from the circulation of 20,640 cu.ft. of air by 27.235 hp.; thus,

$$w.g. = \frac{33{,}000\,H}{5.2\,q} = \frac{33{,}000 \times 27.235}{5.2 \times 20{,}640} = 8.37 \textit{ in.}$$

Ques.—An airway 8x8 ft., 10,000 ft. long, is passing 20,640 cu.ft. of air per min., with a given power. (a) Assuming the *power* on the air remains unchanged, and a regulator having an opening of 3 sq.ft. is introduced into this airway, how much will the circulation be decreased? (b) Assuming the power on the air remains unchanged, will the regulator increase the water gage? (c) If the original water gage was 2 in., what will be the water-gage reading after the regulator is in place? (d) What water gage and horsepower on the air will be required to increase the circulation to the original amount with the regulator still in place?

Ans.—(a) Calling the original quantity of air in circulation q, the rubbing surface s, and the sectional area a; the area of the opening in the regulator A and the required quantity of air, after the regulator is in place, x, this reduced volume of air may be calculated by the formula

$$x = q\sqrt[3]{\frac{A^2 s}{A^2 s + 41.6\,a^3}}$$

The rubbing surface is $s = 10{,}000\ (4 \times 8) = 320{,}000$ sq.ft. and the sectional area, $a = 8 \times 8 = 64$ sq.ft.

$$x = 20{,}640\sqrt[3]{\frac{3^2 \times 320{,}000}{3^2 \times 320{,}000 + 41.6 \times 64^3}}$$
$$= 12{,}250 \textit{ cu.ft. per min.}$$

(To be concluded next week)

COAL AND COKE NEWS

Washington, D. C.

In its report submitted to Congress on Dec. 19, the Interstate Commerce Commission reviews the work of the past year with reference to the prosecution of coal companies and rather severely criticizes coal miners for the methods they have been employing in their business. The Commission points out that an indictment has been secured against the Lehigh Valley R.R. Co. for granting a concession by leasing certain lands at Buffalo for a coal yard to the Yates-Lehigh Coal Co. at less than a fair rental. Similarly, an indictment has just been returned against the Wichita Falls & Northwestern R.R. Co. for granting a concession by subletting certain land to an interstate shipper at a lower retal than the carrier was itself paying to the original lessor.

Another indirect device for granting a rebate for which indictment has been secured during the year, says the Commission, is that resorted to by the Vandalia R.R. Co. in favor of the Lumaghi Coal Co. The Vandalia Mineral Co. is a corporation formed by interests controlling the Vandalia R.R. Co. for the purpose of holding coal-mining lands which the Vandalia R.R. Co. under its charter was not permitted to own. The Vandalia Improvement Co. is a holding company also controlled by the interests controlling the Vandalia R.R. Co.

When the Vandalia Mineral Co. was organized the Vandalia Improvement Co. bought all of its stock with money furnished by the Vandalia R.R. Co. Investigation showed that the Vandalia Mineral Co. loaned $260,000 to the Lumaghi Coal Co. to buy coal-mining properties located on the line of the Vandalia R.R. Co. This loan was made at 2 per cent. interest on condition that the Lumaghi Coal Co. would ship all of its coal over the Vandalia R.R.

It further developed that the Vandalia Mineral Co. has borrowed this money from a bank at 4 per cent. interest on notes which had been endorsed by the Vandalia R.R. Co.

Still another case in which carriers are alleged to have connived with a shipper for the purpose of defeating the published rates by roundabout methods was presented to a Federal grand jury in the eastern district of Illinois. The O'Gara Coal Co., a New York corporation, with its principal office in Chicago, had a contract for supplying fuel coal to the Grand Trunk Ry. Co. of Canada. This coal was shipped from the mines in southern Illinois via the Cleveland, Cincinnati, Chicago & St. Louis and Chicago, Indiana & Southern to South Bend, Ind., where it was turned over to the Grand Trunk Western Ry. Co. All of the shipments were billed by the O'Gara Coal Co. to Battle Creek, Mich., a point on the Grand Trunk Western.

As a fact, however, the contract of the O'Gara Coal Co. with the Grand Trunk Ry. Co. provided for delivery of the coal at South Bend, Ind., the junction point between the Chicago, Indiana & Southern Ry. and the Grand Trunk Western. By the arrangement with the Big Four the O'Gara Coal Co. prepaid to this carrier the freight charges to South Bend on the basis of unpublished divisions of the through rates to Battle Creek.

These divisions were less than the local rates to South Bend which should have applied. In this manner the O'Gara Coal Co. secured concessions on all of the coal shipped. The tariffs of the Cleveland, Cincinnati, Chicago & St. Louis expressly prohibited partial prepayment of freight charges when through rates were in effect. In order to make possible the practice of the O'Gara Coal Co. the Cleveland, Cincinnati, Chicago & St. Louis and the Chicago, Indiana & Southern Ry. Co. ignored this tariff provision.

A Fictitious Destination Is Given

Two important prosecutions have been undertaken against carriers for having their company coal billed to fictitious destinations on their line in order to defeat the published rates to actual destinations. Investigations showed that in several hundred cases the Seaboard Air Line Ry. Co. had carloads of coal shipped from Briceville, Tenn., and nearby points on the Southern Ry. billed to the Seaboard Air Line at Williams, Ga.

These shipments were delivered by the Southern Ry. to the Seaboard Air Line at its junction at Helena, Ga. Many of the shipments were consumed at that junction point and others were diverted to other points, but none of them went to Williams, Ga., as the billing directed.

The result was that, instead of paying the local rate of the Southern Ry. Co. from Briceville to Helena or the joint rate from Briceville to destination and receiving out of it jointly its appropriate division the Seaboard Air Line paid the joint rate applying to the more distant point out of which the Southern Ry. received a division much smaller than its local rate to the junction or its division of the joint rate to actual destination.

Other schemes of the same kind are discussed at some length.

The Alaskan Ry. Receives Endorsement

In a report sent to Congress Dec. 24, Secretary of the Interior Lane endorses the plan of a Government railroad in Alaska and urges the opening up of Alaskan coal fields under a leasing and royalty system which he says would make it sufficiently worth while for investors to engage in the exploitation while it would protect the Government. Secretary Lane also says that the same leasing system ought to be applied to Western coal and remarks:

> We wish cheap coal and at the same time a minimum of waste. . . . . We desire competition without waste, a frank impossibility. . . . . In a new country where there must be large development and higher rewards for enterprise, the safest practicable method is to lease the land, the Government taking a modest royalty and retaining some measure of control over operation.

PENNSYLVANIA

Anthracite

Pottsville—Plans for the new coal stripping operations at the top of the Broad Mountain are now in progress. This will involve an expenditure of many thousands of dollars, by the Philadelphia & Reading Coal & Iron Co. The surface from Mt. Laffee to Millins Hill is to be cleared away, exposing the valuable coal measures.

It is unofficially stated that within a few days one of the most historic collieries of the anthracite region, East Bear Ridge, near Mahanoy Plane, will pass from the control of the Philadelphia & Reading Coal & Iron Co. to the Susquehanna Coal Co. This mine has been worked since 1830, or over three-quarters of a century.

Hazleton—Anthracite miners are already beginning preparations for the spring of 1916, when the present wage agreement expires. Local No. 1739 of Lansford has adopted a resolution to be offered at the International Convention of the United Mine Workers, in Janury, urging that agitation and organization of unorganized labor in the United States and Canada be continued, in order that in 1916 the mine workers will be in a position to make a general stand, and upon the eve of a great presidential election "make great headway along the line of political and economic action."

Concrete City—Every one of the twenty double houses in Concrete City, the model village of the D. L. & W. Coal Co., near Nanticoke, is now occupied; and with the completion of the park in the big square 300x410 ft., which is surrounded by the houses, the settlement will be as perfect of its kind as Forest Hill, L. I., the model suburb of the Russell Sage Foundation.

Bituminous

Royal—Thieves recently stole $700 in cash from the W. J. Rainey Coal Co., office in the store. The money was in pay envelopes and represented the amount miners has failed to lift the previous day. The theft was not discovered until delinquet miners appeared at the office for their pay.

Pittsburgh—It is said that President Van Bittner has been reëlected president of district No. 5, by at least 6000 majority. F. P. Hanaway is elected vice-president by about the same majority and Robert Wood, secretary-treasurer, while Philip Murray, was reëlected international board member.

WEST VIRGINIA

Fayetteville—Three dwelling houses belonging to the Cannelton Coal Co., at Cannelton, were totally destroyed by fire recently entailing a severe loss. Several other buildings were badly damaged, all being partially insured.

Charleston—An extension of time until Feb. 15 has been given to the English syndicate contemplating the purchase of most of the properties in the New River district. An agreement was reached at a recent conference on the terms of the contract, and the matter is now wholly in the hands of those who are to raise the finances for the transfer of the property.

Wheeling—Following the attack upon Frank Long by four Italians believed to be members of the Italian Mafia society, the arrest of Long's assailants is expected. Mr. Long had been implicated in the mine trouble of Brooks county, and for some time past had heard rumors that he was marked by the Black Hand.

ALABAMA

Birmingham—A petition in involuntary bankruptcy was recently filed against the Oak Leaf Coal Co., of Cordova. The petitioning creditors were: The Hendon Hardware Co., J. A. Williams, Lantrip Bros., and J. P. Higginbottom, all of Cordova.

OHIO

Columbus—A movement has been started among the employers of labor in Ohio in which the coal operators have joined for a number of amendments to the Workmens Compulsory Compensation law which becomes effective Jan. 1, 1914. As the law stands at present hardships are worked on employers and efforts will be made to secure amendments, which will make it less burdensome. A number of bills are now being prepared to be presented at the extraordinary session of the legislature.

Belleaire—Reports which have been in circulation recently that the rail and river mines were to shut down on account of slack orders are false. According to a semi-official statement, if any time has been lost, or is lost in the future, it will be because a sufficient number of cars to handle the output cannot be secured.

INDIANA

Clinton—Miners in the local unions in the Clinton field met here to consider recommendations for the biennial settlement between miners and operators in the central competitive district, which will have its first consideration at a joint meeting in Indianapolis Jan. 6. Both sides are said to be pretty well satisfied with the present agreement and much less difficulty than formerly is expected in reaching a settlement. Indiana operators seem to have prospered the last two years and miners have had comparatively steady work.

Miners at the Lyford mine struck recently because the superintendent asked some of them to wade through wet bottoms to reach their rooms and they demanded the dismissal of the superintendent. The district president censured the men for stampede methods and they went back to work, after the company agreed to keep the entries as dry as possible.

Vincennes—The American Coal Co. has completed two miles of switch from the Knox mine to Aliceville, a new town near Vincennes, started by the establishment of a mining camp by the company. About 300 miners, mainly from Hymera, have moved here and 300 more are expected by next summer.

Brazil—Operators in the block field say they are finding it hard to meet the competition in Chicago, of the unorganized strip mines in and around Patricksburg, in Owen and Green counties. The union operations pay miners $1.15 a ton while the miners in the non-union mines, it is said; get $1 to $2 a day. There are no regulations as to the width of bars or screens and the non-union mine can put a cleaner coal on the market.

ILLINOIS

Marion—At the recent election at Energy, a mining town northwest of here, the women successfully out-voted the miners, and succeeded in piling up a majority against he saloon element.

Springfield—It is understood here that the principal contentions of the miners in their next agreement with the operators will be a raise of wages and a shorter day, or one of seven hours. The present agreement expires next spring.

MISSOURI

Novinger—Miners at Novinger, Mo., were unable to get their pay checks cashed recently, as the result of a fire which destroyed the Union bank. While the safe was fireproof, the casing and breaching became sweated together and bank officials were unable to open it. Mine officers sent to St. Louis for money and paid the miners within 24 hours.

St. Louis—The hearing before Commissioner Harlan of the Interstate Commerce Commission, recently, on behalf of the railroads for an increase of 5½% in coal rates to St. Louis, and also on behalf of several petitioners to abolish the 20c. per ton bridge toll to St. Louis, brought out the fact that the railroads were discriminating to the extent of 10c. per ton against the City of St. Louis, in favor of East St. Louis, Granite City, and Madison.

It also developed the fact that the fight for the removal of the bridge toll was inspired almost altogether by the operators of mines in the Inner District taking the 52c. freight rate to St. Louis. This is an old fight between the operators of the Inner District and the operators of the Outer District, which takes the 67c. freight rate to this city.

The operators in the Inner District want their rate reduced, and want the Commission to raise the rate from the Outer District. It is likely that the Commission will order, as a result of the testimony, the St. Louis Terminal Railway Association to reduce the Bridge Toll of 20c. a ton to 10c. a ton, but that is about as far, competent authority claims, as the Commission will go as a result of the hearings.

NORTH DAKOTA

Medora—The Medora coal mine is again in operation, and the owner claims the only kiln dried lignite in the state. It is estimated by the State Geologist that the mine property will produce 1,400,000 tons.

COLORADO

New Castle—Union miners who recently went on strike here and whose places were taken by the men who met death in the recent coal mine disaster, almost to a man volunteered to enter the mine after the explosion to recover the bodies of the dead. The organization of the United Mine Workers also furnished $300 to be used by the union to relieve the distress of the families of non-unionists.

OREGON

Roseburg—Excitement is still high in the new coalfield 40 miles east of here and many locations are being made. A good grade of coal is found, which experts say is equal to the Pennsylvania product and much better than other coals that have been mined in Oregon.

WASHINGTON

Morton—Nine persons have made application to obtain patents each for 160 acres of coal land near this town. The development of these lands will mean much for this section, as the coal is a high-grade bituminous.

FOREIGN NEWS

Juneau, Alaska—The registrar in the land office has recommended to the commissioner of the general land office that charges against the Willoughby coal claims in the Bering River district, be dismissed. Cancellation was sought on account of the claimant's failure to prove tract as required by law. There have been no allegations of fraud. The area involved is approximately 480 acres, and the owners are Portland, Ore., and Wilkes-Barre, Penn., parties.

Caracas, Venezuela—Despite the large imports of coal, Venezuela exported during the first half of the current year, 40,026 kilos (88,857 lb.) of this fuel. This is accounted for by the fact that Venezuelan wholesalers supply a number of nearby coast towns in Colombia and Brazil.

PERSONALS

E. T. Hendon has been appointed receiver for the Oak Leaf Coal Co., which recently went into bankruptcy.

Judge Ruppel has appointed the following examining board to hold examinations for mine foreman and fire bosses in Somerset County, Penn.: Mine Inspector Fletcher W. Cunningham, Richard Maize, superintendent of the United Coal Co. and Orville Kregar, of Boswell.

Samuel B. Eaton, for many years general superintendent of the coal mining properties of Crear, Clinch & Co., near Duquoin, Illinois, has resigned. Mr. Eaton has recently disposed of his interest in the company, and will probably move to California. He is succeeded by E. C. Searls.

F. S. Peabody, president of the Peabody Coal Co., and chairman of the Executive Board of the Commonwealth Edison Co., recently delivered an illustrated lecture upon the subject of coal and coal mining before 500 employees of the Commonwealth Edison Co., in the Sherman House at Chicago.

George P. Gallagher, District Superintendent of Exeter, Westmoreland and Maltby Collieries of the Lehigh Valley Coal Co., has been promoted to the position of Assistant Division Superintendent of the Lackawanna Division, to succeed G. P. Troutman, who has resigned to become Assistant General Manager for Markle & Co.

J. E. Baumgartner who has been for the past five years General Superintendent of eleven mines owned by the Superior Coal Co., of Wellston, Ohio, has resigned his position, to take place after the first of the year. Mr. Baumgartner is one of the youngest superintendents in the state and has worked his way up from a trapper boy. He is undecided as to the future.

James Taylor, who was appointed State Mine Inspector of Illinois in 1887, by Governor Dick Oglesby, and who has served ever since with the exception of the Altgeld administration, tendered his resignation to Governor Dunne on Nov. 10. In reply the governor said. "Kindly continue to perform the duties of your office until further notice." It appears that the governor is in no hurry to displace an efficient man in a position where much depends upon experience and ability.

OBITUARY

Daniel M. Barton, general purchasing agent of the General Electric Co., died at his home in Schenectady recently after an illness of five days.

Mr. Barton was born in Moriah, N. Y., in 1843, removing with his parents to Massachusetts while still a child. In 1893 he became assistant purchasing agent of the General Electric Co. and a few years after the main office of this firm was established in Schenectady, he became general purchasing agent, which position he ably filled until the time of his death. He is survived by a wife, a daughter, three grandchildren, a brother and a sister.

RECENT COAL AND COKE PATENTS

Coal Cutting Machine. A. Scharf, 2 Westerbleichstrasse, Dortmund, Germany, 9448 of 1913.

Improvements in Coal Cutting Machines and the Like. Beckett and Anderson, 71 Lanark Street, Glasgow, Scotland, 6627 of 1913.

Improvement in the Construction of Shafts for Coal Mines and the Like. T. E. Harris, 20 Peugam Street, Peugam, South Wales, 24,764 of 1912.

An Improved Apparatus for Testing Gas with Miners' Safety Lamps. W. Baxter, Priory Road, Bolten-upon-Dearne, near Rotherham, 27,264 of 1912.

CONSTRUCTION NEWS

Kittanning, Penn.—A small corporation to be known as the Mohawk Mining Co. has taken over the coal under the Miller farm in East Franklin township and will mine the same.

Kittanning, Penn.—Work is now under way extending the line of the West Penn interests to the mines of the Providence Coal & Coke Co. at Kelly Station for the purpose of electrifying the entire plant.

Marion, Ill.—The Scranton and Big Muddy Coal and Mining Co. has just installed a Sullivan compound straight line compressor, size 24x26x16½x30 in. This machine has been erected to operate 22 mining machines.

Shadyside, Ohio—The Webb mine of the George M. Jones Coal Co. is being put into shape for producing a large amount of coal as rapidly as possible. Entries are being driven and the coal is now being produced at the rate of from 40 to 50 cars each week.

Somerset, Penn.—Mines have been opened at six different points near Central City within the recent past, the largest being those of the Berwind-White and Loyalhanna Coal Co. The railroad tracks will be extended to the new operations inside of a few weeks.

Mt. Carmel, Penn.—Residents of Girardville and Ashland are much pleased over the prospects for the new breaker which will be erected by the Lehigh Valley Coal Co. at Packer No. 5 Colliery, which is located about a mile east of Girardville at Rappahannock.

Cleveland, Ohio—An order has been placed with the Great Lakes Engineering Co. for a 10,000-ton steel freighter to take the place of the ill-fated Charles S. Price which was destroyed Nov. 9 in the disastrous lake storm. The boat will be ready for service in the spring.

Kittanning, Penn.—Another coal mine will be added shortly along the lines of the Pittsburgh, Shawmut & Northern Ry. system. James H. Corbetts, contractor, of Kittanning, has secured one thousand acres of coal land at Timblin and the construction of the necessary mine buildings will be begun shortly.

Pottsville, Penn.—A special meeting of the shareholders of the Shamokin Valley & Pottsville R.R. will be held on Dec. 26 to authorize the proposed conveyance to the Susquehanna Coal Co. of the reversionary interests of the company in certain coal lands now leased by the Mineral Railroad & Mining Co.

Martins Ferry, Ohio—The Pursglove-Maher Coal Co. is arranging for another opening to its Black Diamond mine at Neffs. This opening will be in a hollow to the east of the tipple and will take care of the coal under the James Dixon farm. It will not require a new tipple or extension to the railroad tracks, as the mine tramway will be laid from the mouth of the new mine to the present tipple.

Caney, Kan.—It has been announced that work on the proposed Cherryvale, Oklahoma & Texas will begin in January. The road will run through the Oklahoma coal fields and give operators of that section an outlet which has hitherto been obtained under difficulties. About 40 miles of the new road already has been graded between Caney, Kan., and Vinita, Okla. The 61 miles of road to connect those cities will be built at once.

NEW INCORPORATIONS

Cleveland, Ohio—The Short Creek Coal Co. has increased its capital stock from $600,000 to $1,000,000.

Chattanooga, Tenn.—The Four-Mile Coal Co. has been incorporated with a capital stock of $30,000 to develop coal properties.

Hamilton, Ohio—The Murdoch Coal Co. has filed papers with the secretary of state increasing its capital stock from $10,000 to $20,000.

Huntington, W. Va.—The Bengal Coal Co. has been incorporated with a capital stock of $100,000 to develop coal lands near Man, W. Va.

Cleveland, Ohio—The Roby Coal Co., of Cleveland, Ohio has filed papers with the secretary of state increasing its capital stock from $800,000 to $2,000,000.

Uniontown, Penn.—The Cheat Haven Coal & Coke Co. has reorganized under the name of the Fancy Hill Coal Works. Many improvements in the existing plant are contemplated.

Centralia, Ill.—The Wizard Coal Co. has been organized with a capital of $5000 to mine, buy, sell and deal in coal. The incorporators are Frank F. Noleman, F. Kohl, Walter Eis, Harry Kohl, and F. A. Hartman.

Fort Smith, Ark.—The E. D. Bedwell Coal Co. has been organized with a capital of $50,000, all of which has been subscribed. E. Bedwell is president, T. A. Ball, vice-president, and S. H. Abbott secretary-treasurer.

Belleville, Ill.—The Victoria Coal Co. has been incorporated with a capital of $60,000 for the purpose of mining and dealing in coal and other minerals. The incorporators are L. Senior, John Henderson, and G. M. Henderson.

Bluefield, W. Va.—The Sandy Ridge Coal & Coke Co. has been organized at Bluefield with a capital stock of $50,000. The incorporators are E. E. Carter, G. R. Carter, J. H. Carter, and L. Ray, of Bluefield, and W. V. and R. S. Hansel, of McDowell, Va.

Chicago, Ill.—The Midland Counties Coal Co. has been organized in Chicago with a capital stock of $5000 to do a general mining and manufacturing business. The incorporators are Arthur W. Underwood, Nathan S. Smyser and Charles R. Young.

Birmingham, Ala.—The Nunley Ridge Coal Co., with a capital stock of $24,000, has been incorporated with the following officers: R. D. Curry, president and treasurer; H. E. Mc-

Cormack, vice-president and secretary. The offices of the company will be located at Birmingham.

Baltimore, Md.—The Bridgeport Gas Coal Co. has been organized with a capital stock of $60,000 to acquire and deal in coal lands. The principal owners are Aubrey Pearre, Sifford Pearre, Aubrey Pearre, Jr., of Baltimore; John Lowe, of Shinnston, and Gordon Lake, of Independence.

Eugene, W. Va.—The Mingo Washed Coal Co., of Mingo County has been incorporated to mine coal and manufacture gas. The authorized stock is $20,000, and the incorporators are as follows: Harvey Cory, of Pittsburgh, Robert L. Martin, Jr., Maurice A. Songer, of Eugene, J. H. Greene and B. M. Good, of Williamson.

Bluefield, W. Va.—The Appalachian Coal Land Co. has been incorporated with a capital stock of $100,000 ($25,000 seven per cent. cumulative preferred, and $75,000 common) with the following officers: R. S. Ord, president; Bernard McClaugherty, vice-president; W. S. Patterson, secretary and treasurer; J. Elliott Hall, general manager; and T. M. Morrison, chief engineer.

INDUSTRIAL NEWS

Johnstown, Penn.—A Baldwin-Westinghouse locomotive in Lochrie's mine below Scalp Level recently handled 900 tons of coal in one day of 9½ hours.

Evansville, Ind.—Henry F. Allen, of Pittsburgh, representing capitalists of that city who have made arrangements to merge several of the largest coal mines in western Kentucky has leased the building at First and Main Streets for offices.

Connellsville, Penn.—The Baltimore & Ohio R.R. Co. recently began tests on coke breeze for firing engines on the Connellsville division. Officials of the general offices witnessed the tests which are said to have been successful. This fuel is used in the new automatic stoker locomotives.

Barbourville, Ky.—John G. Matthews recently sold his interest in the Ely Jellico Coal Co. to other stockholders in the same concern. This company has during the past ten years paid dividends of over 200 per cent. Mr. Matthews is opening a new mine in the Brush Creek field in Knox County.

Marianna, Penn.—The Farmers' and Miners' Bank following the failure of the Pittsburgh-Buffalo Coal Co. with which it was affiliated has been closed, and its affairs turned over to the bank examiner. It is a state institution with a capital of $50,000, deposits of about $100,000, and a reserve of $5000.

Martins Ferry, Ohio—Mrs. Frances Crymble has sold 50 acres of coal to the Loraine Coal & Dock Co. for $200 per acre, the deal being closed recently. This coal lies close to the Lansing mine of the company and can be easily taken out. This price is several times what is usually paid for coal in Belmont Co.

Philadelphia, Penn.—The Collier "Hampden" built for the Coastwise Transportation Co., of New York, which will be used in carrying coal along the Atlantic coast was successfully launched from the Camden plant of the New York Shipbuilding Co. on Dec. 15. The craft which has a tonnage of 7000 will be completed in about six weeks.

Washington, D. C.—All Illinois members of the House of Representatives recently received telegrams from the head of the labor movement in that state urging an immediate investigation of the Colorado coal strike and the Michigan copper strike. It is rumored also that strong hints of the need for action had also come from the cabinet.

Punxsutawney, Penn.—As the result of a walk-out of miners at the Adrian mine near here, who demanded a closed shop, the Rochester & Pittsburgh Coal & Iron Co. on Dec. 17, closed down the mine indefinitely. Over 500 miners are affected and the coal company's action followed an announcement that the operators would handle trouble independently and not as an association.

Charleston, W. Va.—Shipments of West Virginia coal and coke over the Norfolk & Western Ry. for the month of November amounted to 3,597,002 tons of which 93,036 tons were coke. Pocahontas coal constituted 2,383,308 tons, while all the coke came from this field. The balance of the month's shipment came from the Tug River, Thacker and Kenova fields.

Washington, D. C.—An advance of 10c. per ton or proportional rates on coal from mines in Kentucky and West Virginia to Milwaukee, Manitowac and Kewaunee, Wis., by way of the Pere Marquette R.R. and car ferry was allowed Dec. 19 by the Interstate Commerce Commission. The maintenance of through routes to points on the west shore of Lake Michigan was ordered continued.

Harrisburg, Penn.—The Public Service Commission has received word from the experts who are investigating for the commission the rates of transportation of coal from the Anthracite regions to Philadelphia, that the preparation of their report is sufficiently advanced for them to give assurance that it will be completed and in the hands of the commission not later than February first.

Camden, N. J.—Word was recently received at the headquarters of the Camden Coke Co. in Camden from Trenton, N. J., that Chancellor Walker had refused to modify his order directing the company to abate an alleged smoke nuisance within six months or close its plant at Mt. Vernon and Chestnut Streets. It is believed that this mandatary order of the court will work great hardship upon the plant management.

Morgantown, W. Va.—The North American Coal Co., of West Virginia has closed an agreement with James A. Comley, of Morgantown, for the development of a tract of one hundred acres of coal on the Monongohela River, and along the Buckhannon & Northern R.R. The contract provides for the operation of all three veins of coal, the Pittsburgh vein being most important. The operating company has option for the purchase of the property.

Edmonton, Alberta—The Alberta Coal Branch line of the Grand Trunk Pacific Ry., 37 miles in length, is now complete, affording transportation facilities for the output of the Mountain Park Coal Co. This mine is now producing 500 tons daily, which it is expected will be increased by April next to 2500 tons. The company has erected 50 houses and established a colony of English and Scotch miners. It is proposed to increase the force to 800 men in the near future. The coal is a high-grade bituminous.

Cincinnati, Ohio—Cincinnati coal dealers and steamboat companies are opposed to Senate Bill No. 136 known as the La Follette Seaman's bill as it is believed this measure is detrimental to local river interests. It is understood that the bill provides for the employment of three crews on all river steamboats instead of two as now required, and it is alleged that this would mean that practically every boat on the river would have to be rebuilt, as none of them are now large enough to accommodate more than two crews.

Philadelphia, Penn. — The mild weather thus far this winter has caused anthracite coal operators of Pennsylvania much money expended for the storage of coal. Only a limited amount can be kept on hand at tide-water, and the rest has to be cared for in the anthracite region itself. It has been estimated that as much as 10 per cent. of the total annual production or nearly 7,000,000 tons are in storage at one time. It is neither expedient nor possible to make the operation of the mines dependent upon the state of the weather.

Columbus, Ohio—The mid-winter meeting of the Michigan-Ohio-Indiana Coal Association will be held at Indianapolis Jan. 20-21. Routine matters will be discussed and steps will probably be taken toward fixing a place and time for the 1914 convention. The association is in good condition as to members and finances and B. F. Nigh, secretary has taken up the settlement of claims against railroads for the members and has been highly successful in this work. The amount collected in 1913 is far in advance of that collected during previous years.

Fort Smith, Ark.—J. L. Rhodes electrician was granted a verdict of $1000 and his assistant, D. Hatcher, a verdict of $375 against the Central Coal & Coke Co., of Hartford, by a jury recently. The men sued for $3000 damages each, for injuries which they alleged to have received when they were sent into a mine to make repairs. While they were in the workings the ventilating fan stopped, and their lanterns ignited gas. Since the explosion 200 men employed in the mine refused to return to work because the company has declined to place an extra guard at the fan house to keep the fan in operation at all times.

New Orleans, La.—Owing to the low stage of water on the Warrior and Tombigbee Rivers, the first regular trip of the barge service between this city and the Alabama coal field was not an unqualified success. It has been proven, however, that the barges will be able to navigate the upper rivers with facility, once locks and dams are completed. With the coming of the winter rise several months of deep water are assured. During this time it is expected that a considerable tonnage of coal will be brought to New Orleans by the water route. The power barges will at least have a fair chance to demonstrate what they will be able to do, and upon the result of their performance depends the possible readjustment of market conditions in New Orleans.

COAL TRADE REVIEWS

GENERAL REVIEW

Entire absence of the customary holiday rush for anthracite. Rumors that some coal is even going into storage. Further recession in bituminous.. All markets have lost ground sharply during the week. Some relief anticipated as a result of the restricted production over the holidays.

While ordinarily the holiday period finds an acute shortage of anthracite and a heavy rush of business, the situation this season is completely reversed. The accumulations of coal at the principal distributing centers are so excessive that the companies are welcoming the opportunity for a cessation of operations, while usually the operating departments are being pushed for ever possible ton that can be produced at this time. The individuals are maintaining a full working schedule, but are forcing the market, and as a result substantial concessions on the regular circular are frequently heard of. There are well defined rumors that the companies are stocking 10 per cent. of their production.

A break of 5c. in the Hampton Roads circular on high-grade West Virginia coals, putting these desirable fuels on a basis 5c. off from the regular circular maintained throughout the summer, may be taken as typical of the condition of the soft coal trade at the moment. All markets as a rule are well stocked, and operators are anxiously soliciting new spot business; those who failed to contract in anticipation of a high price level by Jan. 1, are now finding themselves in a difficult position. There are no indications of a rally as yet and conditions are tending more toward a further shading off. But in spite of all the adverse conditions, prices are remarkably well maintained, a fairly profitable price level ruling, with but little sacrificing of demurrage coal in evidence. The anticipated curtailment in production over the holidays is having a steadying effect upon the situation, and will tend to relieve the pressure on the market after the first of the year.

Domestic coal in the Pittsburgh district is reported the dullest in years. The market lost ground decidedly during the week, steam consumption falling off in all lines and prices irregular; some slight improvement in Connellsville coke is the only encouraging feature in the local situation. The market in Ohio is at a complete standstill with dealers loaded up to the full limit of their storage capacity, and mines working under a heavily curtailed schedule. Some contracts are being renewed at last year's figures, and the possibility of labor troubles in April is having a beneficial effect upon the prices at which this business is being done. Dumpings at the West Virginia piers ran good during the week. The Southern market is dull, insofar as new business is concerned, though consumers continue taking regularly on contracts. The usual holiday rush business has failed to develop and coal is accumulating in the local railroad yards for the first time this year.

The Middlewestern market is regarded as the worst for this period in years. Cars are plentiful, and railroads have accumulated surplus stocks and are beginning to cut down orders. As in the East, however, prices are being held better than conditions seem to warrant, the principal cutting being confined to coal on demurrage. The Western markets are exceedingly easy in spite of the Colorado labor trouble.

EASTERN MARKET

BOSTON, MASS.

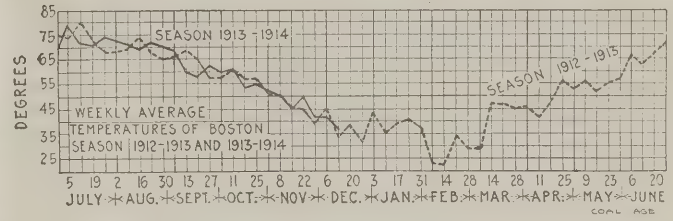
Bituminous quiet and softer. Inquiry for spot coal has ceased and contract demand reduced. Georges Creek remains firm and Pennsylvanias are quiet for tidewater shipment through fairly active all-rail.

Bituminous—There is no material change in the market. The well stocked condition of New England consumers has made the demand for shipment on contracts light and the shippers of New River and Pocahontas are anxious to the extent of actively soliciting spot business. The accumulation of coal at Hampton Roads loading piers has been substantially enlarged and the circular price of $2.85 f.o.b. has been shaded, New River coal having been openly quoted in this market at $2.80. Many are inclined to believe that January will be a particularly dull month for soft coal.

The situation on Georges Creek remains unchanged. This coal continues in good supply, but with the price firm. Pennsylvania coals for tidewater shipment are in little demand due the excessive supply of the Southern grades. The situation at Hampton Roads does not so materially affect all-rail shipment of the Pennsylvania coals. The market is now quotable as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New River
Mines*	$1.00@1.55	$1.25@1.60	$1.67@1.77	
Philadelphia*	2.25@2.75	2.50@2.85	2.92@3.02	
New York*	2.55@3.05	2.80@3.15	3.22@3.32	
Baltimore*			2.80@2.90	
Hampton Roads*				$2.80@2.90
Boston†				3.72@3.82
Providence†				3.72@3.87

*F.o.b. †On cars.



Anthracite—The continuance of warm weather has made this market most inactive. Stove coal appears to be in as poor supply as ever.

The marine freight market remains without change, charters for New England being limited. This ruling rates from Hampton Roads to Boston are 70@75c.

NEW YORK

Under the influence of continued adverse weather and industrial conditions, market remains dull and heavy. Bituminous prices holding remarkably firm. Anthracite dealers overstocked. General curtailment over the holidays.

Anthracite—Mild weather conditions this past week has caused quite a slump in anthracite sales, although comparing the temperature between 1912 and this year there is little variance. Dealers are overstocked and in many instances, if possible, avoid purchasing coal until the new year. Egg coal was held by numerous individuals at 50c. to 60c. off circular and some found it difficult to move even where an equal quantity of stove coal accompanied the egg. Straight stove brought small premiums of 10 to 20 cents. Nut coal in some instances, particularly in the Lehigh grades, sold at 10c. off circular; this size being popular with the peddlers in the free burning grades moved promptly. Pea size continued in fair demand, although buckwheat was plentiful and hard to move even at cut prices. Schuylkill rice is strong, but barley remained inactive. The same condition applied to the Wyoming grades of steam sizes.

From an authentic source it is learned that at the present time the large companies are stocking 10% of their production, which naturally indicates a lack of sufficient orders on hand. The new demurrage rules at all the tidewater points prohibit the holding of coal for an indefinite period and for that reason the companies will have to resort to stocking coal on the ground, which is an expensive proposition, particularly on the prepared sizes due to the breakage in handling. The Reading Co. collieries will be shut down three days a week during the holiday season, and no doubt the same conditions will apply to the Wyoming region. This will materially help conditions all around by Jan. 1.

We quote the New York market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	....	$5.05	
Egg	5.25	$5.25@5.35	5.30	$4.75@5.20
Stove	5.25	5.25@5.40	5.30	5.20@5.35
Chestnut	5.50	5.40@5.50	5.55	5.35@5.45
Pea	3.50	3.40@3.50	3.50	3.35@3.45
Buckwheat	2.75	2.70@2.75	2.45@2.70	2.25@2.70
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

Bituminous trade still remains dull and the tendency toward curtailment by the manufacturers throughout the East, with the exception of some few lines, does not portend much better conditions for the immediate future. The shipments of soft coal have been unusually heavy throughout the season, the contractors taking their supplies freely and the movement on the regular contract tonnage continues in fair volume. Those of the operators who thought it better to keep their tonnage free have found that instead of the high market they expected by Christmas time, an entirely contrary condition obtains.

The decided slump of the market in the West has caused a number of West Virginia operators to look to the East for their market, and this has overtaxed the absorptive power of the market. There is considerable accumulation of coal at tide, a general embargo having been placed on the Pennsylvania R.R. Co., at South Amboy, on Saturday last. The remarkable feature, however, is the fact that in spite of the heavy tonnage available, prices are comparatively well maintained. There appears to be little real sacrifice in the movement of demurrage coal such as one might naturally expect under the conditions. The market is quotable as follows:

West Virginia steam, $2.60@2.75; fair grades of Pennsylvania, $2.70@2.80; good grades of Pennsylvania, $2.80@2.90; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

PHILADELPHIA

Hard coalers forced to curtail production. A customary season of short supplies and heavy demand finds large surpluses available, and market dull. Individuals cutting the circular freely. Tidewater points crowded with coal.

It is now either a case of restricted mining, or large demurrage bills on account of coal held in cars without disposition, and the companies, recognizing this fact have resorted to a restriction of mining. This is most unusual at this period of the year, when as a rule, the holiday season is looked on with apprehension, because of decreased shipments, but it looks now as though the closing of the year will find the market in the throes of a general slump. This is due to the weather, which has been anything but propitious. Outside of stove coal there does not seem to be any active market at all, and with all grades piling up on their hands, and no outlet in sight, the companies have anticipated the season's restricted output by a general curtailed mining.

Individual operators, who continue to run their mines, are forcing a market for their output by quoting prices that must sell the coal. Fifty cents off circular for egg is about the lowest quotation to date, with more to come if further holding of the coal involves demurrage. It is understood that tidewater points are crowded with coal, and while this branch of the business has held its own for the last six months, there are indications that too much cannot be expected of it, and if conditions do not improve in the New England market, there is likely to be considerable demurrage paid before the coal is disposed of. Outside of broken and stove, it is simply a hand to mouth market.

The bituminous trade still shows no tendency toward improvement. Offers for spot coal are eagerly taken by the operators, if there is anything that looks like a profit over the cost of production, and this applies to even the best grades. As low as $1.25 has been quoted for the best Pennsylvania coals, and it is freely predicted that even lower prices than this are likely to prevail, if conditions do not change very shortly.

BALTIMORE, MD.

Both the bituminous and anthracite trade dull and uninteresting. Prices are too near actual production cost for comfort. Coke in poor demand.

The past week has been a most uneventful one for the trade. There has been no indication of a rally; in some cases there has been a still further shading off. In Pennsylvania, a 90c. to $1 figure, even for low-grade coals hits the mining interests hard. The same is true of West Virginia, where gas fuels sold variously during the past week from 75c. to 80c., with steam coals about ten cents better. Fine-grade Pennsylvania steam coals were offered by some producing interests around $1.20 to $1.25. The coke market is off in sympathy with the soft-coal trade. West Virginia cokes were offering as low as $1.75, with Pennsylvanias doing about 15 to 20c. better. The market is the worst for many months.

Mining interests are only operating in part through Maryland, West Virginia and western Pennsylvania. The Christmas and New Year's holidays will prevent an over-production even at the shortened time basis. The movement of anthracite to this city is said to be not two-thirds of what it was at this time last year. Unless some real winter weather arrives soon, the situation will be serious. Movement over the piers continues fair for foreign account, but there is little doing now on the domestic coastwise shipping line.

CENTRAL STATES

PITTSBURGH, PENN.

Combination of adverse conditions has caused a relapse from improved conditions noted last week. Mine operations much restricted and prices fluctuating. Prompt coke limited and market showing a slight improvement.

Bituminous—The coal market has lost ground decidedly since last report, when there had been a temporary improvement due to a cold snap, but which only proved to be of short duration. From all viewpoints the condition is unsatisfactory. Manufacturing demand grows lighter as the iron and steel industry slows down, railroad consumption falls off as the freight movement decreases, and domestic demand is poorer than it has been in any season for years. Prices are quite irregular, cutting being the rule when it is necessary to move tonnage. Sales to consumers are frequent at 10c. differential, which normally applies to dealers, making mine-run $1.20 instead of $1.30, and it is possible that in exceptional cases there has been even more cutting. Mine operations are down to about 50%, against 60% in the early part of the month. We quote regular circular prices, subject to shading, as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The market is taking on a much stronger aspect. The amount of furnace coke available at less than the $2 price asked all along by the majority of producers is proving to be quite limited and some buyers do not find desirable brands in the list. While a few transactions have been closed for next year at less than $2, the latest transaction is 12,000 tons for January, at $2. This deal reflects the attitude of many prospective consumers, who purpose buying for January alone instead of for the quarter or half year. They do not think the market will in any event advance above $2, and by purchasing for January only, the month most likely to show difficulties in coke movement, through weather conditions and the celebration of the various Greek and Russian holidays among the men, they will still have the opportunity of profiting by possible declines later. Negotiations are active with many consumers and the next few days are likely to see many contracts closed, a few for the half year, but the majority probably for January only. Prompt coke is in limited supply and is quotable at a relatively low figure only because prompt demand is almost entirely absent. We quote: Prompt furnace, $1.75; contract furnace, $1.90@2; prompt foundry, $2.50@2.75; contract foundry, $2.50@2.75, per ton at oven.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Dec. 13, at 307,790 tons, a decrease of 14,137 tons, and shipments at $305,845 tons, a decrease of 15,786 tons.

BUFFALO, N. Y.

Weather still adverse to any activity in the coal market. Anthracite as dull as bituminous. Mines in Allegheny Valley reducing output. Not so much soft coal on track. No improvement in sight.

Bituminous—The trade is still quiet, with shippers making a little more effort to keep the tracks clear of unsold coal. While there is still coal here and there under demurrage, it is somewhat less and if the local jobbers can control the movement the production will not be large enough to crowd the consumers for storage and reduce prices. It is not believed there will be any improvement in the trade till well into January and not then if the weather continues mild. Buffalo has the advantage in not being a terminal point, for if there is too much accumulation, the seller has a way of sending some of it further on.

While this does not ease the market to any great extent, it is quite an excusable practice where the mine is inclined to load up a single distributing center too much. Another abuse of late is to sell a lot of coal and then ship half as much more and depend on the buyer's good nature to accept the surplus. There is all of the former difficulties with the miners, who are demanding closed shop and many other conditions. But they find the operators independent as a rule, for producers feel that concessions would be fatal, in view of the spring agreements. Quotations are difficult to make, as many prices are paid and only a few getting former figures, which are $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack rather firmer than three-quarter. Allegheny Valley is about 25c. lower than Pittsburgh.

Coke—The coke market continues quiet, with prospects of remaining at the present low figure till there is a genuine stir in the iron trade. Prices remain on the basis of $4.60 for 72-hr. Connellsville foundry.

Anthracite—So far as actual demand is concerned, the anthracite market is fully as flat as anything else. The local consumption has seldom been as light at this time of the year. Retail dealers are making a bare living and now that the Lakes are closed—without a sign of ice—the rail line demand is not sufficient to take care of the most ordinary output, and Buffalo shipping agents are already beginning to take Lake tonnage for loading to hold on winter storage. The Lake trade closes with the shipment of 103,100 tons in December, a large amount, and 5,033,296 tons for the season, as against 3,925,083 tons in 1912.

TORONTO, CAN.

Trade duller than at any time in more than a decade.

Trade conditions show little change, sales being slow on account of the continuance of unseasonably mild weather. Dealers state that business since the beginning of November has not been so dull at this season since 1902, when similar conditions prevailed. Quotations at retail are as follows: Egg, stove and nut, $8.25; pea, $6.75; soft coal, steam, steam screenings, $4.35; domestic lump, $6; cannel coal, $7.50. Wholesale, ¾ lump, f.o.b. cars, $3.85; soft coal, screenings, f.o.b. cars, $3.

COLUMBUS, OHIO

Trade is weak in every department, due to continued unfavorable weather. Demand light in all grades and mines are being operated at about 50 per cent. capacity. Prices have weakened under the influence of unfavorable weather and the trade is not promising.

Dealers' stocks of domestic grades are large and they are unable to take care of any more coal until they can move their surplus. Customers are slow in placing orders now, believing that there may be lower prices later on. Most of the larger users have laid in their winter's supply and the trade is at a standstill. The smaller dealers are not inclined to take chances on the payment of demurrage. There is some demand for the fancy grades, such as Pocahontas and rescreened varieties.

But domestic trade is not the only branch which shows a softness. The steam business is light and many iron and steel concerns have closed down. All this affects steam grades adversely and the volume of business is comparatively small. In this connection reports of fuel used by railroads are smaller as the freight movement is decreasing. What steam contracts are expiring at this time are being renewed at the same figures that prevailed last year.

The Lake season is now over, and reports from the Hocking Valley Docks at Toledo shows that 2,747,000 tons were loaded during the season, which is an increase of more than 325,000 tons over the previous year. Production has been largely curtailed by the lack of orders and as a result mines have not been operated to their full capacity. In the Hocking Valley and Pomeroy Bend districts, the output is estimated at 45 to 50 per cent. of normal and the reports from the strictly domestic fields show a still smaller percentage. In eastern Ohio the output has been about 40 per cent. of the average.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	$1.85 @ 1.75	....	$2.00 @ 1.85	$1.70 @ 1.60
3-4 inch............	1.65 @ 1.60	$1.20 @ 1.15	1.80 @ 1.70	1.50 @ 1.45
Nut...............	1.30 @ 1.20	....	1.65 @ 1.55	1.30 @ 1.25
Mine-run..........	1.35 @ 1.30	1.10 @ 1.05	1.30 @ 1.25	1.35 @ 1.25
Nut, pea and slack..	0.80 @ 0.75	....	0.90 @ 0.85	0.80 @ 0.75
Coarse slack........	0.79 @ 0.65	0.90 @ 0.80	0.80 @ 0.75	0.70 @ 0.65

DETROIT, MICH.

Plenty of coal and all orders promptly filled. No serious condition anticipated here during the balance of the season. Good stocks on hand.

Bituminous—The recent cold snap has developed a greatly increased demand, but supplies were good, and orders as a rule have been promptly filled. A congestion at junction points south of here, was materially relieved during the previous mild weather and the general opinion is that no serious trouble will be experienced in this direction during the balance of the winter. A falling off in the freight movement and curtailment in the general manufacturing demand have reduced the steam business materially. Contracts expiring Jan. 1, will, as a rule, be renewed on the same basis as last year. Domestic dealers have ample stocks on hand to meet almost any demand that might appear, and new orders are not plentiful. A change in the weather condition will be necessary before an active business can be expected. Prices are not materially changed, but are probably somewhat firmer. The market is now quotable as follows:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.50	....	$1.50	....	....	$2.25	$2.50
Egg...........	1.50	....	1.50	....	....	2.25	2.50
Nut...........	1.35	....	1.20	....	....	....	....
Steam lump....	1.25	....		....	....	....	....
¾-in. lump.....	1.10	$1.10	1.10	$1.10	$1.10	....	....
Mine-run.......	1.00	1.00	1.00	1.10	1.10	1.40	....
Slack..........	0.90	0.90	0.65	0.90	0.90	....	....

Anthracite—All the anthracite sizes are coming in freely and stove coal, which was decidedly short, is now in easy supply at the circular price. Indications point to a surplus of anthracite coal at the present time.

Coke—The coke market is firmer than at any time for a long period. Connellsville foundry is quoted at $1.75, Semet Solvay at $2.75, and gas house at $2.70 f.o.b. ovens. A number of the local ovens are curtailing their production.

HAMPTON ROADS, VA.

Heavy loadings for the government during the week. About normal supply of coal at tidewater. Prices practically the same as for several weeks.

Dumpings for the week have been good, the government alone taking nearly 35,000 tons. Coastwise and foreign shipments have also been fairly heavy. Prices quoted are practically the same as they have been for some time, and although some large sales have been made it is impossible to ascertain at what prices.

Coal moving during the week has nearly all been Pocahontas and New River, there being little demand for the other grades just at this time. Owing to the demand for high volatile being light, few shipments have been sent to tidewater and in consequence there is little of this coal on hand.

During the past week the N. & W. Ry., at Lamberts Point, gave their new pier a test and found everything working satisfactorily. There still remains considerable work to be done on the pier and the prospects are that it will be about the middle of January before any coal is dumped over it.

LOUISVILLE, KY.

Consumption incredibly small for the season of the year. Car shortage relieving the situation somewhat. Curtailed production over the holidays also helping out.

With every prospect for an unusually mild Christmas, the coal trade in this section is facing an unusual state of affairs. The consumption of coal has been incredibly small, and the demand has been of the same sort. The domestic grades are practically not moving at all, many operators and wholesalers, in fact, having received numerous cancellations. Coal stored during the latter part of the summer and early in the fall, for the demand which normally exists at this time, is still on hand, and there is no room for additional storage.

A car shortage is about all that saves the situation from utter demoralization; it keeps the amount of coal on the tracks from reaching the proportions which it otherwise would. The holiday lay-off at the mines will also help things considerably, and if the long-expected winter arrives by Jan. 1, or shortly thereafter, business should show a marked improvement. Until then, it is emphatically a market governed by unseasonable weather. The situation of the steam market is strikingly different from that in the domestic market. The greatly reduced production of the prepared grades has resulted in a similar reduction in the quantities of screenings available, and as most industries are operating on full time, this means something resembling a shortage on the local market.

The better grades of eastern Kentucky, such as Straight Creek, are selling at 90c. a ton, f.o.b. mines, and prospects are for still better prices soon. Western Kentucky nut and slack is worth 65 and 70c., and is in good demand. Prices for domestic sizes are not being freely quoted at much below last week's low level, operators fearing to demoralize the market, but the best grades can be had for $1.85 or thereabouts.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

No improvement in coal market. Stocks accumulating in railroad yards. Blacksmith coal normal. Little activity in furnace or foundry coke. The car situation has improved.

There is no change in the coal market, either on steam on domestic coal, unless it be for the worse. The trade is now practically dead, as far as inquiries or new orders are concerned; contract tonnage is moving regularly, however, though in some instances the consumers are taking only the minimum called for. One of the large interests is offering the best Cahaba coal at $2.75 per ton, which is 50c. under the market for this season, and even then they are not moving their tonnage.

For the first time in several years, a stock of coal is accumulating in the railroad yards, which has a tendency to weaken the market. While prices on domestic coal have been reduced in the effort to obtain business for prompt shipment, prices on the steam grades seem to be holding up, though the steam market is in the same condition as the lump trade. As the market during the summer months, which is usually the dull period, was excellent, the operators are at a loss to understand the slump at this season, which is naturally the best of the year. Blacksmith coal seems to be holding up better than any of the other grades. Little activity is shown either on furnace or foundry coke, but the prices are holding up. On account of the quiet coal market, which necessarily means small shipments, the car situation shows an improvement, which is really the only satisfactory condition at the present time. The usual holiday rush shipments have, so far, failed to materialize.

NEW ORLEANS

Sales show unusually low total. Lack of demand for bunker supply. Prospects good for business after the turn of the year. Cargo outlook poor owing to low rates being named for Atlantic coast product.

The domestic market was quiet due to the return of spring weather. There were plenty of ships in port but they had either coaled last week or were waiting until next week. Total sales in the harbor were the lightest of the winter and points in the interior took little coal, due largely to the fact that taxes are assessed on supplies on hand Jan. 1.

Next week promises to be little better than the one just closed, but there are prospects of considerable business after New Year's. Stocks are believed to be limited and general replenishing will begin at once. Prospects for increased exports, so far as parcel shipments are concerned, are good. The cargo business is expected to continue quiet in the face of the low rates that are being made on coal from the Atlantic seaboard.

INDIANAPOLIS

Mild weather still prevails, cutting down consumption to a minimum. Prices are being held by closing down the mines, though some track coal has moved at bargain rates. Everybody waiting for real winter weather.

Mild weather continues and the coal trade is as small for December as it ever has been within memory of local coal men. Generally speaking, prices remain unchanged, but would be lower, if there was advantage in making them so. There is cutting of prices but this is usually on track coal, to save demurrage charges. For example, with domestic lump listed at $1.90, it is found that sales have been made even down to $1.55. There is no incentive to reduce mine prices in the present kind of weather, for the price is not the controlling factor.

The general opinion has been that the yards are necessarily filled, because of the mild weather, which made consumptive needs small but this has been disproved by a good authority. There have been two or three spells of sharp weather that looked like the real beginning of winter, and although it lasted only two or three days there was almost day and night hauling, during this time. Then came the teamsters' strike, and the retail yards of the state were never busier, probably, than for these few days.

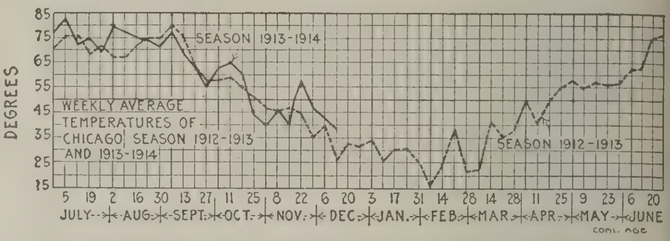
So, after all, considerable holes were made in retailers' piles. It also seems the car shortage, at the time Indiana coal begins to move, hindred the piling up of large stocks. Everybody in the coal business is waiting for winter weather. Operators that ship outside the state say the commercial department of the trade is not up to normal, but in Indiana it is hard to find the factory that is down or running below normal schedule for this time of year. The block coal field is suffering less than the others.

CHICAGO

Mild weather has resulted in a sharp decline in production. Demand for anthracite light and a comparatively small amount of smokeless coal is being moved. Nominal prices are quoted for Springfield coal. The coke market dull.

Coal-carrying roads entering Chicago announce that the continuation of mild weather has resulted in a marked decline in their tonnage. W. J. Jackson, receiver and general manager of the Chicago & Eastern Illinois says his company could handle 35% more coal than is now being offered for shipment. A sharp cut in shipments also has been reported by the Illinois Central and Big Four roads.

The coal market in Chicago, generally, is dull. Anthracite coal is in exceedingly light demand. Shipments direct from the mines have been curtailed and in some instances price reductions ranging between 25c. and 40c. a ton have been made. A marked reduction in the movement of smokeless coal has also been noted. Standard shippers have been able to obtain a price of $1.40 on a few cars of mine-run, but a majority of sales have been based on $1.25. The demand for Hocking coal is light and production is being reduced. Only nominal prices are being quoted for Springfield coal. Comparatively little domestic lump is being made and steam coal is not being sold in large volume.



There is little demand for furnace and domestic coke. Ordinary screenings command from 55c. to 65c. a ton, while some of the higher grades are being sold at from 70c. to 80c. Prices for Indiana coal are variable. A few concerns have continued to produce domestic lump coal in order to get screenings for their steam contracts and a good deal of this coal is up to demurrage in the Chicago market. It is being sold at prices varying between $1.25 and $1.60. Many of the producers have kept their coal away from Chicago and sold it where conditions are more favorable. Carterville operators are declining to accept prices offered on the open market in Chicago for spot coal and unless sales are made for shipments direct from the mines it is the practice of these producers to close down their mines. Prices for lump and egg range between $1.50 and $1.75.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump............	$2.32	$2.45@3.05	$2.27	
Steam lump..............	1.97		1.97	
Egg......................		2.45@3.05		$4.05@4.30
Mine-run.................	1.87	2.30	1.87	3.30@3.45
Screenings...............	1.42	1.75@1.85	1.27	

Harrisburg—Domestic lump and egg, $2.55@2.65; steam lump, $2.25; mine-run, $2.25; screenings, $1.65@1.75; No. 1 nut, $2.55@2.65; No. 2 nut, $2.55.

Carterville—Lump, egg and No. 1 washed, $2.55@2.65; No. 2 washed, $2.55.

Coke—Connellsville, $5.25@5.50; Wise County, $5@5.25; byproduct, egg, stove and nut, $4.90@5; gas house, $4.75@4.85.

ST. LOUIS, MO.

Car supply plentful and market overshipped. Current business worst for this period in years. Railroads well stocked.

Continued mild weather and no demand is the feature of the local market. The market on screenings has been exceptionally good. Carterville has gone up to around 60c. and Standard as high as 50c. However, the market fluctuates daily, depending upon the demand and supply. It is a heartbreaking job right now to sell any amount of lump coal, and that which is being placed is scattered in one and two carlots over a wide territory.

The dealer demand is practically nothing; all the yards are loaded, and steam trade is letting up for the holidays. There is absolutely no anthracite market. Coke is going begging, and so is smokeless.

The railroads have been stocking up quite heavily, and some of them feel that by the end of this month they will have a sufficient tonnage on hand for storage purposes, aside from their contracts. The Rock Island has been taking about 1500 to 1800 tons a day over their contracts, and are about ready to quit. Various other roads are figuring along the same lines. For the first time in many months cars are more than plentiful on all roads.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump...............	....	....	....	$1.00*
3-in. lump...............	....	...	$1.40*	....
6-in. lump...............	$1.30 @ 1.50	$2.25	1.50*	1.20*
Lump and egg..........	1.85 @ 2.15	....	....	....
No. 1 nut................	1.40 @ 1.60	....	....	....
Screenings..............	0.40 @ 0.50	....	....	....
Mine-run................	1.10 @ 1.20	....	....	....
No. 1 washed nut.......	1.75	2.25	1.40	....
No. 2 washed nut.......	1.35	....	1.60	....
No. 3 washed nut.......	1.15	....	....	....
No. 4 washed nut.......	1.05	....	....	....
No. 5 washed nut.......	0.50	....	....	....

*Asking price.

KANSAS CITY, MO.

Colder weather materially stimulated the market. Mines tuning up to greater capacity and outlook much improved.

A cold wave over Kansas and Missouri has materially improved the situation and operators are now optimistic over the outlook. Though the movement of coal has been accelerated, no change in prices is expected before the opening of the new year. At that time, a substantial advance will go into effect, provided, of course, that the cold wave proves of some duration. Demand responded quickly to the weather and dealers' stocks are rapidly being depleted. Mines have in many instances already increased their working time. The majority were only on about half time prior to the change in the weather. Domestic coal is moving better than for several months, while steam lines are even brisker than unsual. Kansas deep shaft fancy lump is quoted at $2.50, f.o.b. mines; Arkansas anthracite, $4.35; Missouri block $2.25.

OGDEN, UTAH

Western markets easy in spite of the acute labor situation. Temperatures mild and cars in plentiful supply. Labor trouble in Colorado not liable to affect the Wyoming markets.

Cold weather is still confined to Denver, Cheyenne and immediate territory, with warm days and temperate nights in eastern Nebraska, Utah, Idaho, Washington and Nevada. Most of the operators in Wyoming and Utah are short of lump orders and are carrying a surplus of nut coal on track at the mines. Coal dealers throughout the territory are buying in limited amounts and nothing but a good storm can improve the present market conditions.

During the past week the mines at Rock Springs, Wyo., were bothered with a car shortage, and two days were lost. This condition reduced the amount of slack and steam coal and for a short period there was a "flurry" in the steam market, as the sugar factories are still consuming large quantities of this grade of coal. During November the Rock Springs district sent quite a large tonnage to Denver, but conditions have changed so that it is hardly probable Denver will need the assistance of Wyoming mines in order to be supplied with coal. The severe snow storm of two weeks ago injured, rather than helped, the coal situation. Hardly a commercial order was delivered in Denver from Dec. 1 to 13. This caused a conjestion and Denver is now flooded with coal. It is estimated there is sufficient coal to last thirty days.

While the market in Utah and Idaho shows a very slight improvement, the conditions east of Wyoming are becoming more discouraging. It is reported the mines in northern Wyoming are only working two and three days per week on account of the weak condition of the Nebraska market.

The mines in the strike zone are working 45 to 55% capacity with a large portion of the coal being consigned to Denver as the market in Kansas is weak. California shows a slight improvement due to rains and while the market is weak, a few shipments are being made to this district.

Owing to weak condition of the market in Nebraska, quotations have eased off and are now:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.00	$2.75
Nut	2.50@3.00	2.00	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

The total shipments of coal over this road for October of the current year were 476,482 tons as compared with 338,518 tons for the same month last year. For the ten months to Oct. 31 of the current year, the shipments were 3,768,423 tons as compared with 2,860,739 tons for the same period last year.

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for August and the first eight months of the years 1912 and 1913:

State	August		Eight Months	
	1912	1913	1912	1913
Missouri	123,603	178,949	1,879,873	1,799,206
Kansas	408,947	451,968	3,203,861	3,586,093
Arkansas	172,090	178,904	1,205,149	1,205,005
Oklahoma	232,768	289,949	1,814,957	2,225,922
Totals	1,027,408	1,099,770	8,103,840	8,816,226

FOREIGN MARKETS

GREAT BRITAIN

Dec. 12—It is still difficult to obtain supplies owing to the full state of colliery order books for December and early January. Quotations are approximately:

Best Welsh steam	$5.04@5.16	Best Monmouthshires	$4.44@4.50
Best seconds	4.86@4.98	Seconds	4.08@4.20
Seconds	4.68@4.80	Best Cardiff smalls	2.64@2.76
Best dry coals	4.56@4.80	Seconds	2.52@2.64

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

British Exports—The following is a comparative statement of British exports for November and the first 11 months of the last three years, in long tons:

	November		11 Months		
	1912	1913	1911	1912	1913
Anthracite	268,098	255,959	2,233,164	2,316,909	2,726,983
Steam	4,529,410	4,322,462	42,863,716	42,429,063	49,030,578
Gas	958,261	936,829	9,594,122	9,730,410	10,547,038
Household	156,401	140,129	1,374, 219	1,497,808	1,635,335
Other sorts	285,275	258,025	2,740,134	2,873,446	3,230,821
Total	6,197,445	5,913,404	58,805,355	58,747,636	67,170,665
Coke	125,601	126,307	847,883	928 612	1,115,317
Manufactured fuel	142,025	163,087	1,481,829	1,394,032	1,874,952
Grand total	6,465,071	6 ,202,798	61,236,067	61,070,280	70,160,934
Bunker coal	1,714,064	1,755,090	....	16,734,586	19,189,501

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Dec. 20:

Stocks	Week's Range			Year's Range	
	High	Low	Last	High	Low
American Coal Products			80	87	80
American Coal Products Pref.	..	..	105	109¼	102
Colorado Fuel & Iron	27¾	26	27¾	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102¼	102¼	102¼
Lehigh Valley Coal Sales	190	175	175	....	....
Island Creek Coal Com	48	46	47	53½	47
Island Creek Coal Pref.	83½	83¼	83½	85	80
Pittsburgh Coal	18¾	18	18¾	24⅜	14½
Pittsburgh Coal Pref.	86½	85	86½	95	73
Pond Creek	18½	17	18½	23¾	16½
Reading	165¼	169⅝	164⅞	171	151⅜
Reading 1st Pref.	83⅞	83⅞	83⅞	92½	82½
Reading 2nd Pref.	88	86⅜	86⅞	95	84
Virginia Iron, Coal & Coke	37	36	36	54	36

Bonds	Closing		Week's Range or Last Sale		Year's Range	
	Bid	Asked				
Colo. F. & I. gen. s.f.g. 5s	90	93	91½	Dec. '13	90	99⅛
Colo. F. & I. gen. 6s	102	106½	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	75	78	76	Dec. '13	76	85
Cons. Ind. Coal Me. 1st 5s	76	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92	87	Dec. '13	87	87
Gr. Riv. Coal & C. 1st g 6s		..	102½	April '06	..	..
K. & H. C. & C. 1st s f g 5s	92½	95	92¼	92¼	91	98
Pocah. Con. Coll. 1st s f 5s	..	85½	86	Oct. '13	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	76	77	76	Dec. '13	73	80½
Tenn. Coal gen. 5s	96	97½	96	96	96	103
Birm. Div. 1st consol. 6s	100¾	101	101	Nov. '13	100⅝	103
Tenn. Div. 1st g 6s	100¼	101½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	.....	..	..
Victor Fuel 1st s f 5s	.	84	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	Dec. '13	92	98

DIVIDENDS

Lykens Valley R.R. & Coal—Dividend of 2% payable Jan. 2, to holders of record Dec. 15.

Mahoning Coal R.R—Dividend on the common stock of $5 payable Feb. 2 to holders of record Jan. 9, and $1.25 on the preferred payable Jan. 1 to holders of record Dec. 20.

Mine Hill and Schuylkill Haven—Dividend of $1.25 payable Jan. 15 to holders of record Dec. 20 to Jan. 14.

Reading Co.—Regular quarterly dividend on the common stock of 2% payable Feb. 12 to holders of record Jan. 26.

Central Coal & Coke Co.—Regular quarterly dividend of 1½% on the common, and 1¼% on the preferred both payable Jan. 15 to holders of record Jan. 1 to Jan. 15.

Island Creek Coal Co.—Regular quarterly dividend on the common of 50c. payable Feb. 2 to holders of record Dec. 23, and regular quarterly on the preferred of $1.50 payable Jan. 1 to holders of record Dec. 23.

FINANCIAL DEPARTMENT

Reading Company

The Reading Co., reports, in part, for the year ended June 30, 1913 as follows:

The combined income account of the Reading Co., the Philadelphia & Reading Railway Co., and the Philadelphia & Reading Coal & Iron Co. compares as follows:

	1913	1912	1911	1910
Gross	$102,822,823	$89,390,135	$88,731,631	$87,768,252
Exports and imports	73,079,811	66,734,124	65,104,651	61,954,341
Net	29,743,012	22,656,011	23,626,980	25,824,911
Fix. chgs.	14,643,138	14,573,797	15,691,274	15,048,842
Surplus	*15,099,874	8,082,214	7,935,604	10,776,069

Reading Co. dividends and sinking fund charges were:

	1913	1912	1911	1910
1st pfd. div.	$1,120,000	$1,120,000	$1,120,000	$1,120,000
2d pfd. div.	1,680,000	1,680,000	1,680,000	1,680,000
Com. stk. div.	4,900,000	4,200,000	4,200,000	4,200,000
Gen. mtg. sk.fd.	502,193	508,513	459,649	433,345
	$8,202,193	$7,508,413	$7,459,649	$6,333,345
Sur. after divs.	**$6,897,681**	**$573,801**	**$476,055**	**$4,742,724**

*Equivalent, after deduction of $502,193 for the general mortgage sinking fund, to 4% on the $28,000,000 first preferred stock, 4% on the $42,000,000 second preferred stock and 16.9% on the $70,000,000 common stock. This compares with 6.8% in 1910-11 and 10.8% in 1909-10.

	1913	1912	1911	1910
Receipts	$40,983,063	$35,733,652	$34,390,139	$33,217,936
Oper. expenses	37,196,144	34,612,338	32,833,569	31,240,645
Net	3,786,918	1,121,115	1,556,561	1,977,391
New work at col.	....	....	1,139,040	1,216,015
Int. debt to Rdg. Co., etc.	2,552,676	864,083	434,238	743,957
Deple lands fd.	....	....	....	445,867
Fixed charges and taxes	94,649	85,445	86,588	88,818
Surplus	1,139,592	171,577	*103,316	*71,501

* Deficit.

	1913	1912	1911	1910
†Income	$9,624,866	$8,085,061	$8,677,841	$9,122,231
Expenses	104,859	110,886	102,642	107,442
Net	9,520,007	7,974,175	8,575,199	9,013,790
Fixed charges and taxes	5,258,331	5,572,375	4,866,586	4,798,595
Surplus	4,261,676	2,401,800	3,708,613	4,215,195

† Does not include dividend paid by the Philadelphia & Reading Railway Co.

The accumulated surpluses of the three companies June 30, 1913, were as follows:

Reading Company—		
*Surplus year ended June 30, 1913	$10,633,930	
Less dividends paid and sinking fund	8,202,193	
Surplus for year	2,431,737	
Previous surplus June 30, 1912	22,404,725	
Surplus as of June 30, 1913		$24,836,461
Philadelphia & Reading Railway—		
Surplus year ended June 30, 1913	$9,698,607	
Less dividends, etc.	6,904,501	
Surplus for year	$2,794,106	
Previous surplus, June 30, 1912	8,765,980	
Surplus as of June 30, 1913		$11,560,086
Philadelphia & Reading Coal & Iron Co.		
Surplus year ended June 30, 1913	$1,139,592	
Surplus as of June 30, 1912	1,459,694	
Surplus as of June 30, 1913		$2,599,286
Total three companies June 30, 1913		38,995,833

*Include $6,372,255 dividends from P. & R. Ry. Co.

In connection with the surplus of Reading Co., the directors have taken the following action:

On the first preferred stock, a quarterly dividend of 1% was declared, payable Sept. 11, 1913, and the sum of $840,000 was set apart to make provision for further quarterly dividends upon that stock: 1% payable Dec. 11, 1913; 1% payable Mar. 12, 1914; 1% payable June 11, 1914.

As to the second preferred stock, a quarterly dividend of 1% was declared, payable July 10, 1913, and the sum of $1,260,000 was set apart to make provision for the following additional quarterly dividends upon that stock: 1% payable Oct. 9, 1913; 1% payable Jan. 8, 1914; 1% payable Apr. 9, 1914.

On the common stock, a quarterly dividend of 2% was declared, payable Aug. 14, 1913.

The dividends paid during the year were the regular quarterly dividends at the rate of 40% per year on the first and second preferred stocks and two quarterly common dividends of 1½% each, and two of 2% each, making a total of 7%, the common stock having been raised from a 6% to an 8% annual basis during the year.

President George F. Baer says as follows:

The gross receipts of the Coal & Iron Co. increased $5,249,410 during the past fiscal year as compared with the previous fiscal year, and the expenses increased $2,583,606, a net increase of $2,665,803.

The net decrease of the fixed charges and taxes of the three companies for the year ended June 30, 1913, as compared with the year ended June 30 1912, was $11,472.

The tonnage of anthracite coal carried increased from 11,224,945 tons in 1911-1912 to 12,860,092 tons in 1912-1913, a gain of 1,635,147 tons, or 14.57%, and the tonnage of bituminous coal increased from 14,806,222 tons to 16,115,417 tons, a gain of 1,309,194 tons, or 8.84%. The revenue from traffic increased from $19,123,327 to $22,060,057, a gain of $2,936,729, or 15.36%.

The Philadelphia & Reading Coal & Iron Co.

The total production of anthracite coal from the lands owned, leased and controlled by the Philadelphia & Reading Coal & Iron Co. for the year ended June 30, 1913, was 12,807,996 tons, as compared with 10,098,831 tons mined during the previous year, an increase of 2,709,165 tons, or 26.83%. During the year the company mined 11,089,742 tons, an increase of 2,418,729 tons, or 27.89%; purchased 524,574 tons, a decrease of 116,697 tons, or 18.20%, and sold 10,478,603 tons, an increase of 553,912 tons, or 5.43% as compared with the previous year. On May 1 the umpire appointed by the board of conciliation to settle the claim of employees for an additional amount of wages due under the sliding scale percentage, decided in favor of the men. Under this award the company will pay to its employees the sum of $106,486.

The total sum expended for improvements during the year and charged to expenses was $1,241,070 as against $839,742 the previous year. The Philadelphia & Reading collateral sinking fund loan has been reduced by the payment of $30,000, for which this company has been reimbursed by the Reading Co. The increase of receipts from the sale of anthracite over last year was $5,057,056; the increase in receipts from sale of bituminous and other sources was $192,353, making an increase in gross receipts of $5,249,410 as compared with previous year. The increase in expenses, excluding the amount expended for improvements, amounted to $2,182,278. Cost of transportation of coal by rail and water during the year was $10,093,802 as compared with $7,700,695 last year.

READING CO. BALANCE SHEET JUNE 30

Assets	1913	1912	1911	1910
R.R. equipment	$37,459,916	$37,331,087	$34,610,517	$33,783,761
Floating equip.	3,644,509	3,643,757	3,718,899	3,768,817
Equip. acct.	10,344,670	6,243,339	9,861,041	8,015,053
Real estate	16,886,936	17,159,222	17,114,402	17,123,350
P. & R. bds. own	20,000,000	20,000,000	20,000,000	20,000,000
Bds. sundry cos.	26,414,493	26,960,730	27,465,267	25,540,958
P. & R. stk. own	42,481,700	42,481,700	42,481,700	20,000,000
P. & R. C. & I. stock owned	8,000,000	8,000,000	8,000,000	8,000,000
Tks. sund. cos.	53,313,452	53,312,451	53,141,700	53,441,441
P. & R. C. & I. Co.	72,980,171	73,466,529	74,423,817	75,385,786
Sund. R. Rs., etc.	4,057,967	3,242,207	2,964,639	2,976,718
Cash	2,716,197	4,606,524	2,496,554	5,260,269
Accrued inc.	372,165	373,291	348,187	355,864
Miscellaneous	384,127	700,471	872,540	891,563
Total	299,055,806	297,525,315	297,498,785	274,253,582
Liabilities:				
Stocks	140,000,000	140,000,000	140,000,000	140,000,000
Bonds	129,312,658	130,216,650	131,266,950	109,001,950
Conting. acct.	1,539,296	1,338,486	1,538,594	1,538,594
Ac. int. and taxes	3,366,543	3,319,172	3,270,055	2,813,090
Philadelphia & R. Ry.	....	....	....	112,174
Cur. business	370,340	41,800	80,178	692,851
Miscellaneous	845	571	23	899
Profit and loss sur.	24,836,461	22,608,626	21,342,984	20,094,021
Total liab.	299,055,806	297,525,315	297,498,785	274,253,582

TRAFFIC STATISTICS

	1913	1912	1911	1910
Miles operated	1,020	1,015	1,014	1,002
Locomotives	987	989	1,026	1,032
Pass. equipment cars	855	861	852	776
Fgt. equpt. cars	42,651	40,210	41,912	40,971
Service cars	1,000	947	938	911
Float equpt (tugs and barges)	135	127	128	130
Pass carried	27,620,457	26,987,719	28,812,798	31,333,231
Pass. car. 1 mi.	410,785,112	398,657,408	410,710,083	411,109,327
Rate p. pass 1m.	1.729c.	1.733c.	1,903c.	1,716c.
Coal (a) car (tns)	12,860,092	11,224,945	11,675,405	10,929,612
Coal (bi) car (tns)	16,115,417	14,806,222	13,848,189	13,241,198
Merchd. carried	26,550,439	22,711,791	22,284,179	23,260,452
*Mer. car 1 mi.	1,994,401	1,713,417	1,647,364	1,220,759

*000 omitted.

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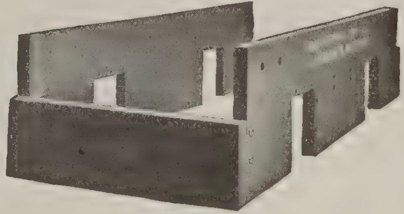

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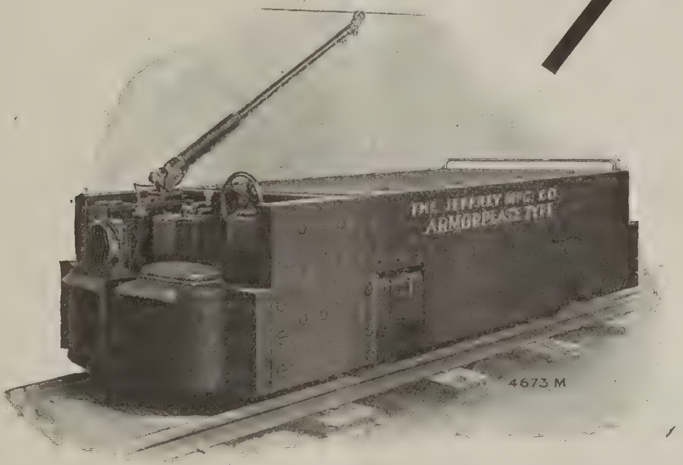

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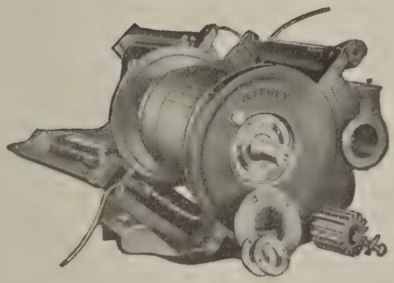

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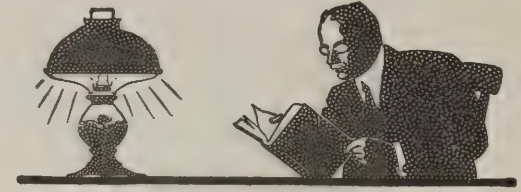

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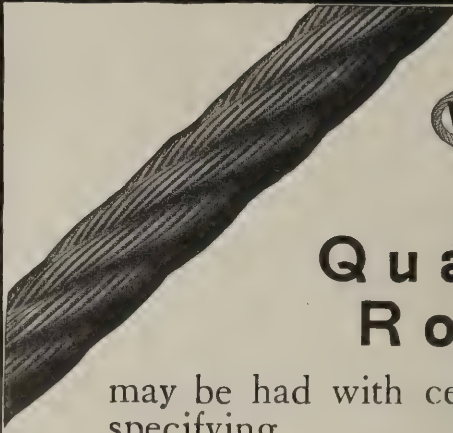

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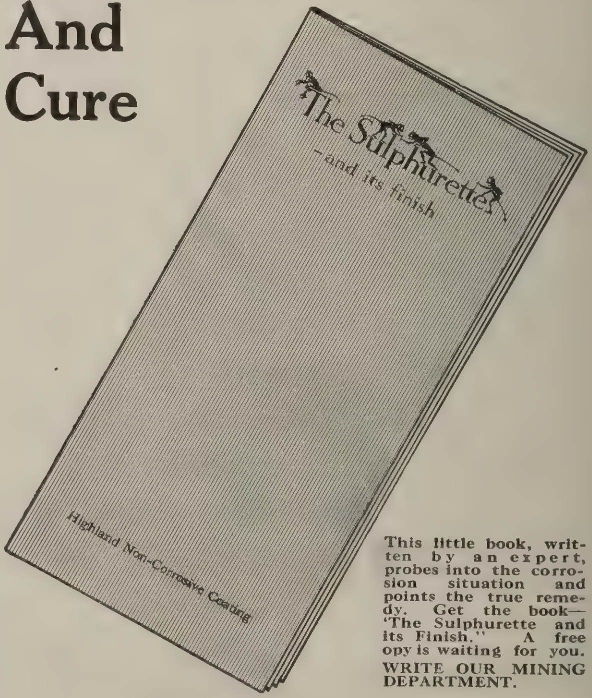

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> June 23, 1913
>
> Dear Sir:—
>
> I have found the test pieces which you put on our boilers, July, 1912, just as sound as when applied. Not only does it keep the iron clean and free from corrosion, but I find it very handy for patching where the other covering is broken off, and this can be done by our own fireman. I would like to see the whole eight boilers treated with the compound. I use it every place I can.
>
> Yours truly,
>
> (Signed) R. P. Browne.

FERROBESTIC

is a liquid binder for asbestos and metal. It is applied with a brush the same as ordinary paint and works perfectly on the hottest surfaces. As it dries instantly, one coat can follow the other without loss of time. One gallon is sufficient to give three complete coats to 115 square feet of surface and as there is no re-inforcing or binding material needed, one man can accomplish as much in one hour using Ferrobestic as would require almost a whole day working under the old-fashioned methods.

Jarring, vibration and water hammer or any condition to which boilers and steam pipes are subjected will not affect the insulation put on over a foundation of Ferrobestic.

Sample Free on Request

If you have an undesirable boiler to lag or a section of pipe that you have trouble keeping covered, this free sample will help you solve the problem. The attached coupon is for your convenience—use it to-day and judge the merits of our claims for yourself.

Ferrobestic is guaranteed satisfactory to the user—try it at our expense.

John Simmons Company
97 Centre Street, New York

JOHN SIMMONS COMPANY, 97 CENTRE STREET, NEW YORK
I will thoroughly test a sample of Ferrobestic if sent
FREE OF CHARGE
Name of Company..
Address..
Engineer..
No. of Boilers..
Type..
125-C

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HAZARD MANUFACTURING COMPANY
WILKES-BARRE, PENN'A.
NEW YORK, 50 DEY ST. PITTSBURG, FIRST NAT. BANK BLDG. CHICAGO, 552 WEST ADAMS ST.

American Made for American Trade

The complete success of New Departure Ball Bearings in meeting the demands of the American market for a bearing of quality, capacity, efficiency, and durability, is attested by the fact that two thousand skilled mechanics are operating ten and one-half acres of modern machinery, producing ten thousand ball bearings per day.

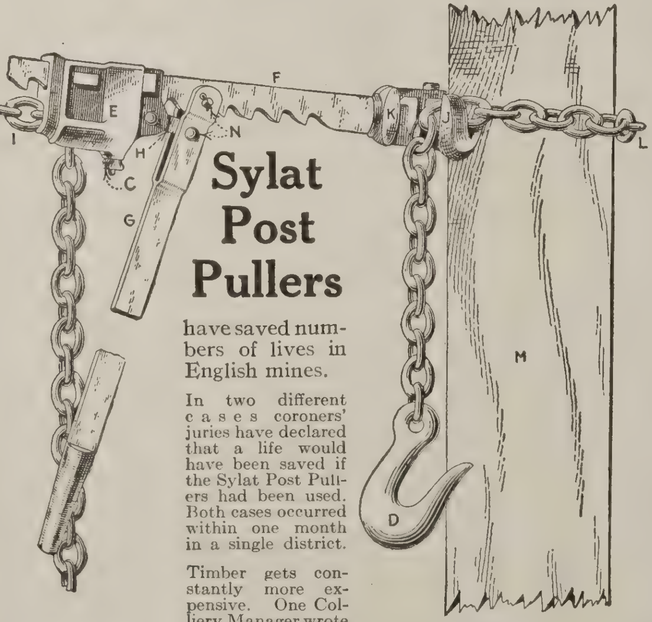
New Departure Guaranteed Ball Bearings

The ball type of bearing has no equal as an eliminator of friction. The New Departure Double Row (combined radial and thrust) is especially adapted for service in mining locomotive motors and mining car wheels.

Ask us for special mining-purpose data.

The New Departure Mfg. Co., Bristol, Conn.

What is a Man's Life Worth?



Sylat Post Pullers

have saved numbers of lives in English mines.

In two different cases coroners' juries have declared that a life would have been saved if the Sylat Post Pullers had been used. Both cases occurred within one month in a single district.

Timber gets constantly more expensive. One Colliery Manager wrote his mine had saved cost of machine in a single day where a roadway of old posts had to be cleared.

One Month's Free Trial.

Send for Catalog.

The Sylvester Company, Connellsville, Pa.

BABBITT METALS
BUT BE SURE THEY ARE

SERVICE THE OLD COKETOWN METALS QUALITY

Made only by the
Riverside Metal Refining Co.
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PATENTED APRIL 27, 1909
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Conveying, Elevating and Hoisting Machinery. Robins Coal and Coke Crushers. We carry a complete stock of Chains and Sprockets. Write for monthly bulletins.

Robins Conveying Belt Company
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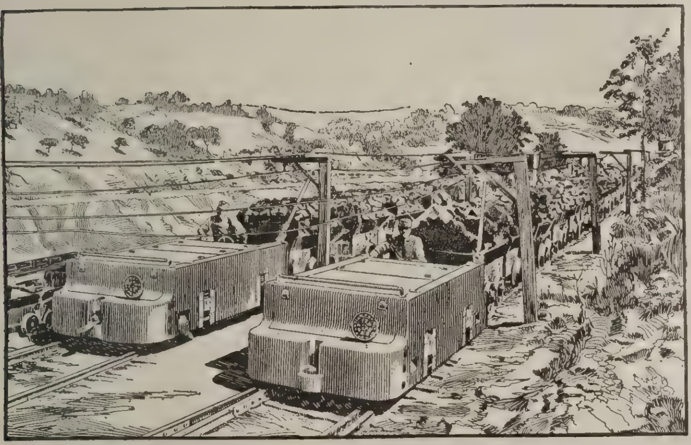
9/10

Think of putting to flight nine-tenths of your upkeep bills on mine locomotives!

Yet you can do it—by doing away with the CAUSE of the breakdowns, which is simply the plain-bearing armature shaft. You've got to DO AWAY WITH WEAR on that shaft, which you can accomplish by specifying it be fitted with

HESS-BRIGHT BALL BEARINGS

Built for Endurance



Hess-Brights on the armature shaft assure permanently perfect air gap; assure that the armature rotates on an exact center without vibration; do away with lubrication and grit trouble, all of which make up nine-tenths of the reasons for locomotive breakdowns.

Tell your locomotive builder to put ball bearings on your locomotives, and be sure he gets the right kind, that standard, tried-and-found-true bearing—Hess-Bright.

The Hess-Bright Mfg. Co.
Front St. and Erie Ave. Philadelphia, Pa.

INDUSTRIAL LOCOMOTIVES FOR STANDARD AND NARROW GAUGE

Correct design is as essential to the successful operation of small locomotives as it is to large ones on trunk lines. Even more so, because they must often work at a distance from shops or repair facilities.

They must be as well and as carefully built, must have large boilers that steam freely, with sufficient power to haul the load. They must be ready for service all day and every day.

Our standard light locomotives embody the most modern construction, are built for the hardest service and do the most work for the least cost.

They are built to successfully operate on rough and uneven tracks. Consult us when you want a new locomotive.

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"MARCUS" Patent Picking Table Screen

BY combining the functions of the separate picking table and the incline screen in one patented machine, "THE MARCUS," we have put into the hands of Coal Operators another means of better coal preparation—naturally greater profits.

THE MARCUS is a horizontal, vibrating screen that has a greater capacity per foot of screening service than the well known "inclined shaker screen."

THE MARCUS is a picking table on which hand picking is more effective than on the old style apron conveyor. The MARCUS combines therefore in one machine a superior screen and a superior picking table. In each capacity it is the very best device known for the purpose and saves from six to ten feet in height of tipple structure and can be added to an existing tipple without raising dumping point.

THE MARCUS is the expression of triumph in the preparation of coal so far as it can be prepared in the tipple and is going to supersede the shaker screen just as the shaker screen has superseded the bar screen.

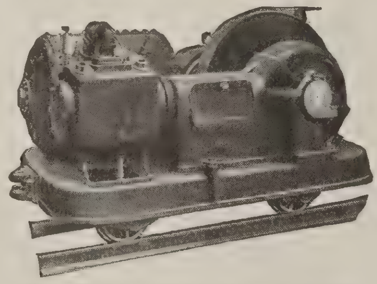
Better write for interesting details now.
Designed and built exclusively by

ROBERTS AND SCHAEFER CO.
ENGINEERS AND CONTRACTORS
CHICAGO, U.S.A.
"FULFILL THE CONTRACT—SATISFY THE CLIENT."

Sullivan Underground Air Compressors

The advantages of small, portable, air power units for use underground appeal to many mine owners, particularly in extended workings and those under development.

A Western Coal Company has recently purchased six of these Sullivan rigs, to operate Sullivan Post Punchers in various parts of a large mine.



Sullivan Portable Electric-Driven Compressor "WK-2"

Sullivan Post Puncher in a steep seam.

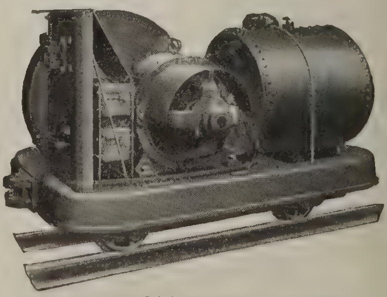
Sullivan "WK-2" Compressors

are complete, portable units, independent except for the electric feed wire.

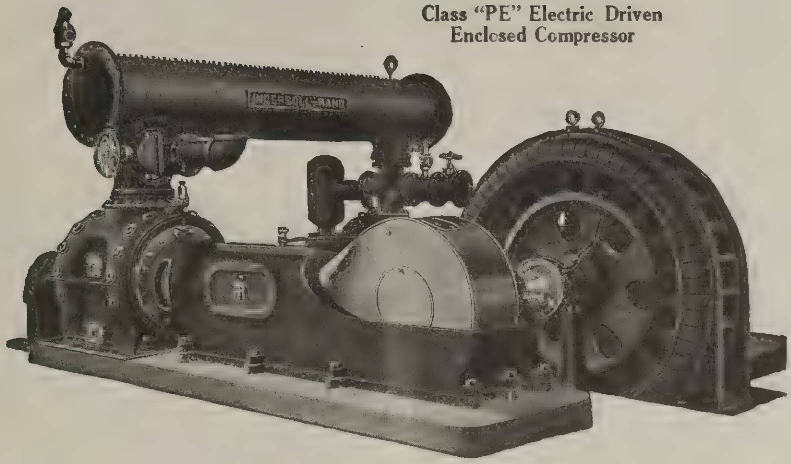
The single stage, center crank compressor is driven by motor, (A. C. or D. C.) through gear and pinion. The cylinder has a hopper jacket for cooling water. The motor is damp proof. Capacity, one or two pick machines or rock drills, a post puncher, or several hammer drills.

Bulletin 58 P C.

Sullivan Machinery Company
122 So. Michigan Avenue Chicago



Sullivan "WK-2" Compressor, motor side.



Class "PE" Electric Driven Enclosed Compressor

Enclosed Construction in Air Compressors

No one would think of mixing sand or grit with the oil for his compressor. Yet the average air compressor without provision for excluding dirt is subject to just this sort of abuse.

Result—excessive power consumption, excessive friction and wear, leakage, loss of adjustment and sacrifice of efficiency.

Enclosed, dust-proof construction is a standard and distinctive feature of all types of Ingersoll-Rand Compressors.

Moreover, this protection is secured without any sacrifice of the "get-at-able" convenience so essential to successful operation; for the covers are easily removed for inspection and adjustment, without loosening any bolts.

Ingersoll-Rand enclosed construction keeps the dirt out and keeps the oil in. This means not only the most efficient and economical lubrication, but also the utmost cleanliness of machine and surroundings.

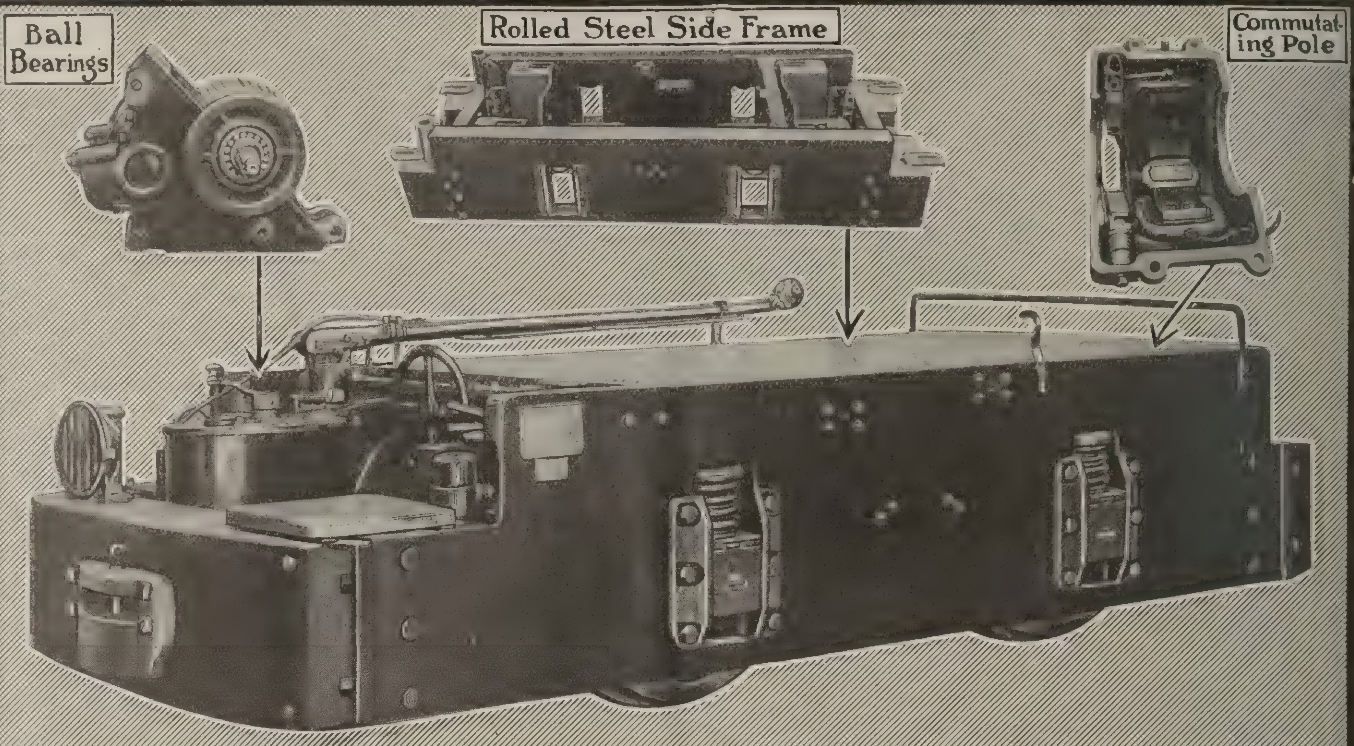
An unenclosed air compressor is more than an anomaly, today—it is an extravagance.

NEW YORK **Ingersoll-Rand Co.** LONDON

Offices the World Over

Compressors **Rock Drills** **Plug Drills** **Coal Cutters**

C-67



Get all good features in one Locomotive

Mine service demands *rolled steel side frames* and *commutating pole ball bearing* motors. The G-E mining locomotive has these features, whose success has been assured, and every other essential requisite necessary to meet mine-haulage conditions.

The rolled steel side frames give great strength. The commutating poles insure perfect commutation and lengthen brush wear.

Ball Bearings Banish Repairs

The ball bearings used for G-E mining locomotive motors prevent armature from touching pole pieces, keep oil out of motor, maintain commutator in alignment, cut down bearing friction and reduce quantity of lubricant required.

Our mining locomotive specialists are ready to give you all desirable features in one G-E mining locomotive.

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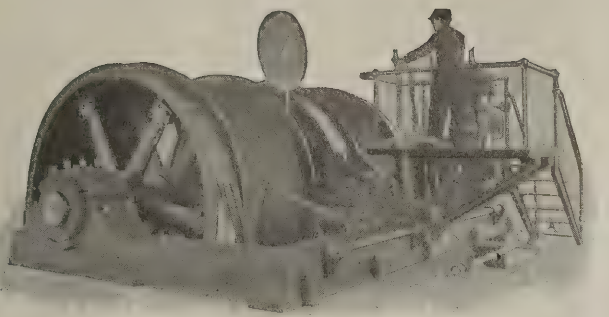
For Texas, Oklahoma and Arizona business refer to Southwest General Electric Co., (formerly Hobson Electric Co.)—Dallas, Houston, El Paso and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont. 4487



63,600 Lbs. Up 30 Degrees at 20.45 Miles Per Hour

is made an every-day occurrence at the Woodward Iron Company's property, Woodward, Ala., by this Vulcan Electric Hoist, because it was built after a careful analysis of local conditions, by Vulcan engineers, backed up by an organization with a 65-year experience in the heart of the Pennsylvania mining regions.

Vulcan Electric Hoists

are built with Strength, Simplicity and Perfect Control, for their foundations. Heavy cast frames, herring-bone cut-steel gears in the larger sizes, ample drum strength with big drum diameters and instant operative response, either forward or reverse, make performances like this commonplace. Made to meet any condition, in any capacity or size.

Send for the Electric Hoist Book.

Vulcan Iron Works **1730 Main St.** **Wilkes-Barre, Pa.**

New York—50 Church Street

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Where the Service Is the Hardest

In the largest coal mines in the country where the service is the hardest, you will find

OTTUMWA HOISTS

at work—ready to meet every demand for heavy continuous duty.

Whether **you** prefer a steam or electric driven hoist—the "Ottumwa" will give greater safety, better economy and longer service than ordinary types.

Write for Bulletin 200.

Ottumwa Iron Works **Ottumwa, Iowa**

WANTS

Positions Wanted, three cents per word, each insertion
Positions Open, five " " " "
No abbreviated words allowed.
Count four words for keyed address.
All advertisements payable in advance.

Copy should reach us not later than Saturday for ensuing week's issue. Answers addressed to our care, 505 Pearl St., New York, will be forwarded.

No information given by us regarding any advertiser's address. Original letters of recommendation or other papers of value should not be inclosed to unknown correspondent.

No advertising accepted from any agency, association or individual charging a fee for "registration," or a commission on wages of successful applicants for positions.

POSITIONS WANTED

Mining engineer and superintendent with wide experience, desires change of location. Address P. W. 204, Coal Age. Jan. 3.

Young mining engineer desires change; has had technical education and five years' experience; location immaterial. Address P. W. 202, Coal Age. Dec. 27.

Engineer with 7 years' experience in mine surveying and mapping property lines and all kinds of construction, wishes position; good references. Address P. W. 199, Coal Age. Jan. 10.

Graduate civil and mining engineer open for engagement; twenty-five years' experience in civil, mining and municipal engineering, concrete construction, contracting; will consider any offer. Address P. W. 203, Coal Age. Dec. 27.

Wanted—Position as superintendent; 10 years' experience in mines containing compressed air, electric and gasoline power; will do my own engineering and drafting, now employed as same; desire a change. Address P. W. 200, Coal Age. Dec. 27.

Mine superintendent of exceptional ability, desires position as superintendent, assistant superintendent, or inspector of mines, thoroughly experienced in gaseous and dusty mines, development work, flat or pitching seams, two first grade certificates, can give the best of results, good references, interview by appointment. Address P. W. 201, Coal Age. Dec. 27.

Robert Giles
M. Am. Soc. C. E.

Edward A. Clark
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Core Contractors With An Engineering Standing

It isn't the equipment, or the number of men employed, or the way a job is hurried through that creates a standing as Reliable Core Drilling Contractors.

But it is a combination of all these requirements coupled with actual experience and good and reliable notes of each hole drilled that has been our means of establishing a reputation for reliable and satisfactory service.

During our twenty five years' experience as engineers, we have taken cores from every strata of the earth, drilling from the surface, under ground, and under water.

Write for a list of our clients and arrange for an interview.

Giles & Clark

30 Church Street New York, N. Y.

Branch Office, Bluefield, West Virginia

For Sale

Two 8-ton double discharge coke larries, standard gauge, new condition. No reasonable offer refused.

Continental Coal Corporation
Pineville, Ky.

ONLY RELIABLE PRODUCTS CAN BE CONTINUOUSLY ADVERTISED

Coal Mine Equipment

Storage and Mine Loading Machines

W. E. Hamilton & Co.

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HANS OLSON, Pres. JNO. A. FISHER, Sec'y

Punxsutawney Drilling and Contracting Company

DIAMOND DRILL CONTRACTORS

Testing Bituminous Coal Lands a Specialty.
Weber Bldg. PUNXSUTAWNEY, PA.

When You Order, Be Sure to Specify "NATIONAL" Pipe

¶ Substitution of ordinary pipe for "NATIONAL" is impossible. Why?—because every length of "NATIONAL" Pipe is marked with the word "NATIONAL" every few feet—Look for it—Have you read the double page announcement which appeared in COAL AGE, December 20th issue, pages 8 and 9

NATIONAL TUBE COMPANY, Pittsburgh, Pa.

Diamond Core Drilling

Coal Testing a Specialty.
Cores of all Strata.

J. R. Richards, Indiana, Pa.

YOU CAN'T LOOK INTO THE EARTH

but we can get you a large clean core of all strata under your land to be examined in broad daylight. No guess work.

THE J. A. BRENNAN DRILLING CO.

Home Office—Scranton, Pa. Field Office—30 Carson St.
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Contractors for Diamond Drilling.

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CONTRACTORS

DIAMOND CORE DRILLING

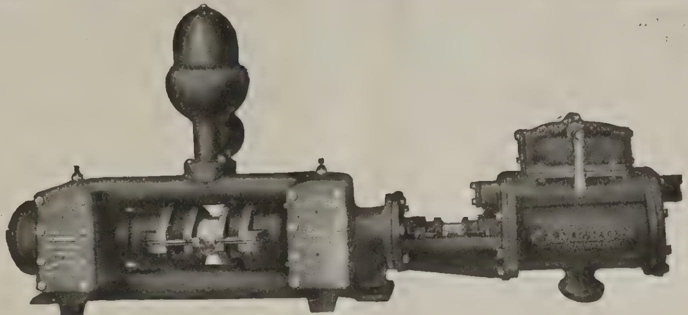
PUNXSUTAWNEY, PA.

(Our specialty—Testing Bituminous Coal Lands)

UP-TO-DATE EQUIPMENTS EXPERT DRILL RUNNERS

YOUR INQUIRIES SOLICITED

The Slogan of the Cameron—"Character: The Grandest Thing"



This Cameron Pump Built to Withstand Gritty Water

If you have had trouble with pumps that have suffered from the wearing qualities of gritty water, then get satisfaction with this Cameron Outside-Packed Plunger Pump.

It is much more durable than a piston pump.

The water-end has no wearing parts except the packing in the stuffing boxes which can be instantly adjusted from the outside. There are no rods, arms or working parts exposed to rust or damage. The plunger is supported in stuffing boxes, and cannot sag or get out of line at the end of the stroke.

There's a Cameron Pump to overcome every pumping difficulty. Get the right type for your purpose. Write for Bulletin No. 9 showing many types of Cameron Pumps and giving valuable information.

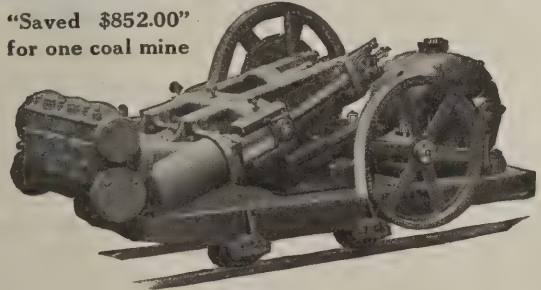
A. S. Cameron Steam Pump Works

11 Broadway, New York

12-27-13

DEMING MINE PUMPS

"Saved $852.00" for one coal mine



Deming portable triplex mine pump. Made in many different sizes.

DEMING PUMPS THE WORLD'S BEST

Iron truck insures perfect alignment of pump and motor at all times.

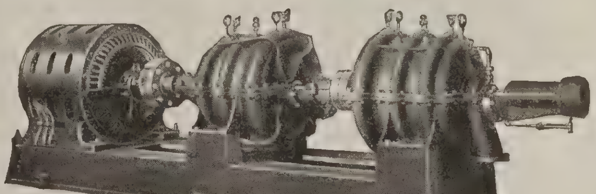
One of our customers has figured out that every year his Deming mine pump saves him $852.00.
He used to own a steam pump.
It is good business to keep in touch with such economies. A copy of his letter is yours for the asking.

The Deming Company, Salem, Ohio

Hand And Power Pumps For All Uses

Harris Pump & Supply Co., Pittsburgh.
Henton & Hubbell, Chicago. Hendrie & Bolthoff Mfg. and Supply Co., Denver, Colo.
Ralph B. Carter Co., New York.

Jeanesville Centrifugal Mine Pumps



Thoroughly Modern in Design

Applies to the whole line of **Jeanesville Mine Pumps.** Built on methods of tested value. Strong and reliable always, yet as simple as possible consistent with the work demanded of them. 50 years of experience is at your command if you will write us your pumping needs.

Write for our new Mine Pump Catalogue J 40-73.

THE JEANESVILLE IRON WORKS CO.
WORKS: HAZLETON, PA. New York Office: 115 Broadway

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Mine
Ventilating
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Catalog No. 30317

The
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Manufacturers of

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Electrically Operated
Coal Punchers
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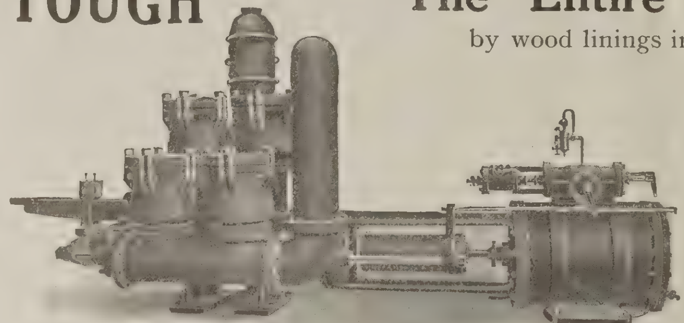


YOUGH

The Entire Water End is Protected
by wood linings in the cylinders, clearance and valve chambers.

YOUGH Wood-Lined Pumps

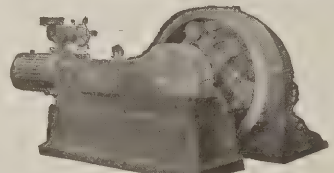
are designed to resist the corrosive action of strong sulphur water.

The steam ends are equipped with our patented steam-actuated valves, giving a quick cut-off and insuring high economy.

If your conditions are particularly hard—a **YOUGH PUMP** will help you over every difficulty.

Write for catalog.

Boyts, Porter & Company, Connellsville, Penna.



Our Engineers will be glad to make recommendations.

Are you in doubt as to what you need in your plant? Come and talk the matter over with us and watch the

Ridgway Units

in actual service. They are suitable for any service and will meet the most exacting conditions.

Let us send bulletin CA. It's Free.

Ridgway Dynamo & Engine Company
Ridgway, Pa.

YOU can't step higher until your present foothold is safe. Make it safe by using modern methods that will help you do better work at less cost. The advertisements show you how.

MOUNT CARMEL IRON WORKS

Founders of Iron and Brass
Machinists and Engineers

"Mt. Carmel" Steam Pumps; Coal Mining Machinery; "B&K" Coal Jigs

Works and Office on Penna. & L. V. R. R.

Both Phones. MOUNT CARMEL, PENNA.

Something New In Pumps

Ask for catalogue D-9 and WHY.

Alberger Pump and Condenser Company
140 Cedar Street, New York

Scranton Mine Pumps

Scranton Mine Pumps are built right in the heart of the mining district and are designed with a first-hand knowledge of mine pump requirements.

Be informed, at least, on these efficient pumps. A post card will bring our booklet.

THF SCRANTON PUMP COMPANY, 1441 Meylert Avenue, Scranton, Pa.

Milwaukee GASOLINE LOCOMOTIVES

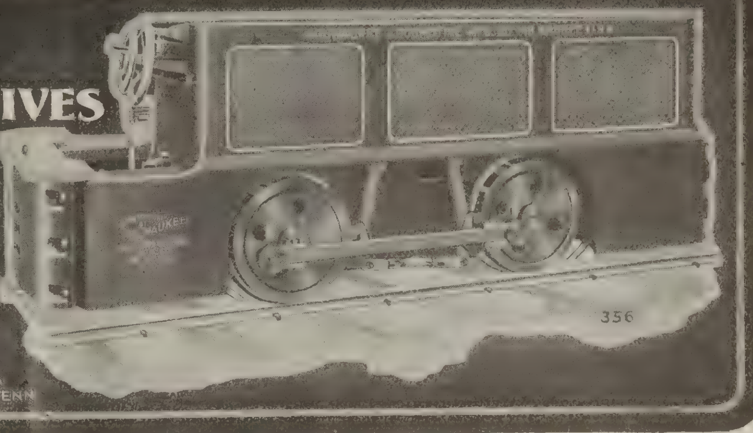
Reduce Haulage Costs

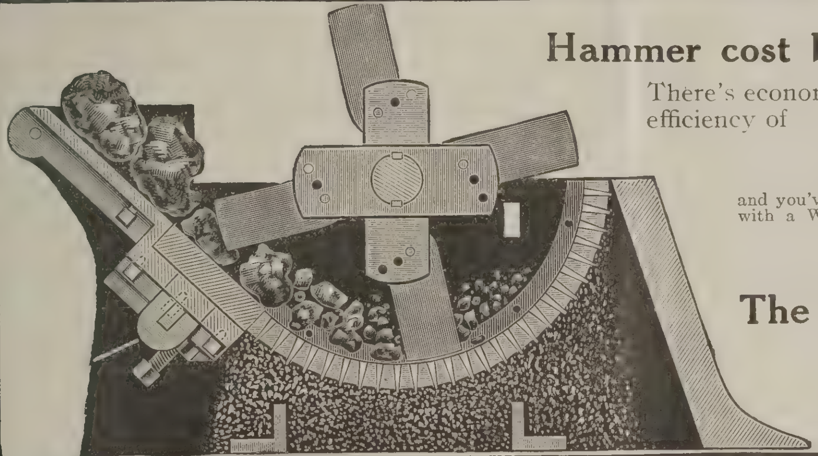
SAFE RELIABLE ECONOMICAL

Catalog A 103 Tells All About Them
Write For A Copy Today

MILWAUKEE LOCOMOTIVE MFG. CO.
Milwaukee, Wis.

Sales Offices NEW YORK N.Y. CHICAGO ILL. PITTSBURG PA. HUNTINGTON W.VA. KNOXVILLE TENN.





Hammer cost below 7/100 cents per ton—

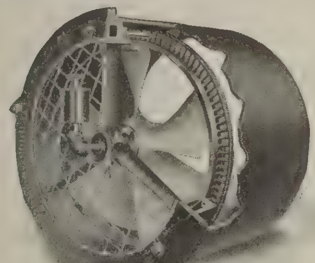
There's economy for you. Hitch that up with the high efficiency of

Williams Crushers

and you've a combination you need. There's big saving to be had with a Williams—there's long life, useful life and inexpensive life. Find out.

The Williams Crusher Book sent without obligation. Just write.

The Williams Patent Crusher and Pulverizer Company
Old Colony Building, Chicago
268 Market Street, San Francisco, Cal. Factory, 2701 No. B'way, St. Louis. Pittsburgh Office, Jenkins Arcade Bldg.



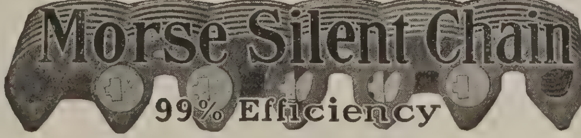
This Blower Will Increase Your Boiler Capacity

The "Typhoon" Turbine Blower will give you more steam from your present boiler equipment by greatly increasing the draft. Installed directly in boiler wall. Requires no attention.

Ask for bulletin and list of coal companies using this blower.

L. J. WING MFG. CO., 9th Ave. and Hudson St., New York
Manufacturers of Blowers, Damper Regulators, Feed Water Regulators, Fans, Pressure Blowers and Vacuum Pumps.

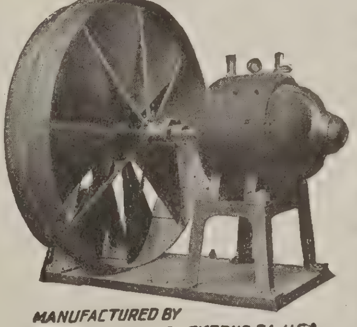
The annual meeting of the stockholders of the Hill Publishing Company, for the election of directors for the ensuing year and for the transaction of such other business as may properly come before the meeting, will be held at the office of the company, in the Hallenbeck building, 497-505 Pearl Street, Borough of Manhattan, New York City, N. Y., on Tuesday, January 27, 1914, at 12 o'clock noon. Dated, New York City, December 19, 1913. ROBERT McKEAN, Secretary.



Morse Silent Chain
99% Efficiency

Write for Bulletin No. 1120
Morse Chain Company, Ithaca, N. Y.

"Ship Two Same As Last"


MANUFACTURED BY THE J.C.STINE CO. TYRONE, PA., U.S.A.

That's what a satisfied customer wired us then wrote us this letter.

PREMIER POCAHONTAS COLLIERIES CO.
Premier, W. Va. Aug. 18, 1911
The J. C. Stine Company,
J. C. Stine, Mgr.,
Tyrone, Pa.
Dear Sir:—
Fan installed and doing fine work. Wired you today;—"Ship two fans same as last; rush one all possible.
Now beg to confirm same. Let one come at once if two not ready. If ready, ship two at once. Trace for delivery. Prepay to Premier, W. Va. on N. & W. Railroad. Yours truly,
(signed)
Frank P. Harman, President.

After using three fans for over 15 months he ordered two more, making five J. C. Stine fans which are giving him splendid service every day in the year.

This is not the only customer. Here's one that has six of our silent chain type. Read what he says:—

THE WHEELING & LAKE ERIE COAL MINING COMPANY.
Mt. Pleasant, Ohio, May 26, 1911
The J. C. Stine Company, Mr. J. C. Stine, Mgr.,
Tyrone, Pa.
Dear Sirs:—Replying to your very kind favor of the 19th inst. with reference to a report as to how your fans are doing in our mines.
I beg to advise that I cannot sing their praises too highly as they certainly do all you claim and anyone making purchase of this fan for the purpose for which it is intended I assure you is making no mistake.
I wish to again thank you for the good treatment and good service I received from you while installing our fan. Very truly yours,
(signed)............. Michael Gallagher, Gen'l. Mgr.

These fans are made in ten sizes from 3 to 8 feet in diameter. They are the cheapest and most efficient ventilators in the world.

The J. C. Stine Company, Tyrone, Pa.

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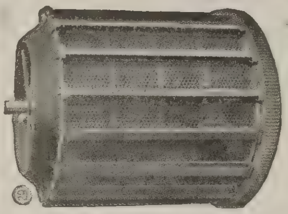
CRUSHERS



(Patent Applied For)

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6 designs in 52 sizes

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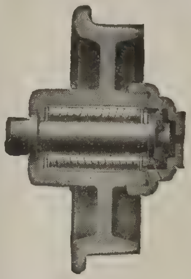

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Bulletin 604E tells all about them.
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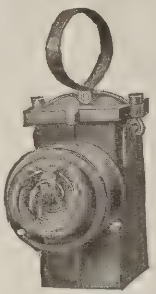
Built to stand the hard knocks of Everyday Mine Use



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"M" Hubbell Lantern
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Send in your request early for your copy.

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Emporium, Pa.

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advertising consisted of displaying a name, a product and a picture of the factory in which it was made.

Sometimes a neat little verse was added or a picture of a lady fair but **irrelevant** to the subject.

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Those were the fairy-tale days of advertising.

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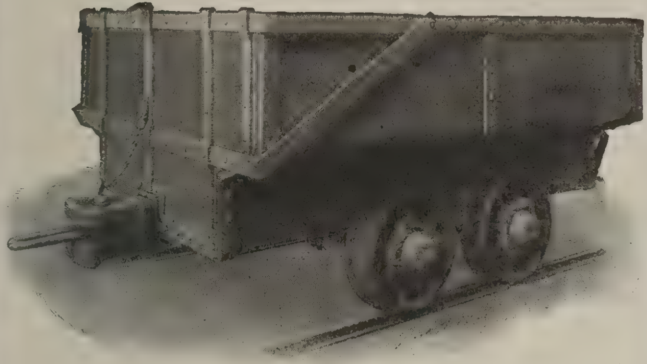
are High Quality Cars



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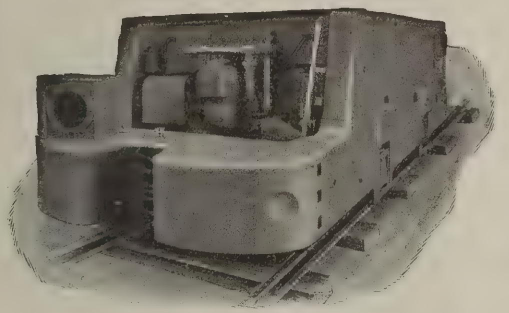

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This motor will not and cannot give you any trouble unless you abuse it. Safe, dependable, and highly economical in operating and maintenance costs.

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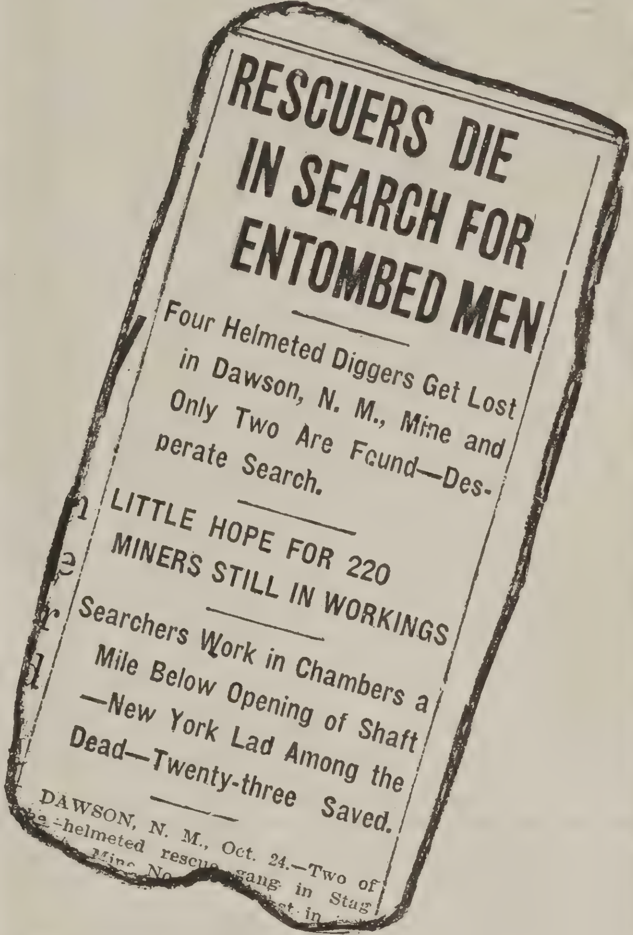

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Searchers Work in Chambers a Mile Below Opening of Shaft —New York Lad Among the Dead—Twenty-three Saved.

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-helmeted rescue gang in Stag
Mine No.

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will provide the safeguard needed for your rescue gang.

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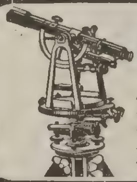

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The Electric Locomotive & Car Co.
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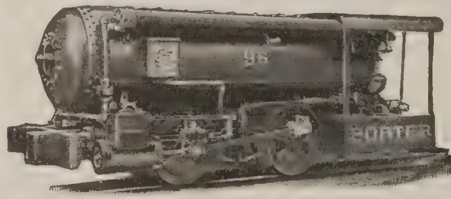

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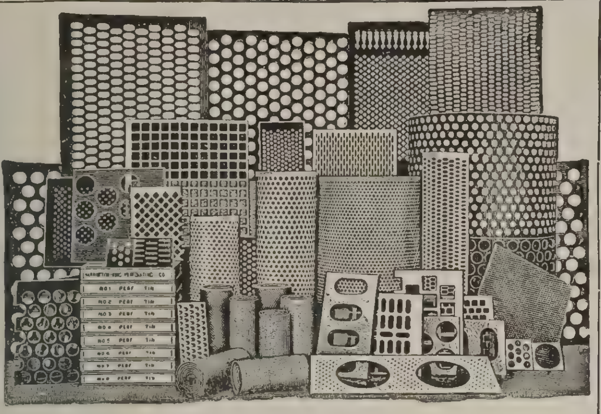

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Variations in thickness of metal run from No. 18 U.S.S. Gauge (1-20th in.) to one-half inch, according to size of holes.

Manganese Bronze Screens for Sulphurous Mine Waters.

Please send detail specifications with your order or inquiry.

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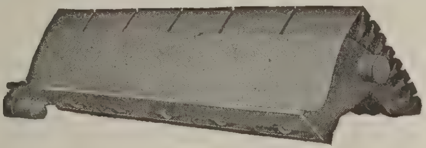
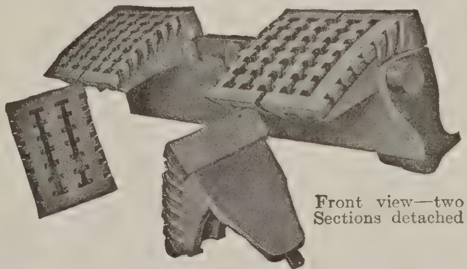
HERE'S A GRATE THAT CAN'T BURN OUT



Back view of McClave Removable Sectional - Top Grate Bar No. 2.



Front view—two Sections detached

McClave Grate No 2

The bar of this grate has a detachable top, **cast in sections.** These sections fit down securely by a shank and socket arrangement upon the body part of the bar, but any section can be quickly and easily removed and a new section placed, if burning, warping or breakage occurs. The body part, which is trussed in design, stronger than the usual single piece bar, is absolutely protected from heat-action by these tops. **The bar itself cannot burn out.**
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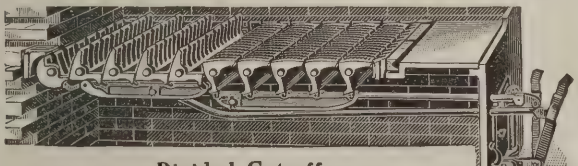

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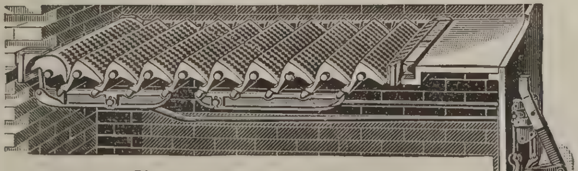

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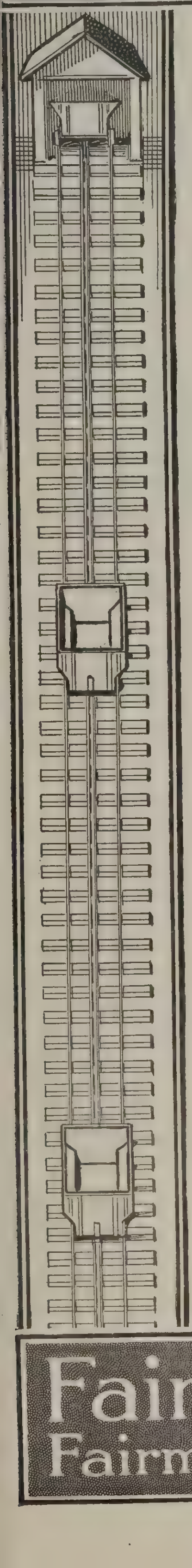

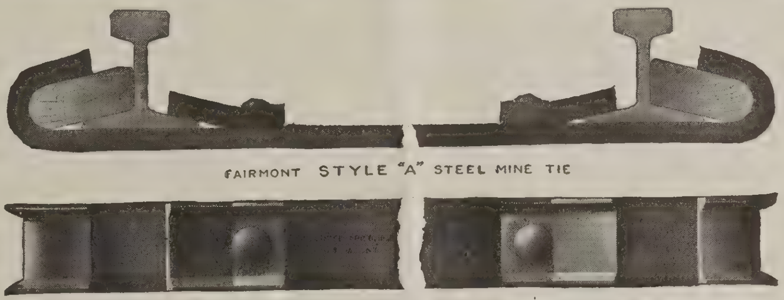

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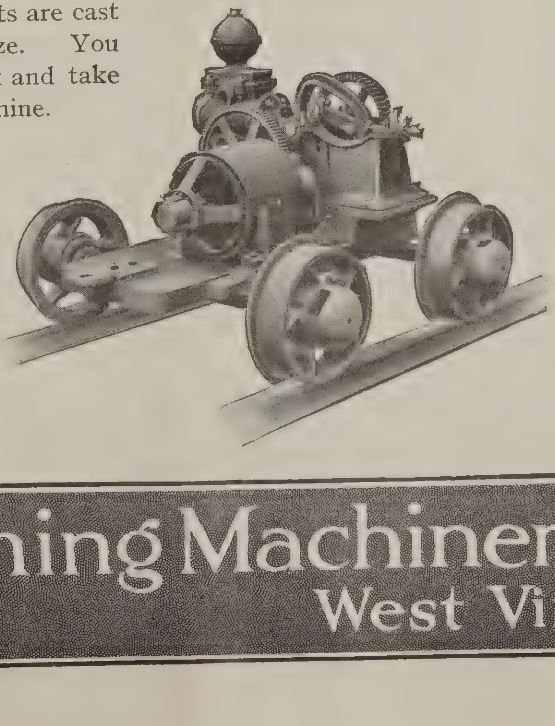

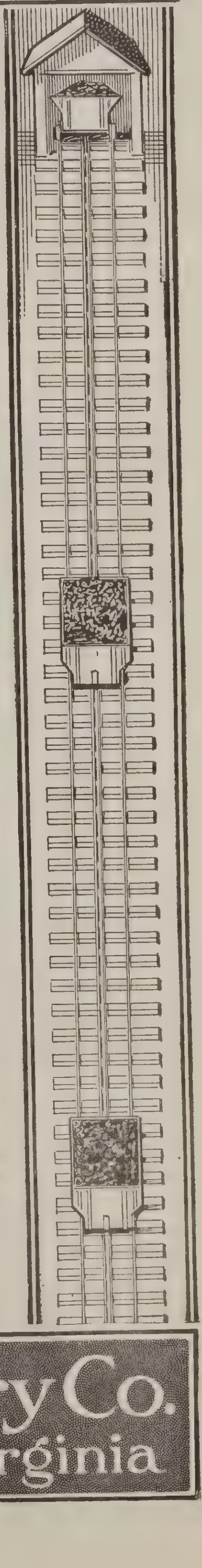

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Fairmont
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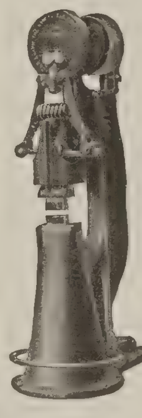

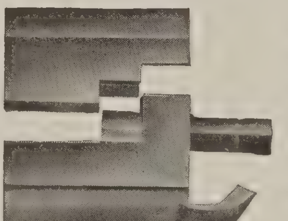

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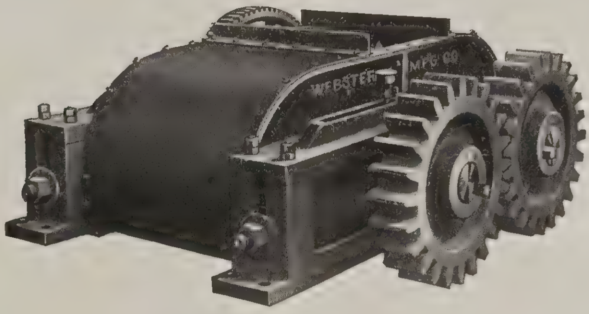

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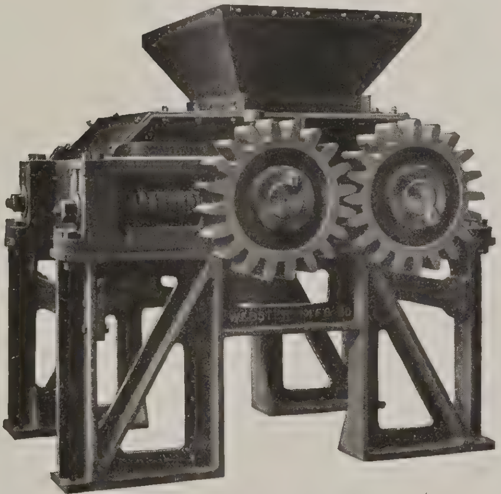

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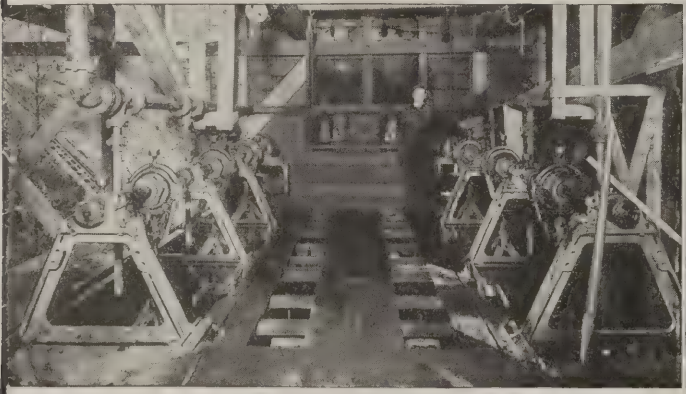

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